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Maija-Liisa Suihko
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Contents

Preface

The VTT Culture Collection is a collection of microorganisms and cell cultures, which is housed in the unit Biotechnology and Food Research of the Technical Research Center of Finland (VTT) and is mainly financed by VTT. It has been a member of the European Culture Collections' Organization (ECCO) since 1984, of the World Federation for Culture Collections (WFCC) since 1985 and was registered with the World Data Center for Microorganisms (WDC) in 1986 (number 139).

The first microbial strains were deposited in 1959. The current total holding is 2800 strains including 800 yeasts, 720 filamentous fungi and 1250 bacteria/archaea. The non-confidential strains are listed in this catalogue. The main services are:

- public and safe deposit of microorganisms
- delivery of pure cultures to industry and research
- identification of bacteria by API, FAME and RiboPrinter® databases

ORDERING AND DELIVERY

Orders for cultures will be accepted by letter, telephone, fax or Email and should be addressed to:

VTT Biotechnology and Food Research
Culture Collection
P.O. Box 1500
FIN-02044 VTT
FINLAND

Tel.: +358-9-456 5133
Fax: +358-9-455 2103
Email: maija-liisa.suihko@vtt.fi
URL: http://www.vtt.fi/bel/mib/index.htm
Research group: Proces Microbiology
from 1.1.2000: Detection and Control of Contaminants

The cultures are usually delivered as freeze-dried preparations. On request active cultures on solid or liquid media are also delivered.

The charge should be paid after receipt of the invoice. The charge for a freeze-dried ampoule requested in May 1999 is 320 FIM or 55 EUR or 60 US$ exclusive of VAT (22%). Postage

(transport) and handling charges are added. Active cultures have a special price depending on the culture. Charges are revised annually.

NOMENCLATURE

Fungi. The scientific names used for yeasts and filamentous fungi reflect current taxonomic practice. When both the anamorph and teleomorph names are available the strains are catalogued according to their teleomorph names. In cases when some strain has been well known before by its anamorph or synonym name, the appropriate cross-references are used for that species. No attempt is made to cover all synonyms or anamorphs.

Bacteria. The scientific names of bacteria are in accordance with the January 1999 upgraded list of *Bacterial Nomenclature* compiled by DSMZ. The names given in the *Approved Lists of Bacterial Names* are indicated by ^{AL} and those validly published after that are indicated by ^{VP}. Other names are invalid and if used are indicated by "invalid name".

ARRANGEMENT OF THE STRAIN DATA

The microbial groups are listed according to the letter code: A = brewer's yeasts, B = baker's yeasts, C = other yeasts, D = filamentous fungi and E = bacteria/archaea. The strains are listed alphabetically according to their scientific names. Within each species, strains are arranged numerically according to the three last numbers of their VTT accession numbers. The first two numbers correspond to the year of deposition.

Type strains are indicated by ^{T} at the end of the VTT code. The strains having an asterisk (*) before the code are distributed only for scientific purposes. Before delivery of such cultures a written agreement must be completed by the purchaser.

After the VTT code is the abbreviation of the collection or institute, with its accession number or its code in brackets, from which the strain was received, followed by former names in brackets. Next are given synonymous collection numbers and codes in brackets without any history, the source and location of isolation, additional information, studies at VTT followed by reference numbers in brackets, media and growth conditions used in brackets.

Espoo, May 1999

Maija-Liisa Suihko

ABBREVIATIONS OF COLLECTIONS, INSTITUTIONS AND COMPANIES

AB	Allied Breweries, UK
ABBC	Asahi Breweries Ltd, Japan
AJ	Ajinomoto Company, Inc., Central Research Laboratories, Kawasaki, Japan
ALKO	Research Laboratories, State Alcohol Monopoly, Helsinki, Finland. Now Primalco or RF
AMP	Australian Mycological Panel. Previously referred to as "Aust" or SN
ATCC	American Type Culture Collection, Manassas, Virginia, USA
ATHUM	Collection of Fungi, University of Athens, Department of Biology, Athens, Greece
AUCM	All-Union Collection of Microorganisms. Now VKM
B	Janssens Pharmaceutica, Beerse, Belgium
BAM	Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany.
BEL	VTT Biotechnology and Food Research, Espoo, Finland.
BICZAS	Institute of Biology, Czechoslovak Academy of Sciences. Same as BUCSAV
BBA	Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Mikrobiologie, Berlin, Germany
BGSC	Bacillus Genetic Stock Centre, Ohio State University, Columbus, Ohio, USA
BIO	VTT Biotechnical Laboratory. Now BEL
BKM	Same as VKM
BPE	Collection of the late Dr. B.P. Eddy, Low Temperature Research Station, Cambridge, UK. See also LTS
BRi	Brewing Research International, Lyttel Hall, Nutfield, Surrey, UK. Formerly BRFI
BU	Same as BUCSAV
BUCSAV	Botanical Institute of the Czechoslovak Akademy of Sciences, Prague, Czech Republic
CBS	Centraalbureau voor Schimmelcultures, Baarn, The Netherlands; CBS Yeast Division, Delft, The Netherlands
CCC	Adolph Coors Company, Research and Development Department, Golden, Colorado, USA
CCEB	Culture Collection of Entomogenous Bacteria, Czechoslovak Academy of Sciences, Department of Insect Pathology, Institute of Entomology, Prague, Czech Republic
CCM	Czech Collection of Microorganisms, Masaryk University, Brno, Czech Republic
CCRC	Culture Collection and Research Center, Food Industry Research and evelopment Institute, Hsinchu, Taiwan
CCTM	Centre de Collection de Type Microbien, Institut de Microbiologie, Université de Lausanne, Lausanne, Switzerland
CCUG	Culture Collection University of Göteborg, Department of Clinical Bacteriology, Göteborg, Sweden

CCY	Culture Collection of Yeasts, Institute of Chemistry, Slovak Academy of Sciences, Bratislava, Slovakia
CDC	Center for Disease Control (formerly Communicable Disease Centre), United States Public Health Service, Atlanta, Georgia, USA
CEB	Centre d'Etudes du Bouchet, Le Bouchet, France
CECT	Coleccion Espanola de Cultivos Tipo, Universidad de Valencia, Edificio de Investigacion, Burjasot (Valencia), Spain
CIP	Collection des Bactéries de l´Institut Pasteur, Paris, France.
CLMR	Central Laboratory, South Manchuria Railway Company, Dairen, Manchuria
CMIM	Central Museum of Industrial Microorganisms. Same as VKPM
CN	Wellcome Collection of Bacteria, Burroughs Wellcome Research Laboratories, Beckenham, Kent, UK
CNCM	Collection Nationale de Cultures de Microorganismes, Paris, France
CNCTC	Czech National Collection of Type Cultures, National Institute of Public Health, Prague, Chech Republic. Same as IEM.
CUB	Actinomycetes Culture Collection, School of Applied Biology, University of Bradford, Yorkshire, UK
DBVPG	Collezione dei Lieviti Industriali, Dipartamento di Biologia Vegetale, Universitá di Perugia, Perugia, Italy
DBM	Department of Biochemistry and Microbiology, University of Chemical Technology, Prague, Czech Republic
DSM	DSMZ-Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Braunschweig, Germany
EBC	European Brewery Convention
EELA	National Veterinary and Food Research Institute, Helsinki, Finland
EKT	Department of Applied Chemistry and Microbiology, Division of Food Chemistry and Technology, University of Helsinki, Helsinki, Finland
ELI	VTT Food Research Laboratory. Now BEL
ELTDK	Faculty of Veterinary Medicine, Department of Food and Environmental Hygiene, University of Helsinki, Helsinki, Finland
EMPA	Eidgenössische Materialprüfungs- und Versuchsanstalt, St. Gallen, Switzerland
ETH	Eidgenössische Technische Hochschule, Institut für spezielle Botanik, Zürich, Switzerland
FAT	Department of Acricultural Chemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan
FDA	US Food and Drug Administration, Washington, DC, USA
FERM	Fermentation Research Institute, Agency of Industrial Science and Technology, Ministry of Industrial Trade and Industry, Chiba, Japan
FGSC	Fungal Genetic Stock Center, Department of Microbiology, University of Kansas Medical Center, Kansas City, Kansas, USA
FIRDI	Food Industry Research and Development Institute, Hsinchu, Taiwan, China

FMJ	Faculty of Medicine, Juntendo University, Tokyo, Japan
FPRL	Forest Products Research Laboratory, Forest Service, US. Department of Agriculture, Madison, WI, USA
FRR	Division of Food Research, CSIRO, North Ryde, New South Wales, Sydney, Australia
HAMBI	Culture Collection of the Faculty of Agriculture and Forestry, Department of Applied Chemistry and Microbiology, University of Helsinki, Helsinki, Finland
HMS	Hopkins Marine Station of Stanford University, Pacific Grove, California, USA
HY	University of Helsinki, Helsinki, Finland
MMKEM	Department of Applied Chemistry and Microbiology, Division of Microbiology, Helsinki, Finland
IAM	Institute of Applied Microbiology, University of Tokyo, Tokyo, Japan
ICE	Icelandic Fisheries Laboratories, Reykjavik, Iceland
ICMP	International Collection of Microorganisms from Plants, DSIR Mount Albert Research Centre, Auckland, New Zealand. Formerly PDDCC.
ICPB	International Collection of Phytopathogenic Bacteria, University of California, Davis, California, USA
IEM	Institute of Epidemiology and Microbiology, Czech Republic. Same as CNCTC
IFG	Institut für Gärungsgewerbe, Berlin, Germany
IFO	Institute for Fermentation, Osaka, Japan
IGC	Portuguese Yeast Culture Collection. Now PYCC
IID	Institute of Medical Science, Laboratory Culture Collection (formerly Institute for Infectious Diseases), University of Tokyo, Tokyo, Japan
IMB	Institut für Mykologie. Same as BBA
IMET	Nationale Kulturensammlung für Mikroorganismen, Zentralinstitut für Mikrobiologie und Experimentelle Therapie. Now DSMZ-Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Jena, Germany
IMI	International Mycological Institute, Now: Genetic Resources Collection, CABI Bioscience UK Centre (Egham), Bakeham Lane, Egham, Surrey, UK.
IMRU	Institute of Microbiology, Rutgers State University, New Brunswick, New Jersey, USA
IP	Institut Pasteur, Paris, France
IPV	Institute of Plant Pathology, University of Milano, Milano, Italy
ISP	International Streptomyces Project, Ohio Wesleyan University, Delaware, Ohio, USA
ITI	Same as TII
IZ	Instituto Zimotecnico Universidade de Sao Paulo, Sao Paulo, Brazil
JCM	Japan Collection of Microorganisms, Institute for Physical and Chemical Research (RIKEN), Hirosawa, Wako, Saitama, Japan
KCC	Culture Collection of Actinomycetes, Kaken Pharmaceutical Co., Ltd., Tokyo, Japan

KCTC	Korean Collection of Type Cultures, Genetic Engineering Center, Korea Institute of Science and Technology (KIST), Seoul, Korea
KEKI	Central Food Research Institute, Budapest, Hungary
KFA	Kernforschungsanlage, Jülich, Germany
KM	Kansai Medical School, Osaka, Japan
KTL	National Public Health Institute, Helsinki, Finland
KY	Tokyo Research Laboratory, Kyowa Hakko Kogyo Company Ltd., Tokyo, Japan
LBG	Institut für Landwirtschaftliche Bakteriologie und Gärungsbiologie, Eidgenössische Technische Hochschule, Zürich, Switzerland
LCP	Museum National d'Histoire Naturelle, Laboratoire de Cryptogamie, Paris, France
LMD	Laboratory of Microbiology and Enzymology, Delft University of Technology, Delft, The Netherlands
LMG	Laboratorium voor Microbiologie, BCCM/LMG Bacteria Collection, Universiteit Gent, Gent, Belgium
LSHB	London School of Hygiene and Tropical Medicine, London, UK
LTS	Low Temperature Research Station, Cambridge, UK. See also BPE
LSHTM	London School of Hygiene and Tropical Medicine, Mycological Reference Laboratory, London, UK
METLA	Finnish Forest Research Institute, Vantaa Research Centre,Vantaa, Finland
MTTK	Agricultural Research Centre, Institute of Plant Pathology, Jokioinen, Finland
MUCL	Mycoteque de l'Universite Catholique de Louvain, Louvain-la-Neuve, Belgium
NCA	National Canner's Association, Washington, DC, USA
NCDC	Same as CDC
NCDO	National Collection of Dairy Organisms. Now NCFB
NCFB	National Collection of Food Bacteria. Relocated to NCIMB
NCIB	National Collection of Industrial Bacteria. Now NCIMB
NCIMB	National Collections of Industrial and Marine Bacteria Ltd, Aberdeen, Scotland, UK
NCMB	National Collection of Marine Bacteria. Now NCIMB
NCPF	National Collection of Pathogenic Fungi, PHLS Mycological Reference Laboratory, Public Health Laboratory, Bristol, UK
NCPPB	National Collection of Plant Pathogenic Bacteria, Central Science Laboratory, York, UK
NCTC	National Collection of Type Cultures, PHLS Central Public Health Laboratory, London, UK
NCYC	National Collection of Yeast Cultures, ReNo Ltd, c/o Institute of Food Research, Norwich Research Park, Colney, Norwich, UK
NDRC	National Defense Research Committee, Washington, DC, USA
NEP	New England Biolabs, Beverly MA, USA
NI	Nagao Institute, Tokyo, Japan
NIH	National Institute of Health, Bethesda, Maryland, USA
NIZO	Netherlands Institute of Dairy Research, Ede, The Netherlands

NRC	National Research Council, Ottawa, Ontario, Canada. Same as NRCC
NRCC	Same as NRC
NRRL	Agricultural Research Service Culture Collection, National Center for Acricultural Utilization Research, Peoria, Illinois, USA
NZDRI	New Zealand Dairy Research Institute, Palmerston North, New Zealand
NZRCC	New Zealand Reference Culture Collection, DSIR Plant Diseases Division, Auckland, New Zealand
OUT	Department of Biotechnology, Graduate School of Engineering, Osaka University, Suita, Osaka, Japan
PCI	Penicillin Control and Immunology Section, Food and Drug Administration, Washington, DC, USA
PDDCC	Plant Diseases Division Culture Collection. Now ICMP
PMS	University of Canterbury, New Zealand
Primalco	Primalco Ltd Biotec, Rajamäki, Finland
PRL	Prairie Regional Laboratory, Saskatoon, Saskatchewan, Canada
PSA	Progetto Sistematica Actinomiceti, Institute of Microbiology, Milano University, Milano, Italy
PUU	VTT Forest Products Laboratory. Now RTE
PYCC	Portuguese Yeast Culture Collection, SA Biotecnologia, Fac. Ciencias e Tecnologia/UN, Monte de Caparica, Portugal
PZH	Collection of Cultures, Institute of Hygiene, Warsaw, Poland
QM	Pioneering Research Division (formerly Quartermaster Research and Development Center), US Army Natick Laboratories, Natick, Massachusetts, USA
RF	Röhm Enzyme Finland Oy, Rajamäki, Finland
RH	Collection of Dr. R. Hugh, George Washington University, Washington, DC, USA
RIA	Russia Research Institute for Antibiotics, Moscow, Russia
RIB	National Research Institute of Brewing, Hiroshima, Japan
RIBM	Research Institute for Brewing and Malting, Prague, Czech Republic
RTE	VTT Building Technology, Espoo, Finland
RUT	Rutgers University. See IMRU
RV	Collection of Leptospira Strains, Instituto Superiore di Sanita, Roma, Italy
TC	Thaxter Collection, Farlow Herbarium, Harvard University, Cambridge, Massachusetts, USA
TII	Technological Institute of Iceland, Reykjavik, Iceland
TKK	Helsinki University of Technology, Espoo, Finland
TTKY	Technical University of Tampere, Tampere, Finland
TY	University of Turku, Turku, Finland
UAMH	University of Alberta, Mold Herbarium and Culture Collection, Edmonton, Alberta, Canada
UCD	University of California, Department of Food Science and Technology, Davis, USA
UMIST	University of Manchester, Institute of Science and Technology

UNCC	Actinoplanaeae Culture Collection, University of North Columbia, Chapel Hill, NC, USA
USCC	University of Surrey Culture Collection, Department of Microbiology, Guidford, UK
USDA	United States Department of Agriculture, Agricultural Research Service, Southern Regional Research Center, New Orleans, LA, USA
VKM	Russian Collection of Microorganisms, Institute of Biochemistry and Physiology of Microorganisms, Pushchino (Moscow Region), Russia
VKPM	Russian National Collection of Industrial Microorganisms, GNII Genetika, Moscow, Russia
VLB	Versuchs- und Lehranstalt für Brauerei, Institut für Gärungsgewerbe, Berlin, Germany. See IFG
VPI	Virginia Polytechnical Institute and State University, Blacksburg, Virginia, USA
VTT	Technical Research Centre of Finland, Espoo, Finland.
WB	University of Wisconsin, Department of Bacteriology, Madison, Wisconsin, USA

BREWER´S YEASTS

Bottom fermenting

Top fermenting

Bottom fermenting

A-59001 Finnish brewery. High attenuation. Studies on brewing properties (60, 502, 507) and lipids (98). (Medium 1, 25°C)

A-59002 Finnish brewery. Stockholms bryggeri. Studies on brewing properties (60, 507). (Medium 1, 25°C)

A-59003 Finnish brewery. Good fermentation rate. Studies on brewing properties (60, 502, 507) and lipids (98). (Medium 1, 25°C)

A-62004 Finnish brewery (K). High attenuation. High formation of diacetyl. Good formation of higher alcohols. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-62005 Finnish brewery (Weihenstephan L). Studies on brewing properties (60, 507). (Medium 1, 25°C)

A-62006 Finnish brewery. (München, Augustina). Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-62008 Finnish brewery (2). High formation of diacetyl. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-59009 Finnish brewery (Orion D). Good fermentation rate. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-60010 VLB (Rüg). Studies on brewing properties (60, 502, 507) and continuous fermentation (4, 15). (Medium 1, 25°C)

A-61011 BIO (Dortmund R_1). Non-flocculent. High formation of higer alcohols, 4-vinyl phenol and 4-vinyl guaiacol. Studies on properties (60, 507). (Medium 1, 25°C)

A-60012 EBC Yeast Group (Weihenstephan 1). Slow fermentation rate. Low attenuation. Studies on properties (60, 507). (Medium 1, 25°C)

A-62013 EBC Yeast Group (Weihenstephan 294). Studies on properties (60, 507). (Medium 1, 25°C)

A-60014 VLB (UD1). Non-flocculent. Good fermentation rate. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-62016 BIO (10F). Isolated from VTT A-60010. High formation of higher alcohols. Studies on pH and agitation (57), brewing properties (60, 297, 502, 507), pH and recycling (65), lipids (98) and xylulose fermentation (159, 181). (Medium 1, 25°C)

A-66017 Finnish brewery (Berlin W). Non-flocculent. Good fermentation rate. High attenuation. High formation of esters. Good formation of higher alcohols. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-66018 Finnish brewery (W 100 WA). Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-62019 BIO (10E). Isolated from VTT A-60010. Studies on continuous fermentation (4, 15), flavour compounds (5, 6, 8, 9, 10, 12, 13, 15, 16, 19), nitrogenous compounds (11), brewing properties (60, 507), pH and recycling (65) and lipids (98). (Medium 1, 25°C)

A-62020 BIO (10N). Isolated from VTT A-60010. Very early and strong flocculation. Very slow fermentation. Very low attenuation. Studies on continuous fermentation (4, 15), flavour compounds (5, 6, 8, 9, 10, 12, 13, 15, 16), nitrogenous compounds (11), stirred batch fermentation (27), brewing properties (60, 507), pH and recycling (65). (Medium 1, 25°C)

A-59021 Finnish brewery (Orion). Studies on brewing properties (507). (Medium 1, 25°C)

A-66023 BIO. Isolated from beer. Good fermentation rate. Studies on brewing properties (60, 297, 502, 507). (Medium 1, 25°C)

A-69025 Finnish brewery. High formation of esters. Studies on brewing properties (60, 502, 507), pH and recycling (65), lipids (98) and detection of contaminants (340). (Medium 1, 25°C)

A-59026 Weihenstephan 26. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-66027 EBC Yeast Group (Weihenstephan A). Good fermentation rate. Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-66028 EBC Yeast Group (Weihenstephan B). Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-71037 Finnish brewery (W3). Studies on stirred batch fermentation (27) and brewing properties (507). (Medium 1, 25°C)

A-72039 Finnish brewery (Jörgensen 2094). Studies on brewing properties (60, 502, 507). (Medium 1, 25°C)

A-73040 Finnish brewery (Jörgensen 2153). High formation of diacetyl. Studies on pH and agitation (57), pH and recycling (65), lipids (98) and brewing properties (502, 507). (Medium 1, 25°C)

A-70041 Finnish brewery. Studies on brewing properties (507). (Medium 1, 25°C)

A-70042 Finnish brewery. Non-flocculent. Studies on brewing properties (507). (Medium 1, 25°C)

A-59044 Weihenstephan 44. Studies on brewing properties (60, 502, 507) and lipids (98). (Medium 1, 25°C)

A-75050 Swedish brewery. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-74058^{T} NCYC 396 (= CBS 1513 = IFO 1167 = NRRL Y-12693 = Carlsberg lager Strain 1). Type strain for *Saccharomyces carlsbergensis*. Non-flocculent. High formation of diacetyl. Studies on brewing properties (507). (Medium 1, 25°C)

A-74059 NCYC 529 (= Weinfurtner 4). Studies on brewing properties (507). (Medium 1, 25°C)

A-82063 ATCC 26602 (= CCY 48-88 = NRRL Y-11857 = NRRL Y-11877 = Rose SA 23). Isolated from sugar refinery sample. High alcohol production from cane molasses. Sugar tolerant. Ethanol production at elevated temperatures. Very slow fermentation. Very low attenuation. Studies on xylulose fermentation (159, 181) and brewing properties (507). (Medium 1, 25°C)

A-66065 ATCC 9080 (= ATCC 24904 = BICZAS 0323/1 = CCY 48-76 = CBS 2354 = IFO 0565 = NCYC 74 = DSM 70424 = Hillman Hospital strain 4228). Assay of inositol, pantothenic acid and pyridoxine. Maltose fermentation studies. α-glucosidase synthesis. 2μ plasmid negative. Produces ergosterol, endo-DNase A and niacin. Diploid. High formation of 4-vinyl phenol and 4-vinyl guaiacol. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-59066 Weihenstephan 66. Good fermentation rate. Studies on brewing properties (60, 502, 507) and lipids (98). (Medium 1, 25°C)

A-85068 ALKO 409 (= NCYC 1047). British brewery. High formation of acetaldehyde. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-85069 ALKO 410 (= NCYC 1146). Non-European brewery. High formation of acetaldehyde. Studies on brewing properties (507). (Medium 1, 25°C)

A-85070 ALKO 412 (= NCYC 1322). British brewery. Non-flocculent. High formation of esters. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-85071 ALKO 413 (= NCYC 1324). British brewery. Non-flocculent. Good fermentation rate. High attenuation. High formation of esters. Good formation of higher alcohols. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-94125 Finnish brewery (American yeast). Fast fermentation rate. High attenuation. Good formation of higher alcohols. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-94126 Finnish brewery (Danish yeast). Fast fermentation rate. Good formation of higher alcohols. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-94127 Finnish brewery (American yeast). High formation of esters. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-94128 Finnish brewery (Czech yeast). Non-flocculent. Fast fermentation rate. High formation of esters. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-94129 Finnish brewery (Czech yeast). High formation of acetaldehyde. Studies on brewing properties (502, 507). (Medium 1, 25°C)

A-95145 Finnish brewery (French yeast). (Medium 1, 25°C)

GMO strains

* A-87076 BIO. Strain VTT A-63015 carrying the α-*ald* gene of *Klebsiella terrigena* VTT E-74023 in the vector pET 13.1 (= plasmid pKB003, *ADH1* promoter and terminator). Studies on construction and brewing properties (327, 330, 346, 391, 395, 474). US patent 5108925 and FI patent 92333. (Medium 43, 25°C)

* A-88086 BIO (91 I). Strain VTT A-63015 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* promoter and terminator. Studies on construction and brewing properties (313, 314, 330, 346, 380, 391, 395, 474). US patent 5108925 and FI patent 92333. (Medium 1, 25°C)

* A-88088 BIO (18). Strain VTT A-63015 carrying the α-*ald* gene of *Enterobacter aerogenes* VTT E-87292 in the vector pET 13.1 (= plasmid pKB009, *ADH1* promoter and terminator). Studies on construction and brewing properties (327, 330, 346, 391, 395). US patent 5108925. (Medium 43, 25°C)

* A-88090 BIO (177 I). Strain VTT A-63015 integrated with the α-*ald* gene (of *Enterobacter aerogenes* VTT E-87292) expression casette including *ADH1* promoter and terminator. Studies on construction and brewing properties (313, 314, 330, 346, 380, 391, 395, 453). US patent 5108925. (Medium 1, 25°C)

* A-88091 BIO (296). Strain VTT A-63015 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* promoter and terminator. Studies on construction and brewing properties (330, 346, 380, 395, 453, 513). (Medium 1, 25°C)

* A-93111 BIO (3). Strain VTT A-63015 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* "middle" promoter and terminator. *ADH1* locus. Copy number 1. Studies on construction and brewing properties (513). (Medium 1, 25°C)

* A-93112 BIO (4). Strain VTT A-63015 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* "middle" promoter and terminator. *ADH1* locus. Copy number 1. (Medium 1, 25°C)

* A-94134 BEL (129.1.2 = 462/2) Strain VTT A-63015 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* "middle" promoter and terminator. *ADH1* locus. Copy number 1. (Medium 1, 25°C)

* A-97157 BEL (964.2.1.2). Strain A-66024 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* promoter and terminator. Studies on construction and brewing properties. (Medium 1, 25°C)

* A-97158 BEL (1334.2.1.1). Strain A-66024 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* "middle" promoter and terminator. *ADH1* locus. Studies on construction and brewing properties. (Medium 1, 25°C)

* A-97159 BEL (1334.2.1.10). Strain A-66024 integrated with the α-*ald* gene (of *Klebsiella terrigena* VTT E-74023) expression casette including *ADH1* "middle" promoter and terminator. *ADH1* locus. Studies on construction and brewing properties. (Medium 1, 25°C)

Top fermenting

A-60055 NCYC 1200. Non-flocculent. High attenuation. High formation of esters. Studies on immunology (22, 24, 177) and brewing properties (507, 508). (Medium 1, 25°C)

A-60056 NCYC 240 (Whitbread strain) (= MUCL 30938). Restriction analysis of 2m plasmid. Oxygen requirement 40 ppm. Maltotriose is fermented slowly. Proved to be stable in BRI brewery. Studies on immunology (22, 24, 177), lipids (132, 164), use as host strain (258) and brewing properties (507, 508). (Medium 1, 25°C)

A-80061 BIO (British yeast). Non-flocculent. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-81062 BIO (British yeast). Good flocculation. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-83067 BIO (British yeast). Non-flocculent. High attenuation. Used for beer fermentation in bottles. Contains POF-gene (phenolic off-flavour). Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-91103 Hefebank Weihenstephan 312. Slow fermentation rate. Low attenuation. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93113 NCYC 1026 (= ATCC 46785 = NRRL Y-11875). Good flocculation. High formation of acetaldehyde. Used commercially in Tower Fermenters (continuous process). Oxygen requirement 8 ppm. Contains 2m plasmid. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93114 NCYC 1028. Good flocculation. Chain former. High formation of acetaldehyde. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93115 NCYC 1063. Good flocculation. Used in fermentation of stout. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93116 NCYC 1087. Head forming Yorkshire Square Stone type. Very early and strong flocculation. Very slow fermentation. Low attenuation. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93117 NCYC 1245. High attenuation. Used commercially in conical batch fermenters. Oxygen requirement 40 ppm. Contains 2m plasmid. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93118 NCYC 1258. Very early and strong flocculation. Very slow fermentation. Low attenuation. High formation of acetaldehyde, 4-vinyl phenol and 4-vinyl guaiacol. Used in Tower Continuous Fermenters. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93119 NCYC 1333. Good flocculation. Head-forming Yorkshire Stone Square type recommended for bottled pale ale. Oxygen requirement about 40 ppm. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93120 NCYC 1335. Very high formation of 4-vinyl phenol and 4-vinyl guaiacol. Used in fermentation of stout. Oxygen requirement >40 ppm. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93121 NCYC 1681. High formation of acetaldehyde. Very high formation of 4-vinyl phenol and 4-vinyl guaiacol. Used in pilot scale fermenters. Bottom cropping. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-93122 NCYC 2397. Darley's strain. Non-flocculent. Fast fermentation rate. High attenuation. High formation of diacetyl. Very high formation of 4-vinyl phenol and 4-vinyl guaiacol. Fast fermenter. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94124 Hefebank Weihenstephan 68. Good flocculation. Fast fermentation rate. High formation of higer alcohols, 4-vinyl phenol and 4-vinyl guaiacol. Used for production of beer from wheat. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94130 Finnish brewery. High formation of esters and higher alcohols. Ferments good also at 10°C. Studies on brewing properties (507). (Medium 1, 25°C)

A-94131 Finnish brewery. Fast fermentation rate. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94132 Finnish brewery (British yeast). Fast fermentation rate. High formation of esters and higher alcohols. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94133 Finnish brewery (Australian yeast). Good fermentation also at 10°C. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94135 Finnish brewery (Danish yeast). High formation of 4-vinyl phenol and 4-vinyl guaiacol. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94136 Finnish brewery (British yeast). Non-flocculent. High attenuation. High formation of esters, higher alcohols, 4-vinyl phenol and 4-vinyl guaiacol. Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94137 Finnish brewery (Danish yeast). Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94138 Finnish brewery (Danish yeast). High formation of esters. Very high formation of 4-vinyl phenol and 4-vinyl guaiacol. Studies on brewing properties (507, 508) (Medium 1, 25°C)

A-94139 Finnish brewery (British yeast). Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-94140 Finnish brewery (British yeast). Studies on brewing properties (507, 508). (Medium 1, 25°C)

A-95144 Finnish brewery (French yeast). (Medium 1, 25°C)

A-98162 Finnish brewery (British yeast). (Medium 1, 25°C)

A-98166 Finnish brewery (British yeast). (Medium 1, 25°C)

BAKER’S YEASTS

B-62001 BIO. Finnish yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-67002 Oy W. Rosenlew Ab. Used for production of commercial baker's yeast from sulphite waste liquor. Studies on baker's yeast (25) and fodder yeast production (30). (Medium 2, 25°C)

B-62003 Oy Lahden Polttimo Ab. (Medium 2, 25°C)

B-63004 Oy Lahden Polttimo Ab. (Medium 2, 25°C)

B-65005 BIO. Swedish yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-65006 BIO. Swedish yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-67007 Oy W. Rosenlew Ab. Austrian yeast. Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-67008 Oy W. Rosenlew. Swedish yeast. Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-67009 Oy W. Rosenlew Ab. Esthonian yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-67010 Oy Lahden Polttimo Ab. Danish yeast. Studies on baker's yeast production (7, 25), fluoridization (14) and immunology (22, 24, 177). (Medium 2, 25°C)

B-67011 Oy W. Rosenlew Ab. Dutch yeast. Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-67012 Oy W. Rosenlew Ab. Dutch yeast. Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-67013 Oy W. Rosenlew Ab (VJ 69 57-59-60). Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-68015 Oy Lahden Polttimo Ab. Norwegian yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-69016 Oy Lahden Polttimo Ab. Norwegian yeast. Studies on baker´s yeast production (25). (Medium 2, 25°C)

B-69017 Oy Lahden Polttimo Ab. British yeast. Studies on baker´s yeast production (25), immunology (22, 24, 177), semicontinuous cultivation (55, 83), contamination (69, 80, 140), lipids (98) and xylulose fermentation (159, 181). (Medium 2, 25°C)

B-70019 Oy Lahden Polttimo Ab. German yeast. Studies on baker´s yeast production and acid tolerances (25, 50, 54, 188). (Medium 2, 25°C)

B-72020 Oy Lahden Polttimo Ab. Swedish yeast. Studies on baker's yeast production and acid tolerances (50, 54, 188). (Medium 2, 25°C)

B-72021 BIO. Finnish yeast. (Medium 2, 25°C)

B-72022 Oy Lahden Polttimo Ab. Austrian yeast. Studies on baker's yeast production and acid tolerances (50, 54, 188). (Medium 2, 25°C)

B-73023 Oy Lahden Polttimo Ab. Austrian yeast. Studies on baker's yeast production and acid tolerances (50, 54, 188). (Medium 2, 25°C)

B-74026 BIO. Hungarian yeast. (Medium 2, 25°C)

B-74027 Oy Lahden Polttimo Ab. Austrian/Danish yeast. (Medium 2, 25°C)

B-75028 Oy Lahden Polttimo Ab. Swedish yeast. (Medium 2, 25°C)

B-75029 Oy Lahden Polttimo Ab. Danish yeast. (Medium 2, 25°C)

B-72030 Oy Lahden Polttimo Ab. German yeast. (Medium 2, 25°C)

B-72031 Oy Lahden Polttimo Ab. Polish yeast. (Medium 2, 25°C)

B-74032 Oy Lahden Polttimo Ab. Swedish yeast. (Medium 2, 25°C)

B-74033 Oy Lahden Polttimo Ab. Austrian yeast. (Medium 2, 25°C)

B-75034 Oy Lahden Polttimo Ab. Danish yeast. (Medium 2, 25°C)

B-76035 Oy Lahden Polttimo Ab. Swedish yeast. (Medium 2, 25°C)

B-76036 Oy Lahden Polttimo Ab (DHW Universal). (Medium 2, 25°C)

B-78045 BIO. Polish yeast. (Medium 2, 25°C)

B-79046 Oy Lahden Polttimo Ab. Austrian yeast. (Medium 2, 25°C)

B-81047 ALKO 743 (B I Lh 524 = MK270 = DSM 5600). Studies on xylulose fermentation (159, 181) and interactions of microbes in preferment (504). (Medium 2, 25°C)

B-82048 Oy Lahden Polttimo Ab. Japanese yeast. (Medium 2, 25°C)

* B-96078 ALKO. Austrian yeast. (Medium 2, 25°C)

* B-96079 ALKO 1496 (*Saccharomyces cerevisiae* var. *ellipsoideus*). Received from CBS at the end of 1940s. (Medium 2, 25°C)

* B-96080 ALKO 1497. Received from CBS at the end of 1940s. (Medium 2, 25°C)

* B-96081 ALKO 1500. Finnish yeast. (Medium 2, 25°C)

* B-96082 ALKO 1501. Dutch yeast. (Medium 2, 25°C)

* B-96083 ALKO 1502. Dutch yeast. (Medium 2, 25°C)

* B-96084 ALKO 1567. Swedish yeast. (Medium 2, 25°C)

* B-96085 ALKO 1570. Estonian yeast. (Medium 2, 25°C)

* B-96086 ALKO 1608. Dutch yeast. (Medium 2, 25°C)

* B-96087 ALKO 1637. Finnish yeast. (Medium 2, 25°C)

* B-96088 ALKO 1640. German yeast. (Medium 2, 25°C)

* B-96089 ALKO 1644. American yeast. (Medium 2, 25°C)

* B-96090 ALKO 1669. Zulu´s kaffer yeast. (Medium 2, 25°C)

* B-96091 ALKO 2331. Danish sugar dough yeast. (Medium 2, 25°C)

* B-96092 ALKO 2364 (*Torulaspora delbrueckii*). Finnish sour dough yeast. (Medium 2, 25°C)

* B-96093 ALKO 2438. French sugar dough yeast. (Medium 2, 25°C)

* B-96094 ALKO 2441. British frozen dough yeast. Strong aroma. (Medium 2, 25°C)

* B-96095 ALKO 3045. American salt and sour dough yeast. (Medium 2, 25°C)

* B-96096 ALKO 3103. Japanese frozen dough yeast. (Medium 2, 25°C)

* B-96097 ALKO 3170. British frozen dough yeast. (Medium 2, 25°C)

* B-96098 ALKO 3261. Japanese yeast. (Medium 2, 25°C)

* B-96099 ALKO 3278. Japanese yeast. (Medium 2, 25°C)

* B-96100 ALKO 3503 (= h228 = R206). Hybrid (ALKO 1700 MATa x ALKO 582 MATα). Diploid a/α. Frozen dough yeast. (Medium 2, 25°C)

* B-96101 ALKO 3656 (= NCYC 847). French yeast. US Pat Appl 863950 and 863952. (Medium 2, 25°C)

* B-96102 ALKO 3658 (= NCYC R30). French yeast. Patent strain. (Medium 2, 25°C)

* B-96103 ALKO 4035. Dutch frozen dough yeast. (Medium 2, 25°C)

B-96105 ALKO 572. American active dry yeast. (Medium 2, 25°C)

B-96106 ALKO 573. American active dry yeast. (Medium 2, 25°C)

B-96107 ALKO 574. American active dry yeast. (Medium 2, 25°C)

B-96108 ALKO 575. American active dry yeast. (Medium 2, 25°C)

B-96109 ALKO 576. Dutch dry yeast. (Medium 2, 25°C)

B-96110 ALKO 577. British active dried yeast. (Medium 2, 25°C)

B-96111 ALKO 578. American dry yeast. (Medium 2, 25°C)

B-96112 ALKO 579. German dry yeast. (Medium 2, 25°C)

B-96113 ALKO 580. Danish dry yeast. (Medium 2, 25°C)

B-96114 ALKO 581. German dry yeast. (Medium 2, 25°C)

B-96115 ALKO 582. French instant dry yeast. (Medium 2, 25°C)

B-96116 ALKO 588. Chinese yeast. (Medium 2, 25°C)

B-96117 ALKO 597. British dry yeast. (Medium 2, 25°C)

B-96118 ALKO 743 (= DSM 5600 = B-81047). Swedish yeast. (Medium 2, 25°C)

B-96119 ALKO 759. British dry yeast. (Medium 2, 25°C)

B-96120 ALKO 804. American fresh yeast. (Medium 2, 25°C)

B-96121 ALKO 913. Dutch instant yeast. (Medium 2, 25°C)

B-96122 ALKO 981. Polish yeast. (Medium 2, 25°C)

B-96123 ALKO 1171. Dry yeast from Iraq. (Medium 2, 25°C)

B-96124 ALKO 1172. Dry yeast from Sudan. (Medium 2, 25°C)

B-96125 ALKO 1174. German granulated yeast. (Medium 2, 25°C)

B-96126 ALKO 1175. Dry yeast from Angola, Mosambique. (Medium 2, 25°C)

B-96127 ALKO 1376. Dutch dry yeast. (Medium 2, 25°C)

B-96128 ALKO 1467. Dry yeast from Libya. (Medium 2, 25°C)

B-96129 ALKO 1495 (= Carlsberg 245). Carlsberg Laboratorium, Copenhagen, Denmark. Diploid. (Medium 2, 25°C)

B-96130 ALKO 1513. Austrian yeast. (Medium 2, 25°C)

B-96131 ALKO 1517. Austrian yeast. (Medium 2, 25°C)

B-96132 ALKO 1519. Tower fresh yeast from a spirit factory in Delhi, India. (Medium 2, 25°C)

B-96133 ALKO 1520. Tower fresh yeast from a spirit factory in Bombay, India. (Medium 2, 25°C)

B-96134 ALKO 1538. Dutch yeast. (Medium 2, 25°C)

B-96135 ALKO 1545. American dry yeast. (Medium 2, 25°C)

B-96136 ALKO 1546. Austrian yeast. (Medium 2, 25°C)

B-96137 ALKO 1547. American dry yeast. (Medium 2, 25°C)

B-96138 ALKO 1548. Dutch yeast. (Medium 2, 25°C)

B-96139 ALKO 1550. Norwegian yeast. Flocculates strongly. (Medium 2, 25°C)

B-96140 ALKO 1551. Danish yeast. (Medium 2, 25°C)

B-96141 ALKO 1552. Swedish yeast. (Medium 2, 25°C)

B-96142 ALKO 1555. British yeast.(Medium 2, 25°C)

B-96143 ALKO 1556. British dry yeast. (Medium 2, 25°C)

B-96144 ALKO 1559. Austrian yeast. (Medium 2, 25°C)

B-96145 ALKO 1560. German yeast. (Medium 2, 25°C)

B-96146 ALKO 1561. Russian yeast. (Medium 2, 25°C)

B-96147 ALKO 1562. Swedish dry yeast. (Medium 2, 25°C)

B-96148 ALKO 1563. Swedish dry yeast. (Medium 2, 25°C)

B-96149 ALKO 1566. Norwegian yeast. (Medium 2, 25°C)

B-96150 ALKO 1569. Russian yeast. (Medium 2, 25°C)

Available are also the following strains from the formerly ALKO collection:

ALKO 1172, 1479, 1498, 1499, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1512, 1514, 1515, 1537, 1539, 1540, 1541, 1542, 1543, 1544, 1553, 1554, 1558, 1564, 1565, 1571, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1633, 1634, 1635, 1636, 1639, 1641, 1643, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1688, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1760, 1901, 1980, 2186, 2207, 2208, 2246, 2247, 2282, 2330, 2343, 2344, 2345, 2346, 2348, 2349, 2366, 2437, 2439, 2456, 2516, 2713, 2714, 2863, 2880, 3031, 3044, 3053, 3054, 3262, 3263, 3264, 3265, 3279, 3461, 3462, 3463, 3464, 3466, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3491, 3492, 3493, 3494

OTHER YEASTS

Brettanomyces anomalus Custers
See *Dekkera anomala*

Candida albicans (Robin) Berkhout

C-75003 HY, Department of Serobacteriology. (Medium 3, 25°C)

C-85161 ATCC 10231 (= DSM 1386 = CBS 6431 = IFO 1594 = NCYC 1363 = NCPF 3179 = NIH 3147 = ELI 506). Isolated from bronchomycosis. Sterility testing. Assay of haloprogin, amphotericin B, nystatin and anti-microbial preservatives. Produces phenethyl alcohol and tryptophol. (Medium 3, 25°C)

C-96263 DSM 1665 (= ATCC 2091 = CBS 2730 = IFO 1393 = NCYC 854 = CIP 1180.79 = NRRL Y-79 = R. Chodat 132). Used for fungicide, sterility and media testing. Test strain. (Medium 3, 25°C)

C-98311 NCPF 3153 (= Hasenclever 207/5/3). MRL antigen strain. Serotype A. (Medium 3, 25°C)

Candida apicola (Hajsig) S.A. Meyer & Yarrow

C-87174 BEL (Ra-4). Isolated from margarine, Finland. (Medium 3, 25°C)

Candida boidinii Ramirez

C-98306 DSM 70034 (= ATCC 48180 = Henninger Ca-0311 = Ogata strain *Kloeckera* 2201). Utilizes methanol. (Medium 3, 25°C)

Candida brassicae Amano et al.
See *Issatchenkia orientalis*

Candida catenulata Diddens & Lodder

C-78082 BIO. Isolated from fodder yeast culture, Finland. (Medium 3, 25°C)

Candida colliculosa (Hartmann) S.A. Meyer & Yarrow
See *Torulaspora delbrueckii*

Candida dattila (Kluyver) S.A. Meyer & Yarrow
See *Kluyveromyces thermotolerans*

Candida diddensiae (Phaff et al.) Fell & S. Meyer

C-82054 DSM 70042 (= MUCL 27724 = Windisch Ca-5001). Isolated from fruit jelly. Studies on xylitol (203). (Medium 3, 25°C)

C-82134 DSM 70044 (strain parakrusei). Studies on xylitol (203). (Medium 3, 25°C)

Candida fabianii Kodoma et al.
See *Pichia fabianii*

Candida famata (Harrison) S.A. Meyer & Yarrow
See *Debaryomyces hansenii*

Candida glabrata (Anderson) S.A. Meyer & Yarrow
Syn. *Torulopsis glabrata*

C-74074^{T} CBS 138 (*Torulopsis glabrata*) (= ATCC 2001 = ATCC 36583 = IFO 0622 = NRRL Y-65). Isolated from faeces. Mapping of mitochondrial DNA. (Medium 3, 25°C)

Candida guilliermondii (Castellani) Langeron & Guerra var. ***guilliermondii***
See *Pichia guilliermondii*

Candida guilliermondii (Castellani) Langeron & Guerra var. ***nitratophila*** Diddens & Lodder
See *Pichia jadinii*

Candida guilliermondii (Castellani) Langeron & Guerra var. ***soya***
See *Pichia guilliermondii*

Candida holmii (Jörgensen) S.A. Meyer & Yarrow
See *Saccharomyces exiguus*

Candida intermedia (Ciferri & Ashford) Langeron & Guerra var. ***intermedia***

E-98309 CBS 2044. Isolated from washed bottle, Sweden. (Medium 3, 25°C)

Candida kefyr (Beijerinck) van Uden & Buckley
See *Kluyveromyces marxianus*

Candida krusei (Castellani) Berkhout var. krusei
See *Issatchenkia orientalis*

Candida lambica (Lindner & Genoud) van Uden & Buckley
See *Pichia fermentans*

Candida lipolytica (Harrison) Diddens & Lodder var. ***lipolytica***
See *Yarrowia lipolytica*

Candida lusitaniae van Uden & do Carmo-Sousa
See *Clavispora lusitaniae*

Candida maltosa Komagata et al.

C-77077 BIO. Isolated from brewer's yeast culture, Finland. (Medium 3, 25°C)

Candida membranaefaciens (Lodder & Kreger-van Rij) Wickerham & Burton

C-96251 BEL. Isolated from recycled fibre pulp, Finland. (Medium 3, 25°C)

C-96257 BEL. Isolated from circulating process water of mill, Spain. (Medium 3, 25°C)

Candida milleri Yarrow

C-87175 EKT (P101 = CBS 8195). Isolated from sour dough seed, Finland. Studies on sour dough (504, 536). (Medium 3, 25°C)

C-94204 EKT (1N). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

C-94205 EKT (2N). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

C-94206 EKT (3N). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

* C-95232 Primalco (TS 75). Isolated from sour dough seed, Finland. Studies on sour dough (536). (Medium 3, 25°C)

C-96244^{T} CBS 6897 (= ATCC 56464 = CCRC 21634 = IFO 10295 = NRRL Y-7245 = L. Kline C). Isolated from San Francisco sour dough. Production of liquid sour dough starter (US Pat. 3734743. (Medium 3, 25°C)

* C-96250 Primalco (TS 57). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

Candida oleophila Kaisha & Iizuka
See *Yarrowia lipolytica*

Candida parapsilosis (Ashford) Langeron & Talice

C-82056 DSM 70123 (= Windisch Ca-2006). Isolated from beer. Studies on xylitol (203). (Medium 3, 25°C)

C-82068 DSM 70125 (= Windisch Ca-2008 = Lammers 6). Isolated from sausage. Studies on xylitol (203). (Medium 3, 25°C)

C-82069 DSM 70126 (*Candida chalmersii*) (= Windisch Ca-2010). Isolated from human mycosis. Studies on xylitol (203). (Medium 3, 25°C)

Candida pelliculosa Redaelli var. ***pelliculosa***
See *Pichia anomala*

Candida polymorpha Ohara & Nonomura ex M.T. Smith & Batenburg-van der Vegte
See *Pichia triangularis*

Candida pseudotropicalis (Castellani) Basgal var. ***pseudotropicalis***
See *Kluyveromyces marxianus*

Candida pulcherrima (Lindner) Windisch
See *Metschnikowia pulcherrima*

Candida robusta Diddens & Lodder
See *Saccharomyces cerevisiae*

Candida saitoana Nakase & Suzuki
Syn. *Torula candida*

C-74071^T CBS 940 (= ATCC 36584 = DBVPG 6016 = IFO 0380 = JCM 1438 = VKM Y-2451). Isolated from air, Japan. Type strain also for *Torula candida*. Studies on xylitol (203). (Medium 3, 25°C)

C-95219 BEL (94H id/1). Isolated from pilot steeping of malting process, Finland. (Medium 3, 25°C)

Candida sake (Saito & Ota) van Uden & Buckley

C-94208 BEL (Immo 4). Isolated from a pilot scale immobilized beer main fermentation column, Finland. (Medium 3, 25°C)

C-95220 BEL (3C 104/1). Isolated from pilot steeping of malting process, Finland. (Medium 3, 25°C)

Candida sp.

C-83141 ATCC 20615 (= Purdue Research Foundation mutant XF 217). Produces ethanol from D-xylose (US Pat. 4368268). Studies on xylose fermentation (181). (Medium 3, 25°C)

C-95221 BEL (3C 104/3). Isolated from pilot steeping of malting process, Finland. (Medium 3, 25°C)

Candida sphaerica (Hammer & Cordes) S.A. Meyer & Yarrow
See *Kluyveromyces lactis*

Candida tenuis Diddens & Lodder

C-96253 BEL. Isolated from recycled fibre pulp. (Medium 3, 25°C)

Candida tropicalis (Castellani) Berkhout
Syn. *Monilia candida*
Monilia murmanica

C-71014 CCY 29-7-25 (*Monilia murmanica*). Studies on immunology (22, 24, 177), biomass from sulphite waste liquor and lignocellulosic wastes (30, 40, 59, 62, 68, 82, 125), pentose fermentation (159, 181) and xylitol (203). (Medium 3, 25°C)

C-78081 BIO. Isolated from fodder yeast culture, Switzerland. Properties similar to those of *Candida viswanathii*. Studies on xylitol (203). (Medium 3, 25°C)

C-78086 ATCC 1369 (*Monilia candida*) (= BICZAS 0651/2 = CCY 29-7-7 = NRRL Y-11860). Studies on pentose fermentation (159, 178, 181) and xylitol (203, 461). (Medium 3, 25°C)

C-78087 ATCC 9968 (*Monilia murmanica*) (= CBS 2317). Experimental production of food yeast in USSR. Studies on xylitol (203, 461). (Medium 3, 25°C)

C-79100 Finnish paper mill. Studies on xylitol (203 (Medium 3, 25°C)

C-84159 Finnish paper mill. Produces polysaccharides. (Medium 3, 25°C)

C-84160 Finnish paper mill. Produces polysaccharides. (Medium 3, 25°C)

Candida utilis (Henneberg) Lodder & Kreger-van Rij
See *Pichia jadinii*

Candida valida (Leberle) van Uden & Buckley
See *Pichia membranaefaciens*

Candida versatilis (Etchells & Bell) S.A. Meyer & Yarrow
Syn. *Torulopsis versatilis*

C-82065^{T} DSM 70662 (*Torulopsis versatilis*)(= DSM 6956 = CBS 1752 = IFO 0652 = ATCC 60131 = NCYC 972 = VKM Y-772). Isolated from fermenting cucumber brine, USA. Produces D-arabitol from D-ribulose, D-mannitol and D-fructose from glycerol, volemitol from lactose. Studies on xylitol (203). (Medium 3, 25°C)

Candida viswanathii Viswanathan & Randhawa ex Sandhu & Randhawa

C-78080 BIO. Finnish paper mill. Properties similar to those of *Candida diddensii*. (Medium 3, 25°C)

Candida zeylanoides (Castellani) Langeron & Guerra

C-93190 ELI 778 (UKY 5). Isolated from silage, UK. Studies on effect of siderophores (527). (Medium 3, 25 C)

Clavispora lusitaniae Rodrigues de Miranda
Anam. *Candida lusitaniae*

C-95224 BEL (*Candida lusitaniae*). Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

C-95230 BEL (*Candida lusitaniae*). Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

C-95231 BEL (*Candida lusitaniae*). Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

C-95233 BEL (10) (*Candida lusitaniae*). Isolated from salad, Finland. (Medium 3, 25°C)

C-97285 BEL (3a) (*Candida lusitania*). Isolated from industrially crushed pine apples, Finland. (Medium 3, 25°C)

Cryptococcus albidus (Saito) Skinner

C-92012 BIO (1). Isolated from steeping water of barley malting, Finland. Studies on effect of siderophores (527). (Medium 3, 25°C)

C-95226 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

Cryptococcus infirmo-miniatus (Okunuki) Phaff & Fell

C-97288 BEL (12). Isolated from an industrial process of jam, Finland. (Medium 3, 25°C)

Cryptococcus lactativorus Fell & Phaff
See *Sporopachydermia lactativora*

Cryptococcus laurentii (Kufferath) Skinner

C-95227 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

Debaryomyces coudertii Saëz
Syn. *Torulaspora coudertii*

C-86163^{T} IFO 1381 (*Torulaspora coudertii*) (= NCYC 932 = IFO 1817 = CBS 5167 = ATCC 18106 = NRRL Y-7425 = JCM 2387 = Saëz A-770). Isolated from faeces of emperor penguin (*Aptenodytes patagonica*), France. (Medium 3, 25°C)

Debaryomyces hansenii (Zopf) Lodder & Kreger-van Rij
Anam. *Candida famata*
SynT. *Debaryomyces sake*
Torulaspora hansenii

C-82128 ATCC 20220 (*Torulaspora hansenii*) (= NI 3365). Produces xylitol (US Pat. 3619369). Studies on xylitol (203). (Medium 3, 25°C)

C-82129 ATCC 20212 (*Debaryomyces sake*) (= NI 3177). Produces xylitol (US Pat. 3619369) and D-arabitol. Studies on xylitol (203). (Medium 3, 25°C)

Debaryomyces hansenii var. ***fabryii*** (Ota) Nakase & Suzuki

C-96262 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 3, 25°C)

C-97286 BEL (5). Isolated from industrial apricot pieces, Finland. (Medium 3, 25°C)

Debaryomyces sake Saito & Oda
See *Debaryomyces hansenii*

Dekkera anomala M.T. Smith & van Grinsven
Anam. *Brettanomyces anomalus*

C-75001^T CBS 77 (= ATCC 10559 = NRRL Y-1415 = NCYC 449 = DSM 70727 = IFO 0796 = MUCL 27702 = Windisch Br-0301 = Sand R 3796). Isolated from stout beer, UK. Type strain for *Brettanomyces anomalus.* Studies on biomass from whey (49), biofilms (522, 545). (Medium 3, 25°C, $CaCO_3$ addition 0.5 %)

C-91183 BIO (P12) (*Brettanomyces intermedius*). Isolated from bottled beer, Finland. Studies on biofilms (522, 545). (Medium 3, 25°C)

Hansenula anomala (Hansen) H. & P. Sydow
See *Pichia anomala*

Hansenula fabianii Wickerham
See *Pichia fabianii*

Hansenula subpelliculosa Bedford ex Barnett et al.
See *Pichia subpelliculosa*

Hasegawaea japonica var. ***versatilis*** Wickerham & Duprat ex Slooff
See *Schizosaccharomyces japonicus* var. *japonicus*

Issatchenkia orientalis Kudryavtsev
Anam. *Candida krusei* var. *krusei*
SynA. *Candida brassicae*

C-71008 CCY 29-9-2 (*Candida krusei*). Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-73009 BIO (*Candida krusei*). Isolated from commercial baker's yeast, Finland. Studies on contamination (69, 80, 140), bioluminescence (114) and detection (150, 177). (Medium 3, 25°C)

C-75010 ALKO 1471 (B III 39) (*Candida krusei*). Isolated from commercial baker's yeast, Finland. (Medium 3, 25°C)

C-79090^T ATCC 32196 (= CBS 6799 = IFO 1664 = Amano E-17). Isolated from cabbage waste. Type strain for *Candida brassicae*. Studies on ethanol from cellulose hydrolyzate (126). (Medium 3, 25°C)

C-89178 BIO (*Candida krusei*). Isolated from an immobilized beer main fermentation column, Finland. Studies on survival in immobilized yeast bioreactor (397), biofilms (522, 545). (Medium 3, 25°C)

C-95225 BEL (*Candida krusei*). Isolated from commercial baker's yeast, Latvia. (Medium 3, 25°C)

C-97287 BEL (6) (*Candida krusei*). Isolated from industrially crushed bananas, Finland. (Medium 3, 25°C)

Kluyveromyces fragilis (Jörgensen) van der Walt
See *Kluyveromyces marxianus*

Kluyveromyces lactis (Dombrowski) van der Walt
Anam. *Candida sphaerica*
SynT. *Saccharomyces lactis*

C-67026 IFG (*Saccharomyces lactis*) (= IFG 2403 = St. Mehnert 1161). Studies on biomass (49, 61), ethanol (173) and β-galactosidase (lactase) (73, 154) from whey. (Medium 3, 25°C)

C-81104 DSM 70799 (= ATCC 8585 = CBS 2359 = IFO 1267 = NRRL Y-1140 = NCYC 1368 = Laffer 61, type C). Isolated from creamery, USA. Carries two linear DNA plasmids, pGK 11 and pGK 12 and associated killer character. Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. Haploid. (Medium 3, 25°C)

C-81114 ATCC 12426 (*Saccharomyces lactis*)(= NRRL Y-1193). Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. Homothallic. (Medium 3, 25°C)

Kluyveromyces marxianus (Hansen) van der Walt
Anam. *Candida kefyr*
SynT. *Kluyveromyces fragilis*
Saccharomyces fragilis var. *fragilis*
Saccharomyces fragilis var. *bulgaricus*
Saccharomyces marxianus
SynA. *Candida pseudotropicalis* var. *pseudotropicalis*

C-75007^{T} CBS 834 (= NRRL Y-329 = ATCC 42265 = DBVPG 6141 = NRRL Y-329 = VKM Y-742). Isolated from kefyr grains, The Netherlands. Type strain for *Candida kefyr*. Studies on biomass from whey (49, 61). (Medium 3, 25°C)

C-71013 HY, Department of Biochemistry (E) (*Candida pseudotropicalis*). Studies on biomass (40, 62) and protoplast fusion (172). (Medium 3, 25°C)

C-72023 IFG (*Kluyveromyces fragilis*). Studies on biomass (49), ethanol (173) and β-galactosidase (lactase) (154) from whey and xylitol (203). (Medium 3, 25°C)

C-75024 ATCC 8608 (*Kluyveromyces fragilis*) (= Laffer 85, type F = KY 5463 = NRRL Y-1163). Isolated from dairy. Studies on biomass (49, 61, 64), ethanol (173) and β-galactosidase (lactase) (73, 154, 184) from whey, xylitol (203) and membrane filtration (267). (Medium 3, 25°C)

C-75025 ALKO 1011 (BI5) (*Saccharomyces fragilis*). Studies on biomass (49, 61, 64), ethanol (173) and β-galactosidase (lactase) (73, 154) from whey and xylitol (203). (Medium 3, 25°C)

C-72027 IFG (*Saccharomyces marxianus*). Studies on immunology (24), ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81105 NCYC 744 (*Candida pseudotropicalis*) (= ATCC 44691 = Cox U.D. 829 = ELI 502). Isolated from fruit yoghurt. Regulation of β-D-galactosidase synthesis. Studies on β-galactosidase (lactase) (154) and ethanol (173) from whey and protoplast fusion (172). (Medium 3, 25°C)

C-81106 IP 513 (*Candida pseudotropicalis*). Studies on β-galactosidase (lactase) (154) and ethanol (173) from whey and protoplast fusion (172). (Medium 3, 25°C)

C-81107 CBS 397 (*Kluyveromyces fragilis*) (= ATCC 46537 = NCYC 851 = UCD 71-58). Isolated from yoghurt. Produces cytochrome C and protein (German Pat. 2948827). Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81108 NRRL Y-2415 (*Kluyveromyces fragilis*) (= NCYC 1425). Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81109^{T} ATCC 16045 (*Saccharomyces fragilis* var. *bulgaricus*) (= ATCC 56494 = CBS 2762 = NCYC 970 = UCD 71-13 = Santa Maria Y2). Isolated from yoghurt. Used for production of yeast protein. Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81110 ATCC 8635 (*Saccharomyces fragilis*) (= DSM 5421 = NRRL Y-1190 = CCY 51-1-1 = BICZAS 326/5 = Henneberg 236 = Laffer 132, type E). Isolated from yoghurt, Germany. Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81111 ATCC 28244 (*Saccharomyces fragilis*) (= Duitschaever 5850). Single-cell protein production from whey. Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81112 ATCC 8554 (*Kluyveromyces fragilis*) (= ATCC 34439 = CBS 5795 = NRRL Y-1109 = NCYC 1426). Isolated from dairy product. Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-81113 ATCC 34440 (*Kluyveromyces fragilis*) (= NRRL Y-1196). Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

C-82138 ATCC 9767 (*Candida pseudotropicalis*) (= Burkholder 26 = BICZAS 652/5 = CCY 29-8-8 = FMJ 1026 = IFO 1065). Transformation in the conversion of lactose-negative to lactose-positive cells. (Medium 3, 25°C, requirement for biotin, thiamine, pantothenic and nicotinic acids)

C-83140 ATCC 12424 (*Saccharomyces fragilis*) (= NRRL Y-610 = NCYC 1429 = Stovall 21041). Produces NAD-dependent alcohol dehydrogenase, inulase and β-galactosidase (lactase). Removal of lactic acid from waste water. Homothallic. (Medium 3, 25°C)

C-95234 BEL (24) (*Candida kefyr*). Isolated from salad, Finland. (Medium 3, 25°C)

Kluyveromyces thermotolerans (Filippov) Yarrow
Anam. *Candida dattila*
SynT. *Saccharomyces veronae*

C-72028 IFG (*Saccharomyces veronae*). Studies on ethanol (173) and β-galactosidase (lactase) (154) from whey. (Medium 3, 25°C)

Metschnikowia pulcherrima Pitt & M.W. Miller
Anam. *Candida pulcherrima* (Lindner) Windisch

C-71030 HY, Department of Biochemistry (*Candida pulcherrima*). (Medium 3, 25°C)

Monilia candida Bonorden
See *Candida tropicalis*

Monilia murmanica Plevako & Cheban
See *Candida tropicalis*

Octosporomyces japonicus var. ***versatilis*** Wickerham & Duprat ex Slooff
See *Schizosaccharomyces japonicus* var. *japonicus*

Pachysolen tannophilus Boidin & Adzet

C-81121^{T} NRRL Y-2460 (= NCYC 614 = CBS 4044 = ATCC 32691 = DSM 70352 = MUCL 27787 = IFO 1007 = Windisch Pc-0101 = Boidin 145). Isolated from tanning liquor. Xylose fermentation (US Pat. 4 359 534). Diploid. Studies on pentose fermentation (159, 178, 181) and xylitol (203). (Medium 3, 25°C)

C-81122 NRRL Y-2461 (= NCYC 1597). Isolated from tanning liquor. Xylose fermentation. Studies on xylitol (203). (Medium 3, 25°C)

C-81123 NRRL Y-2462 (= NCYC 1599). Isolated from tanning liquor. Xylose fermentation. Studies on xylitol (203). (Medium 3, 25°C)

C-81124 NRRL Y-2463 (= NCYC 1600). Isolated from tanning liquor. Xylose fermentation. Studies on xylitol (203). (Medium 3, 25°C)

Pichia alcoholophila Klöcker
See *Pichia membranaefaciens*

Pichia anomala (Hansen) Kurtzman
Anam. *Candida pelliculosa* var. *pelliculosa*
SynT. *Hansenula anomala*
Willia anomala

C-74021^{T} CBS 5759 (*Willia anomala*) (= DSM 6766 = NRRL Y-366 = NCYC 432 = ATCC 8168 = MUCL 28639). Neotype strain. Studies on xylitol (203). K_4 killer. Smooth colony type. (Medium 3, 25°C)

C-74022 Oy Lahden Polttimo Ab (*Hansenula anomala*). Isolated from bread, Sweden. Studies on xylitol (203). (Medium 3, 25°C)

C-93189 ELI 777 (UKY 4). Isolated from silage, UK. Studies on effect of siderophores (527). (Medium 3, 25°C)

C-94191 BEL. Isolated from an immobilized beer prefermentation column, Finland. Produces 4-vinyl guaiacol and 4-vinyl phenol. Studies on biofilms (522, 545). (Medium 3, 25°C)

C-95209 BEL. Isolated from pilot scale immobilized brewing process (main fermentation), Finland. (Medium 3, 25°C)

C-96252 BEL. Isolated from process water of a paper mill, Spain (Medium 3, 25°C)

Pichia fabianii (Wickerham) Kurtzman
Anam. *Candida fabianii*
SynT. *Hansenula fabianii*

C-78079 BIO (*Hansenula fabianii*). Isolated from fodder protein culture. (Medium 3, 25°C)

Pichia farinosa (Lindner) Hansen
Syn. *Pichia miso*

C-82125 ATCC 20210 (*Pichia miso*) (= NI 3362). Produces xylitol (US Pat. 3619369). Studies on xylitol (203). (Medium 3, 25°C)

C-82127 ATCC 20218 (= NI 3363). Produces xylitol (US Pat. 3619369). Studies on xylitol (203). (Medium 3, 25°C)

C-98310 CBS 2007 (= IFO 0462). Isolated from sake. (Medium 3, 25°C)

Pichia fermentans Lodder
Anam. *Candida lambica*

C-74031^T CBS 187 (= ATCC 10651 = NRRL Y-1619 = IFO 1124 = NCYC 850 = BICZAS 334/2 = CCY 39-4-2 = DBM 57). Isolated from buttermilk. (Medium 3, 25°C)

C-78078 BIO (*Candida lambica*). Isolated from fodder protein culture, Switzerland. (Medium 3, 25°C)

C-81126 BIO (= CBS 7052). Isolated from fodder yeast culture, Finland. (Medium 3, 25°C)

Pichia guilliermondii Wickerham
Anam. *Candida guilliermondii* var. *guilliermondii*
SynA. *Candida guilliermondii* var. *soya*

C-59004 Stockholms bryggeri (VJ 122) (*Candida guilliermondii*). Studies on immunology (22, 24, 56, 177) and xylitol (203). (Medium 3, 25°C)

C-71005 HY, Department of Biochemistry (H) (*Candida guilliermondii*). Studies on riboflavin (2) and xylitol (203). (Medium 3, 25°C)

C-72064 IFG *Saccharomyces rouxii*). Studies on xylitol (203) and yeast detection (372). (Medium 3, 25°C)

C-82130 ATCC 20216 (= CBS 7042 = NI 3541) (*Candida guilliermondii* var. *soya*). Produces xylitol (US Pat. 3619369). Studies on xylitol (203). (Medium 3, 25°C)

C-97284 BEL (1a). Isolated from industrial banana preparation, Finland. (Medium 3, 25°C)

C-97290 BEL (17). Isolated from industrial pine apple-apricot-mango jam, Finland. (Medium 3, 25°C)

Pichia jadinii (Sartory et al.) Kurtzman
Anam. *Candida utilis*
SynT. *Torula mineralis*
Torulopsis utilis
SynA. *Candida guilliermondii* var. *nitratophila*
Torula utilis
Torulopsis utilis var. *major*

C-71015 ATCC 9226 (*Torulopsis utilis*) (= IFO 1086 = FMJ 4026). Studies on biomass from sulphite waste liquor and lignocellulosic wastes (30, 40, 62, 68, 82, 125), pentose fermentation (159, 181), xylose catabolism (163, 181) and xylonic acid (300). (Medium 3, 25°C)

C-71016 CCY 29-38-16 (*Candida arborea*, *Candida utilis*) (= BICZAS 653/10). Studies on immunology (22, 24, 177) and biomass from sulphite waste liquor (30). (Medium 3, 25°C)

C-78083 BIO (*Candida utilis*). Isolated from fodder yeast culture, Switzerland. Slow growth. (Medium 3, 25°C)

C-78085 ATCC 9950 (*Torulopsis utilis*) (= NRRL Y-900 = CBS 5609 = IFO 0988 = NCYC 707 = DSM 2361). Production of yeast protein from potato. Degradation of ribonucleic acid. Produces acetaldehyde, S-adenosyl-methionine synthetase, adenosyl D-methionine, adenosyl 2-methyl-methionine and ethyl acetate. Zinc accumulation studies. Assay of antibiotics. (Medium 3, 25°C)

C-79091^{T} ATCC 9256 (= NRRL Y-1084 = CBS 841 = IFO 0626 = NCYC 359 = DSM 70167 = VKM Y-768 = JCM 2311). Type strain for *Torulopsis utilis* var. *major*. Ferments xylose. Produces secondary alcohol oxidase, protein from ryegrass straw. Studies on pentose fermentation (159, 181) and biofilm detection (495). (Medium 3, 25°C)

C-84146^{T} CBS 567 (= NRRL Y-1509). Isolated from distillery. Type strain for *Candida guilliermondii* var. *nitratophila*. (Medium 3, 25°C)

C-84147^{T} CBS 621 (= ATCC 22023 = NRRL Y-7586 = NCYC 769 = DBVPG 6160 = VKM Y-74). Isolated from yeast factory. Type strain for *Candida utilis* and *Torula mineralis*. Ferments xylose. Produces dihydroxyacetone reductase, 2,3-butanediol dehydrogenase and alcohol dehydrogenase. European patent 81107416, German patent BRD 3100715. (Medium 3, 25°C)

C-84148 CBS 839 (*Candida utilis*) (= NRRL Y-2226 = DBVPG 6213). Isolated from sputum. (Medium 3, 25°C)

C-84149 CBS 840 (*Candida utilis*) (= IFO 0619 = NRRL Y-2225). Isolated from sputum. (Medium 3, 25°C)

C-84150 CBS 842 (*Candida utilis*). Isolated from CBS 841. German patent P 2856694. (Medium 3, 25°C)

C-84151 CBS 890 (*Candida utilis*). (Medium 3, 25°C)

C-84152 CBS 1516 (*Candida utilis*) (= NRRL Y-1427). (Medium 3, 25°C)

C-84153 CBS 1517 (*Candida utilis*) (= NRRL Y-1082). (Medium 3, 25°C)

C-84154 CBS 1726 (*Candida utilis*). Isolated from vagina. (Medium 3, 25°C)

C-84155 CBS 2160 (*Candida utilis*). Isolated from *Taraxacum* sp. flower. (Medium 3, 25°C)

C-84156 CBS 4511 (*Candida utilis*). Isolated from dried yeast. (Medium 3, 25°C)

C-84157 CBS 5947 (*Candida utilis*) (= NCYC 708 = LTS 23 = ATCC 42181 = CMI 23311). (Medium 3, 25°C)

C-86162 IFO 0396 (*Torula utilis*) (= ATCC 16321 = KY 5027 = Kyowa Ferm. Ind. Co. Ltd. 128). Produces ribotides of 2-substituted-6- hydroxypurines (US Pat. 3586606). Studies on pyruvic acid secretion (373). (Medium 3, 25°C)

Pichia membranifaciens Hansen (Hansen)
Anam. *Candida valida*
SynT. *Pichia alcoholophila*

C-86170 NCYC 326 (*Pichia alcoholophila*). Isolated from draught beer. Studies on biofilms (522, 545). (Medium 3, 25°C)

C-94192 BEL. Isolated from an immobilized beer secondary fermentation column, Finland. Studies on biofilms (522, 545). (Medium 3, 25°C)

C-97289 BEL (15). Isolated from spiced yoghurt, Finland. (Medium 3, 25°C)

Pichia miso Mogi
See *Pichia farinosa*

Pichia quercuum Phaff & Knapp

C-84158^{T} ATCC 24254 (*Pichia quercibus*) (= CBS 2283 = DSM 70386 = IFO 0949 = IFO 1276 = MUCL 27797 = NRRL YB-4281 = Windisch Pi-1001 = Phaff 54-K-41). Isolated from slime flux of *Quercus kelloggii*, USA. (Medium 3, 25°C)

Pichia subpelliculosa Kurtzman
Syn. *Hansenula subpelliculosa*

C-82050 DSM 70783 (*Hansenula subpelliculosa*)(= MUCL 27765 = Windisch Ha-0703). Isolated from beer. Studies on xylitol (203). (Medium 3, 25°C)

Pichia triangularis M.T. Smith & Batenburg-van der Vegte
Anam. *Candida polymorpha*

C-82131 ATCC 20213 (*Candida polymorpha*) (= NI 3554). Produces xylitol (US Pat. 3619369) and D-arabitol. Studies on xylitol (203). (Medium 3, 25°C)

Rhodosporidium toruloides Banno
Anam. *Rhodotorula gracilis*

C-71034^{T} ATCC 10788 (= ATCC 15385 = CBS 14 = IFO 0559 = NCYC 921 = NRRL Y-1091 = MUCL 28637 = VKM Y-334 = Rennerfelt strain Burea). Isolated from wood pulp from Coniferae. Authentic strain for *Rhodotorula gracilis*. α-mating type. Produces phenylalanine ammonia lyase, phosphodiesterase and lipid. Studies on biomass from sulphite waste liquor (30). (Medium 3, 25°C)

C-82132 ATCC 26194 (*Rhodotorula gracilis*) (= CBS 6681 = CCY 20-2-16 = NCYC 819 = Höfer 5). Mating type a. Sugar transport studies. (Medium 3, 25°C)

C-98308 CBS 315 (= IFO 0388 = NRRL Y-6672 = VKM Y-333). Isolated from air, Japan. α-mating type. Type strain of *Torula rubescens* Saito. (Medium 3, 25°C)

Rhodotorula glutinis (Fresenius) Harrison

C-92011 BIO (2). Isolated from steeping water of barley malting, Finland. Studies on effect of siderophores (527). (Medium 3, 25°C)

C-93187 ELI (UKY 1). Isolated from silage, UK. (Medium 3, 25°C)

Rhodotorula gracilis Rennerfelt
See *Rhodosporidium toruloides*

Rhodotorula minuta (Saito) Harrison

C-96261 BEL (113B). Isolated from mouldy house, Finland. (Medium 3, 25°C)

C-97305 BEL. Isolated from yoghurt jam, Sweden. (Medium 3, 25°C)

Rhodotorula mucilaginosa (Jörgensen) Harrison

C-89179 BIO. Isolated from an immobilized beer main fermentation column. Studies on survival in immobilized yeast bioreactor (397), biofilms (522, 545). (Medium 3, 25°C)

C-95228 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

C-95237 BEL. Isolated from a virgin fibre sample, Finland. Medium 3, 25°C)

C-96259 BEL (113B). Isolated from mouldy house, Finland. (Medium 3, 25°C)

C-96260 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 3, 25°C)

Saccharomyces acidifaciens Nickerson var. ***acidifaciens***
See *Zygosaccharomyces bailii*

Saccharomyces anamensis Will & Heinrich
See *Saccharomyces cerevisiae*

Saccharomyces bailii Lindner
See *Zygosaccharomyces bailii*

Saccharomyces bayanus Saccardo

C-72037 IFG. (Medium 3, 25°C)

C-74039 Finnish brewery (a 33). (Medium 3, 25°C)

C-59067 Stockholms Bryggeri (VJ 40) (*Saccharomyces uvarum*). Studies on immunology (22, 24, 56, 177). (Medium 3, 25°C)

Saccharomyces carlsbergensis E.C. Hansen
Syn. *Saccharomyces pastorianus*
See Bottom fermenting brewer´s yeasts

Saccharomyces cerevisiae Meyen ex E.C. Hansen
Anam. *Candida robusta*
SynT. *Saccharomyces anamensis*
Saccharomyces cerevisiae var. *ellipsoideus*
Saccharomyces chevalieri
Saccharomyces diastaticus
Saccharomyces ellipsoideus
Saccharomyces intermedius
Saccharomyces italicus
Saccharomyces logos
Saccharomyces oviformis
Saccharomyces sake
Saccharomyces steineri
Saccharomyces turbidans
Saccharomyces willianus

Distiller's yeast strains

C-79093 ATCC 4132. Produces sn-glycerol-3-phosphate dehydrogenase. High temperature optimum. Studies on ethanol production from hydrolyzed cellulose (126) and xylulose fermentation (159, 181). Studies on immobilization (249). (Medium 3, 25°C)

* C-91180 Finnish paper mill. Isolated from sulphite spirit process, Finland. (Medium 3, 25°C)

C-96203 NCYC 87 (= ATCC 9763 = NRRL Y-567 = CBS 2978 = CBS 5900 = CCY 21-4-48 = DSM 1333 = NCTC 7239 = NCTC 10716 = PCI M50 = ELI 501). Assay of antifongine (US Pat. 3052605), nystatin, candicidin, anisomycin, amphotericin B and natamycin. Studies on sour doughs (504), siderophores (527). (Medium 3, 25°C)

C-95243 BEL (DL = A-94135). Isolated from commercial dry yeast culture, Denmark. (Medium 3, 25°C)

C-96245 NCYC 90 (= NCTC 2779). (Medium 3, 25°C)

C-96246 NCYC 360 (Seagram & Sons). (Medium 3, 25°C)

C-96247 NCYC 431 (= ATCC 2345 = ATCC 44732 = NCYC 73 = NRRL Y-132). (Medium 3, 25°C)

Wine yeast strains

C-70036 NCYC 482 (Moussec strain) (*Saccharomyces oviformis*). Champagne yeast. Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-70040 NCYC 93 (*Saccharomyces cerevisiae* var. *ellipsoideus*) (= NCTC 2161). Studies on immunology (22, 24, 56, 177). (Medium 3, 25°C)

C-70041 NCYC 104 (= strain Badascony 1). Hungarian wine yeast. Studies on xylulose fermentation (159, 181). (Medium 3, 25°C)

C-70042 NCYC 177 (Anheuser-Busch Inc., USA). Californian wine yeast. Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-70047 NCYC 356. Mead yeast. (Medium 3, 25°C)

C-79097 ATCC 20270 (*Saccharomyces sake*) (= KY 5606). Sake yeast. Patent strain. Studies on xylulose fermentation (159, 181) and production of xylitol (203). (Medium 3, 25°C)

C-79098 ATCC 26421 (*Saccharomyces sake*) (= BU 9-5 = FERM-P 1178). Non-foaming mutant of Kyokai 7. Sake yeast. Studies on xylitol (203). (Medium 3, 25°C)

C-79099 ATCC 26422 (*Saccharomyces sake*) (= NCYC 479 = IFO 2347 = Kyokai 7). Sake yeast. Studies on xylitol (203). (Medium 3, 25°C)

C-83143 BIO. Isolated from dried red grapes originating from Chateau Giscours. Spontaneous Bordeaux strain. (Medium 3, 25°C)

C-84144 BIO. Isolated from Norwegian commercial culture (Kargus Vingjaer). High ethanol tolerance. (Medium 3, 25°C)

C-97292 MUCL 29400. Isolated from cider, commercial strain, Belgium. (Medium 3, 25°C)

C-97293 NCYC 816 (= AWRI 729). Widely used Epernay cider yeast. Low H_2S production. (Medium 3, 25°C)

C-97294 NCYC 1431. Cider yeast, France. (Medium 3, 25°C)

Other *Saccharomyces cerevisiae* strains

C-71043 CCY 21-4-9 (*Saccharomyces turbidans*). Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-74045^{T} NCYC 506 (= CBS 1395 = DSM 70471 = NRRL Y-1529 = IFO 1950 = Windisch Sa-07/164). Type strain for *Saccharomyces ellipsoideus*. (Medium 3, 25°C)

C-71052 CCY 21-7-1 (*Saccharomyces intermedius*). Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-71053 CCY 21-15-1 (*Saccharomyces willianus*). Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-72057 IFG (*Saccharomyces chevalieri*). (Medium 3, 25°C)

C-68059 Research Laboratory Arthur Guinness (C 607) (*Saccharomyces diastaticus*). Ferments starch. Studies on immunology (22, 24, 56, 177), detection (150, 177, 340), immobilized yeast bioreactor (397, 544), biofilms (522, 545). (Medium 3, 25°C)

C-70060 BIO (K1) (*Saccharomyces diastaticus*). Isolated from beer. Studies on immunology (22, 24, 177). (Medium 3, 25°C)

C-72063 IFG (*Saccharomyces steineri*). (Medium 3, 25°C)

C-72066 IFG (*Saccharomyces logos*). Studies on xylulose fermentation (159, 181). (Medium 3, 25°C)

C-78084 BIO (*Saccharomyces italicus*). Isolated from fodder yeast culture, Switzerland. (Medium 3, 25°C)

C-79092 ATCC 4126 (*Saccharomyces anamensis*) (= CBS 1200 = BICZAS 321/7 = CCY 21-4-26). Amylo process yeast. Ferments at high temperature. Studies on ethanol from hydrolyzed cellulose (126). (Medium 3, 25°C)

C-79094 ATCC 24858 (= Ali Y 567). Studies on ethanol from cellulosic material (138). Wild type, diploid, high ethanol tolerance. (Medium 3, 25°C)

C-79095 ATCC 24859 (= Ali PPR 11). Studies on ethanol from cellulosic materials (138) and protoplast fusion (172). Wild type, diploid, high ethanol tolerance. (Medium 3, 25°C)

C-79096 ATCC 24860 (= Ali 641a). Studies on xylulose fermentation (159, 181). Wild type, diploid, high ethanol tolerance. (Medium 3, 25°C)

C-82101 ATCC 28338 (*Saccharomyces diastaticus*) (= Takano BH-64). Isolated from beer. Ferments starch. Studies on xylulose fermentation (159, 181). Diploid, homothallic. (Medium 3, 25°C)

C-80102 CNRS-Gif-sur-Yvette-91190, France. ATCC 28383 (= Karst FL 100). Wild type. (Medium 3, 25°C)

C-81117 EKT (P23 = A23). Isolated from sour dough seed, Finland. Studies on microbes of sour dough (434) and interactions in preferment (504). (Medium 3, 25°C)

C-81118 EKT (S73 = B73). Isolated from sour dough seed, Finland. Studies on microbes of sour dough (434). (Medium 3, 25°C)

C-82137 ATCC 26433 (= Wakabayashi 706 R 1). Derived from ATCC 26432. Haploid with mitochondrial oligomycin resistance. Studies on protoplast fusion (172). (Medium 3, 25°C)

C-86164 AJ 14353 (*Candida lipolytica*) (= FERM P-2628). Produces pyruvic acid. (Medium 3, 25°C)

C-88176 Carlsberg Research Center, Denmark (strain AH22). Mating type *a, leu2-3, leu2-112, his4-519, can1*. (Medium 3, 25°C)

C-88177 Carlsberg Research Center, Denmark (strain DBY 746). Mating type *a, his3delta1, leu2-3, leu2-112, ura3-52, trp1-289*. (Medium 3, 25°C)

C-94207 EKT (4N). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

C-95229 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 3, 25°C)

* C-95236 Primalco (TS146). Isolated from sour dough seed, Finland. (Medium 3, 25°C)

C-96258 BEL. Isolated from beer, Sweden. (Medium 3, 25°C)

* C-96264 Primalco (= ALKO 3701). (Medium 3, 25°C)

C-97295 BEL (N9B). Isolated from cider, Finland. (Medium 3, 25°C)

Saccharomyces cerevisiae var. ***ellipsoideus*** (E.C. Hansen) Dekker
See *Saccharomyces cerevisiae*

Saccharomyces chevalieri Guilliermond
See *Saccharomyces cerevisiae*

Saccharomyces cidri Legakis
See *Zygosaccharomyces cidri*

Saccharomyces dairensis Naganishi

C-95235 BEL (32). Isolated from salad, Finland. (Medium 3, 25°C)

Saccharomyces delbrueckii Lindner
See *Torulaspora delbrueckii*

Saccharomyces diastaticus Andrews & Gilliland ex van der Walt
See *Saccharomyces cerevisiae*

Saccharomyces ellipsoideus Reess
See *Saccharomyces cerevisiae*

Saccharomyces exiguus Reess
Anam. *Candida holmii*
SynA. *Torulopsis holmii*

C-74061^{T} CBS 379 (= ATCC 10599 = IFO 1128 = NRRL Y-1538 = NCYC 814). Sour dough yeast. (Medium 3, 25°C)

C-75075 BIO (*Torulopsis holmii*). Isolated from sour dough seed, Ilomantsi, Finland. Studies on growth and acid tolerances (50, 54, 188). (Medium 3, 25°C)

C-81115 EKT (S10 = B10) (*Torulopsis holmii*). Isolated from sour dough seed, Finland. Studies on microbes of sour dough (434) and interactions in preferment (504). (Medium 3, 25°C)

C-81116 EKT (S75 = B75) (*Torulopsis holmii*). Isolated from sour dough seed, Finland. Studies on acetic acid tolerance (352), electrofusion (353) and microbes of sour dough (434). (Medium 3, 25°C)

Saccharomyces fermentati (Saito) Lodder & Kreger-van Rij
See *Torulaspora delbrueckii*

Saccharomyces florentinus (Castelli) Lodder & Kreger-van Rij
See *Zygosaccharomyces florentinus*

Saccharomyces fragilis Jörgensen var. ***fragilis***
See *Kluyveromyces marxianus*

Saccharomyces fragilis var. ***bulgaricus*** Santa Maria
See *Kluyveromyces marxianus*

Saccharomyces intermedius E.C. Hansen
See *Saccharomyces cerevisiae*

Saccharomyces italicus Castelli
See *Saccharomyces cerevisiae*

Saccharomyces lactis Dombrowski
See *Kluyveromyces lactis*

Saccharomyces logos van Laer ex Jörgensen
See *Saccharomyces cerevisiae*

Saccharomyces marxianus E.C. Hansen
See *Kluyveromyces marxianus*

Saccharomyces microellipsoides Osterwalder
See *Zygosaccharomyces microellipsoides*

Saccharomyces mrakii (Capriotti) van der Walt
See *Zygosaccharomyces mrakii*

Saccharomyces oviformis Osterwalder
See *Saccharomyces cerevisiae*

Saccharomyces pastorianus Reess
Syn. *Saccharomyces carlsbergensis*

C-95038^{T} DSM 6580 (= NCYC 392 = CBS 1538 = NRRL Y-1551 = ATCC 12752 = IFO 0613). (Medium 3, 25°C)

C-71044 HY, Department of Microbiology (Y7). Studies on immunology (22, 24, 56, 177). (Medium 3, 25°C)

Saccharomyces sake Yabe
See *Saccharomyces cerevisiae*

Saccharomyces steineri Lodder & Kreger-van Rij
See *Saccharomyces cerevisiae*

Saccharomyces unisporus Jörgensen

C-81119 EKT (P81 = A81) (*Torulopsis pintolopesii*). Isolated from sour dough seed, Finland. Studies on microbes of sour dough (434). (Medium 3, 25°C)

C-81120 EKT (P 109 = A109) (*Torulopsis pintolopesii*). Isolated from sour dough seed, Finland. Studies on microbes of sour dough (434). (Medium 3, 25°C)

Saccharomyces turbidans E.C. Hansen
See *Saccharomyces cerevisiae*

Saccharomyces uvarum Beijerinck
See *Saccharomyces bayanus*

Saccharomyces veronae Lodder & Kreger-van Rij
See *Kluyveromyces thermotolerans*

Saccharomyces willianus Saccardo
See *Saccharomyces cerevisiae*

Saccharomycodes ludwigii Hansen (Hansen)

C-79089 NCYC 734. Isolated from a cider factory. Studies on detection (150). (Medium 3, 25°C)

Schizosaccharomyces japonicus Yukawa & Maki var. ***japonicus***
Syn. *Hasegawaea japonica* var. *versatilis*
Octosporomyces japonicus var. *versatilis*
Schizosaccharomyces versatilis

C-71070^{T} CCY 44-3-1 (*Schizosaccharomyces versatilis*) (= BICZAS 223/1 = ATCC 9987 = NRRL Y-1026 = CBS 103 = IFO 1607). Isolated from home canned grape juice. Studies on immunology (22, 24, 177). (Medium 3, 25°C)

Schizosaccharomyces liquefaciens Osterwalder
See *Schizosaccharomyces pombe*

Schizosaccharomyces pombe Lindner var. ***pombe***
Syn. *Schizosaccharomyces liquefaciens*

C-80103 NCYC 132 (= ATCC 26192 = ATCC 24751 = NRC 213002). Isolated from African millet beer. Produces ß-glucan endohydrolase. Flocculation induction. Ethanol from D-xylulose. (Medium 3, 25°C)

C-82133^{T} ATCC 16979 (*Schizosaccharomyces liquefaciens*) (= CBS 1042 = IFO 0358). Isolated from sulphited grape juice. Decomposition of L-malic acid. Used for assay of inositol. Type strain of *Schizosaccharomyces liquefaciens*. Studies on xylulose fermentation (159, 181). (Medium 3, 25°C)

Schizosaccharomyces versatilis Wickerham & Duprat
See *Schizosaccharomyces japonicus* var. *japonicus*

Sporidiobolus johnsonii Nyland

C-85142 BIO. Isolated from deteriorated peat, Finland. (Medium 3, 25°C)

Sporobolomyces roseus Kluyver & van Niel

C-93188 ELI (UKY 2). Isolated from silage, UK. (Medium 3, 25°C)

Sporopachydermia lactativora Rodrigues de Miranda
Anam. *Cryptococcus lactativorus*

C-95222^{T} MUCL 31273 (= CCRC 21448 = ATCC 32043 = CBS 6192 = IFO 10565 = NRRL Y-11591). Isolated from mouth of man, Finland. Type strain of *Cryptococcus lactativorus*. (Medium 3, 25°C)

C-95223^{T} MUCL 31274 (= CCRC 21491 = ATCC 22026 = CBS 5771 = IFO 1867 = DBVPG 6118 = NRRL Y-6967 = NRRL Y-11592). Isolated from seawater, Antarctica ocean. (Medium 3, 25°C)

Torula candida Saito
See *Candida saitoana*

Torula mineralis Hayduck & Haehn ex F.C. Harrison
See *Pichia jadinii*

Torula utilis Henneberg
See *Pichia jadinii*

Torulaspora cidri (Legakis) van der Walt & Johannsen
See *Zygosaccharomyces cidri*

Torulaspora coudertii (Saëz) van der Walt & Johannsen
See *Debaryomyces coudertii*

Torulaspora delbrueckii (Lindner) Lindner
Anam. *Candida colliculosa*
SynT. *Saccharomyces delbrueckii*
Saccharomyces fermentati

C-72058 IFG (*Saccharomyces delbrueckii*). Studies on immunology (24). (Medium 3, 25°C)

C-72062 IFG (*Saccharomyces fermentati*). (Medium 3, 25°C)

C-97282 BEL (Kol 1). Isolated from an immobilized beer main fermentation column, Finland. Two colony types (a = petites; slow growth). (Medium 3, 25°C)

C-97283 BEL (Kol 2). Isolated from an immobilized beer main fermentation column, Finland. Two colony types (a = petites; slow growth). (Medium 3, 25°C)

Torulaspora hansenii (Zopf) van der Walt & Johannsen
See *Debaryomyces hansenii*

Torulaspora microellipsodes (Osterwalder) van der Walt & Johannsen
See *Zygosaccharomyces microellipsoides*

Torulaspora mrakii (Capriotti) van der Walt & Johannsen
See *Zygosaccharomyces mrakii*

Torulopsis glabrata (H.W. Anderson) Lodder
See *Candida glabrata*

Torulopsis holmii (Jörgensen) Lodder
See *Saccharomyces exiguus*

Torulopsis utilis (Henneberg) Lodder
See *Pichia jadinii*

Torulopsis utilis var. ***major*** Thaysen & Morris
See *Pichia jadinii*

Torulopsis vertilis (Etchells & Bell) Lodder & Kreger-van Rij
See *Candida versatilis*

Trichosporon beigelii (Küchenmeister & Rabenhorst) Vuillemin
Syn. *Trichosporon cutaneum*

C-74033^T ALKO 1543 (= CBS 2466 = ATCC 28592 = IFO 1198 = NCYC 444 = NRRL Y-1490 = FMJ 15013 = MUCL 14471). Type strain for *Trichosporon cutaneum*. (Medium 3, 25°C)

Trichosporon cutaneum (de Beurmann et al.) Ota
See *Trichosporon beigelii*

Trigonopsis variabilis Schachner

C-82055^T DSM 70714 (= ATCC 10679 = CBS 1040 = IFO 0755 = NCYC 770 = NI 7590 = NRRL Y-1579 = MUCL 27875 = Windisch Tg-0101 = Schachner race I). Isolated from beer. Produces D-amino acid oxidase. Studies on xylitol (203). (Medium 3, 25°C)

Willia anomala E.C. Hansen (E.C. Hansen)
See *Pichia anomala*

Yarrowia lipolytica (Wicherham et al.) van der Walt & von Arx
Anam. *Candida lipolytica* var. *lipolytica*
SynA. *Candida oleophila*

C-78088 ATCC 20373 (*Candida oleophila*) (= Siebert AC-7). Mutant derived from ATCC 20177. Produces citric acid (US Pat. 3843465). (Medium 3, 25°C)

C-97297 BEL (*Candida oleophilia*). Isolated from yoghurt jam, Sweden. (Medium 3, 25°C)

Zygosaccharomyces bailii (Lindner) Guilliermond
Syn. *Saccharomyces acidifaciens* var. *acidifaciens*
Saccharomyces bailii

C-72035 IFG (*Saccharomyces acidifaciens*). Studies on immunology (24). (Medium 3 or 79, 25°C)

C-91184 BIO (U29) (*Candida pintolopesii*). Isolated from orange juice, Finland. Good growth on glucose in the presence of 1% acetic acid. (Medium 3 or 79, 25°C)

C-93186 ELI. Isolated from tomato ketchup, Finland. (Medium 3 or 79, 25°C)

C-94194^T CBS 680 (*Saccharomyces bailii*) (= ATCC 58445 = NCYC 1416 = NRRL Y-2227 = IFO 1098 = DBVPG 6287 = DSM 70410 = MUCL 27812). (Medium 3 or 79, 25°C)

C-97291 BEL (U83). Isolated from a rolled sweet cake, Finland. (Medium 3 or 79, 25°C)

Zygosaccharomyces bisporus Naganishi

C-94195^T CBS 702 (*Saccharomyces bisporus*) (= ATCC 52405 = DBVPG 6382 = IFO 1131 = NCYC 1495 = NRRL Y-7558 = NRRL Y-7683 = NRRL Y-12626 = SM 70415 = MUCL 27814 = DSM 70415). Isolated from tea beer. Osmophilic. (Medium 3 or 79, 25°C)

Zygosaccharomyces cidri (Legakis) Yarrow
Syn. *Saccharomyces cidri*
Torulaspora cidri

C-94201^T CBS 4575 (ATCC 36238 = ATCC 46819 = DBVPG 6385 = IFO 1484 = NCYC 775 = NCYC 1567 = NRRL Y-12634 = MUCL 31280 = CCRC 21728 = NRC 2201). Isolated from cider, France. (Medium 3, 25°C)

Zygosaccharomyces fermentati Naganishi

C-94196^T CBS 707 (= ATCC 58446 = MUCL 31281 = NRRL Y-1559 = DBVPG 6297 = CCRC 21760). Isolated from sediment of peppermint. (Medium 3, 25°C)

Zygosaccharomyces florentinus Castelli ex Kudryavtsev
Syn. *Saccharomyces florentinus*
Torulaspora florentina

C-94199^T CBS 746 (= ATCC 36311 = DBVPG 6186 = NRRL Y-1560 = DSM 70506 = MUCL 27832 = Windisch Sa-1703). Isolated from sulphurized grape must, Italy. (Medium 3, 25°C)

Zygosaccharomyces gracilis var. ***italicus*** Sacchetti
See *Zygosaccharomyces rouxii*

Zygosaccharomyces mellis Fabian & Quinet

C-94200^T CBS 736 (= NCYC 2403 = DBVPG 6476 = IFO 1615 = NRRL Y-7559 = NRRL Y-12628). Isolated from honey, USA. (Medium 3 or 79, 25°C)

C-98312 BEL (U97 type B). Isolated from commercial syrup, Finland. (Medium 3 or 79, 25°C)

Zygosaccharomyces microellipsoides (Osterwalder) Yarrow

Syn. *Saccharomyces microellipsoides*
Torulaspora microellipsodes

C-94198^{T} CBS 427 (= ATCC 10605 = DBVPG 6188 = NRRL Y-1549 = VKM Y-484 = IFO 1740 = KCM 0240 = MUCL 27833 = DSM 6959 = CCRC 21759). Isolated from apple juice, Germany. (Medium 3, 25°C)

Zygosaccharomyces mrakii Capriotti

Syn. *Saccharomyces mrakii*
Torulaspora mrakii

C-94202^{T} CBS 4218 (= ATCC 36242 = DBVPG 6289 = IFO 1835 = JCM 1800 = NRRL Y-12654 = MUCL 31151 = CCRC 21652). Isolated from silage, Italy. (Medium 3, 25°C)

Zygosaccharomyces rouxii (Boutroux) Yarrow

Syn. *Zygosaccharomyces gracilis* var. *italicus*

C-94032 Sugar factory (A1). Isolated from commercial brown sugar, Finland. (Medium 78, 25°)

C-94197^{T} CBS 732 (= ATCC 2623 = ATCC 56077 = DBVPG 6187 = IFO 1130 = MUCL 30254 = MUCL 30008 = NCYC 568 = NRRL Y-229). Isolated from concentrated black grape must, Italy. (Medium 79, 25°C)

C-95210 BEL (YPHF10 1a). Isolated from commercial brown sugar, Finland. (Medium 78, 30°C)

C-95211 BEL (331BF10 2). Isolated from commercial brown sugar, Finland. (Medium 78, 30°C)

C-95212 BEL (332BF10 1). Isolated from commercial brown sugar, Finland. (Medium 78, 30°C)

C-95213 BEL (S1BS4 3). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-95214 BEL (331BS4 2). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-95215 BEL (33SVS5 1). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-95216 BEL (332BS1 1). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-95217 BEL (331BS1 2). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-95218 BEL (331BS1 3). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-98307 BEL (U97 type A). Isolated from commercial syrup, Finland. (Medium 79, 30°C)

C-98313 CBS 4837 (= ATCC 14679 = CCRC 21487 = DSM 2531 = IFO 1876 = NCYC 751 = NRRL Y-2547). Isolated from miso. MT a. Production of miso (US Pat 2967108). (Medium 3, 25°C)

C-98314 ATCC 66069 (= Oshima ME-3). Genotype alpha leu-. Leucine auxotrophic mutant harboring pSR1 plasmid. (Medium 79, 30°C)

FILAMENTOUS FUNGI

Absidia corymbifera (Cohn) Saccardo & A. Trotter
Syn. *Absidia lichtheimii*

D-82194 ATCC 7909 (*Absidia lichtheimii*). (Medium 4, 25°C)

D-95438 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Absidia cylindrospora Hagem

D-95509 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Absidia lichtheimii (Lucet & Costantin) Lendner
See *Absidia corymbifera*

Acremonium implicatum (Gilman & Abbott) W. Gams

D-98695 BEL (6aV). Isolated from catacomb, Italy. (Medium 4, 25°C)

Acremonium furcatum (F. & V. Moreau) ex W. Gams

D-96560 BEL. Isolated from process water of a paper mill, Spain (Medium 4, 25°C)

Acremonium murorum (Corda) W. Gams var. ***murorum***

D-96612 BEL (U56/1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Acremonium persicium (Nicot) W. Gams

D-96614 BEL (U60/A1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Acremonium polychronum (van Beyma) W. Gams

D-96627 BEL. Isolated from a malting plant, Finland. (Medium 4, 25°C)

Acremonium sp.

D-96653 BEL (PIH6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Acremonium strictum W. Gams
Syn. *Cephalosporium acremonium*

D-76043^{T} CBS 346.70 (= ATCC 34717 = DSM 3567). Isolated from old leaf of *Triticum sativum* infested with *Puccinia* sp., Germany. (Medium 4, 25°C)

D-79115 ATCC 10141 (*Cephalosporium acremonium*) (= Stevenson 42-765 A). Isolated from pea, Canada. (Medium 4, 25°C)

D-96567 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96640 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Agaricus bisporus (J. Lange) Imbach
Syn. *Agaricus brunnescens* Peck

D-85264 ATCC 44736. Slightly xylanolytic. Studies on α-glucuronidase (232, 277). (Medium 23, 25°C)

Agaricus brunnescens Peck
See *Agaricus bisporus*

Allescheria terrestris Apinis
See *Thielavia terrestris*

Alternaria alternata (Fries : Fries) von Keissler
Syn. *Alternaria tenuis*

D-76024 HY, Department of Plant Phatology (*Alternaria tenuis*). Isolated from *Hordeum vulgare* (barley). (Medium 4, 25°C)

D-79110 DSM 62006 (= Schramm IMB 12090). Isolated from leaf of *Beta vulgaris*, Germany. (Medium 4, 25°C)

D-79111 DSM 62010 (= IMB 12174). Isolated from leaf of *Zinnia elegans*. (Medium 4, 25°C)

D-96616 BEL (U60/A3). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96664 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Alternaria tenuis Nees
See *Alternaria alternata*

Amorphotheca resinae D. Parbery
Anam. *Hormoconis resinae*
SynA. *Cladosporium resinae*

D-84239 HAMBI (*Cladosporium resinae*). ATCC 34066 (= Rubidge MQAD 22). Isolated from kerosene (aircraft jet fuel). Degrades jet fuel. Studies on spoilage of kerosene (410). (Medium 4, 25°C)

D-85243 Karjalan lennosto (strain Carlson 1) (*Cladosporium* sp.). Isolated from storage tank of kerosene. Degrades kerosene. Studies on spoilage of kerosene (410). (Medium 4, 25°C)

Apiospora montagnei Saccardo
Anam. *Arthrinium arundinis*

D-96663 BEL (LVK1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Arthrinium arundinis State
See *Apiospora montagnei*

Aspergillus amstelodami (Mangin) Thom & Church
See *Eurotium amstelodami*

Aspergillus awamori Nakazawa
Syn. *Aspergillus usamii*

D-71025 ALKO 219 (= NRRL 3112 = ATCC 22342 = MUCL 28815 = BIO 1001). Isolated from bran. Produces amyloglucosidase (US Pat. 3301768, US Pat. 3660236 and US Pat. 3988204). Studies on cellulases and enzymatic hydrolysis (44, 45, 48, 66, 68, 82), hemicellulases (286, 318, 441), amyloglucosidase (53, 48, 107, 197, 220) and esterases (355, 484). (Medium 4 or 75, 25°C)

D-74026 BIO (1002). Variant from VTT D-71025. Studies on ß-galactosidase (lactase) (130) and amyloglucosidase (53, 197). (Medium 4 or 75, 25°C)

D-75027 BIO (1007). Mutant from VTT D-74026. Studies on amyloglucosidase (53, 107, 197, 220). (Medium 4 or 75, 25°C)

D-75028 BIO (1009). Mutant from VTT D-74026. Studies on amyloglucosidase (53, 107, 220), glucuronidase (232), hemicellulases (246, 247, 259, 277, 290, 430), enzymatic hydrolysis (293) and esterases (275, 348). (Medium 4 or 75, 25°C)

D-75029 BIO (1010). Mutant from VTT D-74026. Studies on amyloglucosidase (53, 197). (Medium 4 or 75, 25°C)

D-75030 BIO (1012). Mutant from VTT D-74026. Studies on amyloglucosidase (197). (Medium 4 or 75, 25°C)

D-78091 BIO. Isolated from VTT D-78094. Studies on amyloglucosidase (116, 197). (Medium 4 or 75, 25°C)

D-78094 BIO (1006_4). Mutant from VTT D-74026. Studies on amyloglucosidase (107, 197, 220). (Medium 4 or 75, 25°C)

D-78095 BIO (1002_2). Mutant from VTT D-74026. Produces amyloglucosidase. (Medium 4 or 75, 25°C)

D-78096 BIO (1021_3). Mutant from VTT D-74026. Studies on amyloglucosidase (107, 197, 220). (Medium 4 or 75, 25°C)

D-78097 BIO (1005_3). Mutant from VTT D-74026. Studies on amyloglucosidase (107, 197, 220). (Medium 4 or 75, 25°C)

D-78098 BIO (1009_2). Mutant from VTT D-74026. Studies on amyloglucosidase (197). (Medium 4 or 75, 25°C)

D-79100 BIO (14E). Mutant from VTT D-78091. Studies on amyloglucosidase (99, 116, 197). (Medium 4 or 75, 25°C)

D-79101 BIO (94E). Mutant from VTT D-78091. Studies on amyloglucosidase (99, 116, 197). (Medium 4 or 75, 25°C)

D-79102 BIO (94F). Mutant from VTT D-78091. Studies on amyloglucosidase (99, 116, 197). (Medium 4 or 75, 25°C)

D-79104 BIO (57/F). Mutant from VTT D-78091. Studies on amyloglucosidase (99, 116, 197). (Medium 4 or 75, 25°C)

D-79105 BIO (57/H). Mutant from VTT D-78091. Studies on amyloglucosidase (99, 116, 197). (Medium 4 or 75, 25°C)

D-93212 IFO 4388 (= R-0635). (Medium 4 or 75, 25°C)

D-86268 BIO (D28 UV9). Mutant from VTT D-75028. Improved production of xylanase. (Medium 4 or 75, 25°C)

D-86269 BIO (D28 UV40). Mutant from VTT D-75028. Improved production of xylanase. (Medium 4 or 75, 25°C)

Aspergillus awamori var. ***hominis*** Batista & Maia
See *Aspergillus phoenicis*

Aspergillus cellulosae Hopffe
See *Aspergillus fumigatus* var. *fumigatus*

Aspergillus citricus (Wehmer) Mosseray
See *Aspergillus foetidus*

Aspergillus clavatus Desmazieres

D-76036 Swedish brewery (M 22) (*Aspergillus fumigatus*). Causative agent of beer gushing. Studies on ß-glucosidase (79), xylanase (96),gushing factor (158), siderophores (527). (Medium 4, 25°C)

D-83216 British brewery (B). Isolated from malt. Causative agent of beer gushing. Studies on siderophores (527). (Medium 4, 25°C)

D-94422 BEL (AO E51). Isolated from barley malt, Finland. Causative agent of beer gushing. (Medium 4, 25°C)

Aspergillus ficuum (Reichardt) Hennings

E-97642 DSM 932 (= MUCL 31164 = NRRL 3135). Isolated from soil. Produces extracellular phytase. (Medium 4, 25°C)

Aspergillus flavus Link : Fries

D-77059 CBS 131.61 (= IMI 91856 = ATCC 9643 = DSM 1959 = IFO 6343 = QM 380 = NRRL 3537 = NRRL A-5244 = Weston NDRC S.N.3 = SN 3 = Aust. 3 = AMP 3 = Harvard 997 = Weston 997). Isolated from shoe sole, New Guinea. Assay of wood preservative chemicals. Fungus resistance testing. Produces blasticidin-S deaminase. (Medium 4, 25°C)

D-96556 BEL. Isolated from circulating water of paper mill, Spain. (Medium 4, 25°C)

D-96630 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Aspergillus foetidus Thom & Raper
Syn. *Aspergillus citricus*

D-71001^{T} ATCC 10254 (*Aspergillus niger*) (= NRRL 337 = NCTC 1692 = LSHB Ac72 = DSM 734 = CBS 126.48 = CBS 618.78 = IMI 15954 = IMI 41871 = IFO 6428 = MUCL 28130 = Biourge 739 = Thom 4668.4). Type strain for *Aspergillus citricus*. Produces alcohol, amylases, glucan 1,4- α-glucosidase, lipase, esterase and citric acid. Transformation of baked beans wastewater brewery spent liquor, potato peel waste and beet wastewater. Degrades starch. Produces cattle feed from alkaline potato. Studies on amyloglucosidase (26), ß-glucosidase (79), xylanase (96) and citric acid (117). (Medium 4, 25°C)

D-71002 ATCC 14916 (= Bode UV mutant A 103-1). Produces amyloglucosidase (US Pat. 3249514). Studies on amyloglucosidase (26), ß-glucosidase (79), xylanases (87, 89, 96, 97, 286, 318, 336, 365, 416), citric acid (117) and esterases (355, 484). (Medium 4, 25°C)

Aspergillus fumigatus Fresenius
Syn. *Aspergillus cellulosae*

D-82195 BIO (V1). Isolated from compost soil, Vihti, Finland. Studies on proteinase (208), xylanases and hydrolysis of xylan (286, 318, 338, 365, 416), milk clotting enzyme (282), esterases (355, 484) and biobleaching (367, 520). (Medium 4, 25°C)

D-94426^{T} CBS 113.26 (*Aspergillus cellulosae*) (= ATCC 1028 = WB 164 = NRRL 164 = QM 8004 = Thom 4474.1). Isolated from soil, Germany. (Medium 4, 25°C)

D-95437 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95510 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

* D-97678 BEL (DAS/1). Isolated from compost, Finland. (Medium 4, 25°C)

* D-97679 BEL (DAS/19). Isolated from compost, Finland. (Medium 4, 25°C)

Aspergillus glaucus Link : Fries
See *Eurotium herbariorum*

Aspergillus janus Raper & Thom

D-77060^{T} CBS 118.45 (= IMI 16065 = ATCC 16835 = WB 1787 = QM 7416 = NRRL 1787 = NCTC 6970). Isolated from soil, Panama. (Medium 4, 25°C)

Aspergillus kawachii Kitahara & Yoshida

D-93199 IFO 4308. (Medium 4, 25°C)

Aspergillus nidulans (Eidam) Winter
See *Emericella nidulans*

Aspergillus niger van Tieghem

D-70005 Sanitized Testing Laboratory, Burgdorf, Switzerland. EMPA 18. Disinfectant test strain. Studies on ß-glucosidase (79), xylanase (96, 97), citric acid (117) and amyloglucosidase (197). (Medium 4, 25°C)

D-71006 ATCC 13496 (= MUCL 28820 = Corn Products Co. M-370). Isolated from soil, Louisiana. Produces amyloglucosidase (US Pat. 3012944). Studies on amyloglucosidase (26, 197), ß-glucosidase (79), xylanase (96) and citric acid (117). (Medium 4, 25°C)

D-77020 ATCC 9142 (= NRRL 599 = DSM 821 = CCM F-320 = IMI 41874 = Moyer strain Doelger 2). Produces citric acid (good!) and gluconic acid. 18-hydroxylation of steroids. Conversion of acronycin to 9-hydroxylacronycin. Studies on xylanase (96), citric acid (117), amyloglucosidase (197) and biobleaching (520). (Medium 4, 25°C)

D-77049 ATCC 10577 (= DSM 823 = IMI 27809 = NCTC 7193 = NRRL 2322 = NRRL 2354 = NRRL 581 = QM 6906 = Clement A-1-215 = Bernhauer 256 = Ladenberg strain XXII). Produces citric acid. Studies on ß-glucosidase (79), xylanase (96), citric acid (117) and detection by impedance method (504). (Medium 4, 25°C)

D-77050 ATCC 11414 (= IMI 75353 = NRRL 2270 = Wisconsin strain 72-4 = NRC A-1-233). Isolated from ATCC 1015. Studies on ß-glucosidase (79, 90, 101), xylanases (96, 286, 318), citric acid (117), amyloglucosidase (197), milk clotting enzyme (282) and polygalacturonase (320). Biochemical studies of ß-glucosidase (111, 139, 144, 284). Studies on enzymatic hydrolysis (186, 214, 216, 219), esterases (355, 484), wood debarking (422) and entzymatic treatment of pine extractives (472). (Medium 4, 25°C)

D-77051 ATCC 12846 (= NRRL 567 = QM 6742 = Moyer strain Ayers 34). Produces gluconic acid (US Pat. 3669840). Studies on ß-glucosidase (79), xylanase (96) and citric acid (117). (Medium 4, 25°C)

D-77052 ATCC 26036 (= Das strain C). Isolated from soil. Studies on ß-glucosidase (79), xylanase (96, 97), citric acid (117), growth inhibition (574). (Medium 4, 25°C)

D-77053 ATCC 26550 (= NRC A-1-233 = VTT D-77050). Studies on ß-glucosidase (79), xylanase (96) and citric acid (117). (Medium 4, 25°C)

D-81078 ATCC 6275 (= DSM 1957 = MUCL 19002 = CBS 131.52 = IMI 45551 = IFO 6341 = NRRL 334 = QM 324 = QM 458 = TC 215-4247 = WB 334 = Thom 4247 = Friedrich A98 = ELI 500). Isolated from leather. Produces citric acid (US Pat. 4040906). Degrades apple distillery waste. Fungus resistance testing (US federal and military specifications). Testing of paper and paperboard (ASTM Std. D2020, 1976), of baking primer and waterbased vinyl adhesive, of acrylic paints, of antifungal agent (sulfur), varnish, textile, paint, packing material, adhesive for vinyl, water based plastics and leather. Trace element nutrition studies and bioassay of sulfur. Studies on effect of siderophores (501). (Medium 4, 25°C)

D-79106 BIO. Variant from VTT D-77020. Studies on ß-galactosidase (lactase) (108, 112, 129, 137, 141, 220) and amyloglucosidase (197). Studies on automatic control of production in pilot scale (119, 120). (Medium 4, 25°C)

D-85240 NRRL 3 (= NRRL 566 = ATCC 9029 = DSM 2466 = CBS 120.49 = IMI 41876 = WB 3 = WB 566 = Moyer 3 = Anthony 320). Produces lincomycin sulphoxides (US Pat. 3616244), glucono-delta-lactone, gluconic acid, citric acid from whey permeate, glucose oxidase (US Pat. 3701715), lipase, gluconic acid in the production of aldonic acid and aldonate compositions useful in cleaning solutions (US Pat. 3454501). Treatment of pulp mill wastes (US Pat. 3737374). Studies on hemicellulases (430), entzymatic treatment of pine extractives (472) and biobleaching (520). (Medium 4, 25°C)

D-85245 Hungary (strain BKM F-801). Produces pectinase (polygalacturonase). (Medium 4, 25°C)

D-85246 Hungary (strain BKM F-1305). Produces pectinase (polygalacturonase). Studies on hemicellulases (430). (Medium 4, 25°C)

D-95442 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95528 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96540 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-97590 LCP 48.521. Isolated from termitary, Congo. (Medium 4, 25°C)

D-96632 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96635 BEL. Isolated from a recycled fibre pulp sample, Spain (Medium 4, 25°C)

D-96655 BEL (VR12). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96656 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

D-96672 DSM 1988 (= ATCC 16404 = CMI 149007 = DSM 1387 = IFO 9455 = WLRI 034). Isolated from blueberry, North Carolina. Preservative testing of pharmaceuticals. **Test strain**. (Medium 4, 25°C)

Aspergillus ochraceus Wilhelm

D-77061 CBS 578.68. Isolated from extract with phytoalexins, The Netherlands. (Medium 4, 25°C)

D-96574 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96643 BEL (114). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96650 BEL (85). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Aspergillus oryzae (Ahlburg) Cohn var. ***oryzae***
Syn. *Aspergillus oryzae* var. *viridis*

D-68007 NRRL 458 (= ATCC 9376 = ATCC 10063 = IMI 51983 = WB 458 = USDA 290 = Thom A.o.Old). Studies on ß-glucosidase (79) and xylanase (96). (Medium 4, 25°C)

D-72008 BIO. Isolated from sake rice. Studies on ß-glucosidase (79). (Medium 4, 25°C)

D-85248 Hungary (strain MSD MF-410). Produces lipase. Studies on hemicellulases and hydrolysis of xylan (286, 318, 338, 365, 368, 401, 416, 430, 441), esterases (355, 484), biobleaching (367) and entzymatic treatment of pine extractives (472). (Medium 4, 25°C)

D-88348 DSM 1861 (= NRRL 3484 = Meyer = Steinkraus). Isolated from Indonesian food fermentation. (Medium 4, 25°C)

D-88349 DSM 1864 (= Meyer = Steinkraus strain Higashi). Isolated from Indonesian food fermentation. (Medium 4, 25°C)

D-88350 ATCC 10196 (= ATCC 13791 = NRRL-A 5246 = MUCL 19009 = QM 1273 = Stephanini B-1273). Isolated from painted pine panel in tropical test chambers, Virginia. Fungus resistance testing of paints (US standards), lacquer and varnish. Produces fibrinolytic enzyme. Studies on biobleaching (520). (Medium 4, 25°C)

D-88351 ATCC 14605 (= La Wall & Harrisson Res. Labs., Inc, L & H 58075-RH 368). Produces amylolytic, proteolytic and lipolytic enzymes for incorporation in chewing gums and dentifrices (US Pat. 3194738). Studies on biodegradation of microbial polysaccharides (470). (Medium 4, 25°C)

D-88352 ATCC 11493 (= NRRL 2217 = IMI 52144). Isolated from partially fermented soy bean - wheat flour mixture. Produces protease. Floccose strain. (Medium 4, 25°C)

D-88353 ATCC 20423 (= Tokyo Tanabe Co, Ltd. RT 102 = FERM-P 1680). Isolated from soil, Japan. Produces ß-galactosidase (US Pat 3919049). Studies on β-galactosidase (lactase) (341). (Medium 4, 25°C)

D-88354 ATCC 26850 (*Aspergillus parasiticus*, *Aspergillus oryzae* var. *viridis*) (= Samsinakova 45). Isolated from *Mamestra brassicae*. Produces chitinase, lipase and protease. Entomophagous. Studies on biobleaching (520). (Medium 4, 25°C)

D-88355 ATCC 22788 (*Aspergillus oryzae* var. *viridis*) (= Murakami RIB 128 = CBS 81972 = IFO 30113). Isolated from tane koji, Japan. Produces kojic acid. Rice koji made from this strain turns brown. Type culture for variety. Produces α-amylase, glucoamylase, acid protease, acid carboxypeptidase and deferriferri-chrome. (Medium 4, 25°C)

Aspergillus oryzae var. ***viridis*** Murakami

See *Aspergillus oryzae* var. *oryzae*

Aspergillus phoenicis (Corda) Thom

Syn. *Aspergillus awamori* var. *hominis*

D-76019 QM 329. Studies on ß-glucosidase (78, 79, 90, 101), xylanases (96, 97, 286, 318) and citric acid (117). (Medium 4, 25°C)

Aspergillus restrictus G. Smith

D-77065^{T} CBS 117.33 (= CBS 541.65 = ATCC 16912 = IMI 16267 = WB 154 = NRRL 154 = NRRL 4155 = QM 1979 = NCTC 6976 = LSHB BB.94 = Thom 5660.93 = Smith LSHTM 93). Isolated from cotton goods, UK. (Medium 4, 25°C)

Aspergillus terreus Thom

D-82209 National Institute of Public Health, Budapest (OKI 16/5). Studies on cellulases, ß-glucanase, xylanases (286, 318), esterases (355, 484), α-arabinosidases/ arabinofuranosidases (430, 476, 500, 567, 568, 570). (Medium 4, 25°C)

* D-84227 Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow (strain 146). Studies on xylanase (217) and cellobiohydrolase (217). (Medium 4, 25°C)

D-95440 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Aspergillus usamii Sakaguchi et al.
See *Aspergillus awamori*

Aspergillus ustus (Bainier) Thom & Church

D-96659 BEL (114). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Aspergillus versicolor (Vuillemin) Tiraboschi

D-77063 CBS 584.65 (= ATCC 16856 = WB 239 = QM 1989 = NRRL 239 = Thom 5667.506). Isolated from date fruit (Phoenix dactylifera), California. (Medium 4, 25°C)

D-96566 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96660 BEL (114). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96667 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Aureobasidium pullulans (de Bary) Arnaud
Syn. *Pullularia pullulans*

D-73015 BIO (U2) (*Pullularia pullulans*). Studies on melanin (520). (Medium 4, 25°C)

D-89397 NRRL Y-2311-1. Colourless variant. Studies on hemicellulases (430, 441, 484). (Medium 4, 25°C)

D-95524 BEL. Isolated from a virgin birch fibre sample, Finland. (Medium 4, 25°C)

D-96623 BEL (U88). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96649 BEL (77B). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Aureobasidium sp.

D-95459 BEL (U94). Isolated from berry juice, Finland. (Medium 4, 25°C)

Bipolaris sorokiniana (Saccardo in Sorokin) Shoemaker
See *Cochliobolus sativus*

Botryotinia fuckeliana (de Bary) Whetzel
Anam. *Botrytis cinerea*

D-76044 CBS 124.58 (*Botrytis cinerea*) (= ATCC 12481 = DSM 877 = American Cyanamid Co. N 51). Oxidation of steroids (US Pat. 2789940). (Medium 4, 25°C)

D-98688 ATO, Wageningen "ex aardbei" A2 (*Botrytis cinerea*). Studies on growth inhibition (574). (Medium 4, 25°C)

Botrytis cinerea Persoon : Fries
See *Botryotinia fuckeliana*

Byssochlamys fulva M. Olliver & G. Smith
Anam. *Paecilomyces fulvus*

D-70009 WB. Studies on milk clotting enzyme (18). (Medium 4, 25°C)

Cantharellus cibarius Fries

D-88331 ELI 3010. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88332 ELI 3014. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88333 ELI 3015. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88334 ELI 3017. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88335 ELI 3018. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88336 ELI 3024. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88337 ELI 3027. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88338 ELI 3032. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88339 ELI 3034. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88340 ELI 3050. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88341 ELI 3057. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88364 ELI 3019. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88365 ELI 3021. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88366 ELI 3022. Isolated from spores of basidiocarp, Finland.. (Medium 39, 25°C)

D-88367 ELI 3023. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88368 ELI 3028. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88369 ELI 3035. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88370 ELI 3037. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88371 ELI 3041. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88372 ELI 3043. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88373 ELI 3045. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88374 ELI 3046. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88375 ELI 3047. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-88376 ELI 3049. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

D-89389 ELI 3111. Isolated from spores of basidiocarp, Finland. (Medium 39, 25°C)

Cephalosporium acremonium Corda
See *Acremonium strictum*

Chaetomium cellulolyticum Chahal & D. Hawksworth
See *Chaetomium virescens*

Chaetomium globosum Kunze : Fries

D-81079 ATCC 6205 (= QM 459 = USDA 1042.4 = CBS 148.51 = DSM 1962 = IFO 6347 = IMI 45550 = NRRL 1870 = CEB 1218.2 = Harvard 472). Isolated from stored cotton. Fungus resistance testing (US federal and military specifications). Testing of paper and paperboard (ASTM Std. D2020, 1976), of polymers (ASTM Std. G-21, 1980) and of aerosols. Slimicide evaluation (ANSI/ASTM Std. E599, 1977). Produces cellulases and ß-1,4-glucan-4-glucanohydrolase. (Medium 4, 25°C)

D-96644 BEL (LAM5). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96652 BEL (PIH4). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Chaetomium virescens (von Arx) Udagawa
Syn. *Chaetomium cellulolyticum*

D-83217[T] ATCC 32319 (*Chaetomium cellulolyticum*) (= IMI 185905). Isolated from wheat straw compost prepared for mushroom growing, India. Type strain for *Chaetomium cellulolyticum.* Solid-state fermentation for single cell protein production. Produces cellobiose dehydrogenase. (Medium 4, 37°C)

Chrysonilia crassa (Shear & Dodge) v. Arx
See *Neurospora crassa*

Chrysosporium pruinosum (Gilman & Abbott) Carmichael
See *Phanerochaete chrysosporium*

Cladosporium cladosporioides (Fresenius) de Vries

D-92188 IMI 45534 (*C. herbarum*) (= ATCC 16022 = CBS 174.62 = IFO 31006 = QM 489). Isolated from painted floor, Pennsylvania, USA. Fungus resistance testing (US specifications). (Medium 4, 25°C)

D-96646 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Cladosporium herbarum (Persoon : Fries) Link
See *Mycosphaerella tassiana*

Cladosporium resinae (Lindau) de Vries
See *Amorphotheca resinae*

Cladosporium sphaerospermum Penzig

D-88330 PUU (R2). Isolated from birch plywood, Finland. (Medium 4, 25°C)

D-94423 BEL. Isolated from paperboard, Finland. (Medium 4, 25°C)

D-98680 BEL. Isolated from concrete, Finland. (Medium 4, 25°C)

Cochliobolus sativus (S. Ito & Kuribayashi) Drechsler : Dastur
Anam. *Bipolaris sorokiniana*
SynA. *Helminthosporium sativum*

D-76039 HY, Department of Plant Pathology (6262) (*Helminthosporium sativum*). Isolated from *Hordeum vulgare* (barley). (Medium 4 or 24, 25°C)

D-76040 HY, Department of Plant Pathology (9524) (*Helminthosporium sativum*). Isolated from *Hordeum vulgare* (barley). (Medium 4 or 24, 25°C)

Coniophora puteana (Schumacher : Fries) Karsten

D-88343 ELI (= MUCL 11662 = DSM 3085 = ATCC 36336 = BAM-15 = Eberswalde 15). Wood preservative testing. Studies on detection of laccase activity (310) and production of hydrogen peroxide (344, 385). Xylanolytic. Brown-rot fungus. Studies on biobleaching (520). (Medium 4, 25°C)

Coriolus hirsutus (Wulfen : Fries) Quélet
See *Trametes hirsuta*

Cryphonectria parasitica (Murrill) M.E. Barr
Syn. *Endothia parasitica*

D-70010 ELI (*Endothia parasitica* serie *lutheolostroma*). Studies on milk clotting enzyme (18). (Medium 4, 25°C)

D-70011 ELI (*Endothia parasitica* serie *xanthostroma*). Studies on milk clotting enzyme (18). (Medium 4, 25°C)

D-82190 ATCC 14729 (*Endothia parasitica*) (= Chas. Pfizer Co. FD-14497). Produces milk clotting enzyme (US Pat. 3275453). Studies on milk clotting enzyme (174, 282) and hemicellulases (430). (Medium 4, 25°C)

Curvularia inaequalis (Shear) Boedijn
Syn. *Helminthosporium inaequale*, Shear

D-79112 DSM 62462 (= Schramm IMB 12469). Isolated from withering leaf of *Phleum pratense*, Iceland. (Medium 4, 25°C)

D-79113 DSM 62481 (= Schramm IMB 12354). Isolated from brown leaf spot of *Zea mays*, Germany. (Medium 4, 25°C)

D-79116 CBS 116.22. Isolated from cranberry. (Medium 4, 25°C)

D-79117 CBS 550.69. Isolated from soil under *Pinus strobus*, Canada. (Medium 4, 25°C)

D-79118 ATCC 6478 (*Helminthosporium inaequale*) (= ATCC 7869 = Stevenson 1314 = Shear 51). Isolated from cranberry. (Medium 4, 25°C)

D-79120 ATCC 18471 (= ILLS.34526). Isolated from submerged balsa wood. Studies on ß-galactosidase (lactase) (130). (Medium 4, 25°C)

D-79121 ATCC 34599 (= IMI 78037a = MRL 1091). Isolated from barley seed. Studies on ß-galactosidase (lactase) (130), hemicellulases (430) and protoplasts (149, 201). (Medium 4, 25°C)

Curvularia protuberata Nelson & Hodges

D-79119 ATCC 14992 (= QM 8314 = IMI 12950 = NCTC 1319). Isolated from cranberry. Studies on ß-galactosidase (lactase) (130). (Medium 4, 25°C)

Dipodascus capitatus de Hoog et al.
Anam. *Geotrichum capitatum*

D-95458 BEL (*Geotrichum capitatum*). Isolated from a recycled fibre pulp sample, Finland. Taxonomic studies (576). (Medium 4, 25°C)

D-95532 BEL (*Geotrichum capitatum*). Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Doratomyces stemonitis (Persoon : Fries) Morton & G. Smith

D-96617 BEL (U61/A6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Drechslera teres (Saccardo) Shoemaker
See *Pyrenophora teres*

Emericella nidulans (Eidam) Vuillemin
Anam. *Aspergillus nidulans*

D-88382 University of Bristol, UK (strain M1343) (*Aspergillus nidulans*) (= FGSC 375). Genotype: *suA1adE20, adE20, biA1, acrA1, sA4, pyroA4, pA2, lacA1, nicB8, riboB2*, master strain. (Medium 4 or 60, 25°C)

D-88383 University of Bristol, UK (strain G191) (*Aspergillus nidulans*). Genotype: *pabaA1, pyrG, fwA, uaY*. (Medium 4 or 60, 25°C)

D-88384 University of Bristol, UK (strain 324) (*Aspergillus nidulans*). Genotype: *argB2, methH2, wA3, yA2, ivoA15, galA1*. (Medium 4 or 60, 25°C)

D-88385 University of Bristol, UK (strain O^R6) (*Aspergillus nidulans*)(= ATCC 36531). Genotype: *yA1, pabaA2*, (*oliA1*). (Medium 4 or 60, 25°C)

D-88386 University of Bristol, UK (strain O^R31) (*Aspergillus nidulans*). Genotype: *yA1, pabaA2, oliC31*. (Medium 4 or 60, 25°C)

D-88387 University of Bristol, UK (strain R153) (*Aspergillus nidulans*). Genotype: *wA3, pyroA4*. (Medium 4 or 60, 25°C)

D-88388 University of Bristol, UK (strain R21) (*Aspergillus nidulans*). Genotype: *yA1, pabaA2*. (Medium 4 or 60, 25°C)

D-95439 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4 or 60, 25°C)

Endothia parasitica (Murrill) P.J. & H.W. Anderson
See *Cryphonectria parasitica*

Engyodontium album (Limber) de Hoog
Syn. *Tritirachium album* Limber

D-96619 BEL (U61/A8). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Epicoccum nigrum Link
Syn. *Epicoccum purpurascens*

D-76046 CBS 235.59 (= IMI 79494). (Medium 4, 25°C)

Epicoccum purpurascens Ehrenberg
See *Epicoccum nigrum*

Eurotium amstelodami (Mangin) Thom & Church
Anam. *Aspergillus hollandicus*
Syn. *Aspergillus amstelodami*

D-76035 Swedish brewery (M 22) (*Aspergillus amstelodami*). Causative agent of beer gushing. Studies on ß-glucosidase (79) and xylanase (96). (Medium 4, 25°C)

D-92392 BIO (*Aspergillus glaucus*). Isolated from barley malt. (Medium 4, 25°C)

D-89394 BIO (*Aspergillus repens*). Isolated from barley malt. (Medium 4, 25°C)

Eurotium herbariorum (Wiggers : Fries) Link
Anam. *Aspergillus glaucus*

D-77062 CBS 529.65 (= ATCC 9294 = IMI 16114 = Thom 4640.404 = NRRL 13 = NRRL 24 = NRRL 29 = WB 13 = QM 1971 = LSHB Ac.61 = NCTC 3776). Produces auroglaucin and flavoglaucin. (Medium 4, 25°C)

D-95464 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95534 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Eurotium rubrum König et al.

D-77064 CBS 137.61. Isolated from soil, Padua, Italy. (Medium 4, 25°C)

Exophiala jeanselmei (Langeron) McGinnis & Padhye

D-94430 BEL. Isolated from condense water basin in a nuclear power plant, Finland. (Medium 4, 25°C)

D-96483 BEL . Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Exophilia jeanselmei (Langeron) McGinnis & Padhye var. ***lecanii-corni*** (Benedek & Specht) de Hoog

D-95535 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Fomes annosus (Fries : Fries) Cooke
See *Heterobasidion annosum*

Fusarium acuminatum Ellis & Everhart
See *Gibberella acuminata*

Fusarium arthrosporioides Sherbakoff

D-81071 IMI 125834 b (= ATCC 24361 = CBS 314.73). Isolated from *Azalea* sp., New Zealand. (Medium 24, 25°C, daylight)

Fusarium avenaceum (Corda : Fries) Saccardo
See *Gibberella avenacea*

Fusarium cerealis Cooke
Syn. *Fusarium crookwellense*

D-96601 BEL (II). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

Fusarium chlamydosporum Wollenweber & Reinking

D-77055 MTTK 76227/2/4. Isolated from grain. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

Fusarium crookwellense Burgess et al.
See *Fusarium cerealis*

Fusarium culmorum (W.G. Smith) Saccardo

D-72012 MTTK 72313/20. Isolated from barley. Produces zearalenone (F-2 toxin). Studies on toxins (29, 32, 38, 71, 103, 106, 133) and xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-76037 HY, Department of Plant Pathology. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82088 BIO (EBC-80 Jokioinen VII). Isolated from barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-80148 BIO (30) (= MUCL 28166). Isolated from barley. Causative agent of beer gushing. Studies on beer gushing factor (158), artificial contamination (166, 190), xylose fermentation (148, 181), deoxynivalenol (521), siderophores (527), growth inhibition (574). (Medium 24, 25°C, daylight)

D-80149 BIO (36) (= MUCL 28167). Isolated from barley. Causative agent of beer gushing. Studies on artificial contamination (166, 190). (Medium 24, 25°C, daylight)

D-82171 BIO (EBC-80 Jokioinen X). Isolated from germinating barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-82174 BIO (EBC-80 Jokioinen XIV). Isolated from germinating barley. Causative agent of beer gushing. Studies on siderophores (527). (Medium 24, 25°C, daylight)

D-82176 BIO (EBC-80 Jokioinen XVI). Isolated from germinating barley. Causative agent of beer gushing. Studies on beer gushing factor (158). (Medium 24, 25°C, daylight)

D-82179 BBA 62191. Isolated from spicule of *Triticum*, Germany. (Medium 24, 25°C, daylight)

D-82180 BBA 64218. Isolated from malted kernel of *Hordeum vulgare* (barley), Finland. (Medium 24, 25°C, daylight)

D-96606 BEL (XV). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96609 BEL (XXI). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

Fusarium equiseti (Corda) Saccardo
See *Gibberella intricans*

Fusarium graminearum Schwabe
See *Gibberella zeae*

Fusarium lateritium Nees : Fries var. ***lateritium***
See *Gibberella baccata*

Fusarium merismoides Corda var. ***merismoides***

D-95469 BEL. Isolated from pilot malting process, Finland. Orange. (Medium 4, 20°C)

Fusarium nivale var. ***majus*** Wollenweber
See *Monographella nivalis* var. *neglecta*

Fusarium oxysporum Schlechtendahl : Fries

D-80134 MTTK 76116. Isolated from grain. Studies on xylose fermentation (138, 148, 181, 182, 187, 214, 216, 219), immobilization (156, 181), xylose catabolism (157, 163, 181), carbon sources (168, 181, 182), hemicellulases (247, 259, 277, 430), xylonic acid (300), detection by impedance method (504) and effect of microbisidic substances (504). (Medium 24, 25°C, daylight)

D-80135 MTTK 7910. Isolated from grain. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82178 BIO (XIX) (*Fusarium* sp.). Isolated from potato, Finland. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-82183 BBA 62290. Isolated from vascular bundle of wilting plant of *Cucumis sativus*, Germany. Studies on xylose fermentation (181). (Medium 24, 25°C, daylight)

D-95545 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 24, 25°C, daylight)

Fusarium oxysporum f.sp. ***tulipae*** Apt

D-98690 CBS 195.65 (=ATCC 16062 = BBA 8248 = CBS 242.59). Isolated from bulb of *Tulipa sp*., Germany. Studies on growth inhibition (574). (Medium 24, 25°C, daylight)

Fusarium oxysprum fsp. ***lini*** (Bolley) Snyder & Hansen

D-80140 ATCC 10960 (= Christensen strain 1). Produces malic enzyme. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

Fusarium pallidoroseum (Cooke) Saccardo
Syn. *Fusarium semitectum*

D-81073 IMI 160602 (= CBS 131.73 = ATCC 24386) (*Fusarium semitectum*). Isolated from *Musa sapientum* var. *robusta*, Windward Islands. (Medium 24, 25°C, daylight)

D-82184 BBA 62404 (*Fusarium semitectum*). Isolated from rotting germ of *Dioscorea composita*, Guatemala. (Medium 24, 25°C, daylight)

Fusarium poae (Peck) Wollenweber

D-76038 HY, Department of Plant Pathology. Isolated from barley. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82182 BBA 62376. Isolated from kernel of *Avena sativa*, Germany. (Medium 24, 25°C, daylight)

Fusarium sambucinum Fuckel
See *Gibberella pulicaris*

Fusarium semitectum Berkeley & Ravenel
See *Fusarium pallidoroseum*

Fusarium solani (Martius) Saccardo
See *Nectria haematococca* var. *brevicona*

Fusarium sp.

D-79127 Carlsberg Central Laboratorium (No 89, *Elegans*-group). Possibly atypical *Fusarium* section *liseola* species. Causative agent of beer gushing. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-79128 Carlsberg Central Laboratorium (No 90, *Sporotrichiella*-group). Possibly atypical *Fusarium graminearum*. Causative agent of beer gushing. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

Fusarium sporotrichioides Sherbakoff

D-72014 MTTK 72187-10K (*Fusarium tricinctum*) (= MTTK 72187-12). Isolated from grain. Produces T-2 toxin. Studies on toxins (32, 38, 42, 47, 76, 88, 103, 105, 106, 122, 127, 133, 134) and xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-77058 MTTK 7683. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82084 BBA 62423. Isolated from seed of *Pinus nigra*. (Medium 24, 25°C, daylight)

D-80138 MTTK 72187. Isolated from grain. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82175 BIO (EBC-80 Jokioinen XV). Isolated from germinating barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

Fusarium tricinctum (Corda) Saccardo
See *Gibberella trincta*

Fusarium verticillioides (Saccardo) Nirenberg
See *Gibberella moniliformis*

Galactomyces geotrichum (Butler & Petersen) Redhead & Malloch
Anam. *Geotrichum candidum*

D-84228 ATCC 26195 (*Geotrichum candidum*) [= DSM 6401 = Bordeleau 107-C (L-3)]. Isolated from Nixon sand loam, USA. Produces peroxidase and aniline oxidase. Biotransformation of herbicide-derived anilines. Utilizes ethylmethylketone. Studies on biobleaching (520). (Medium 4, 25°C)

D-84238 Finnish paper mill (*Geotrichum candidum*). Isolated from paper machine. Studies on biobleaching (520). (Medium 4, 25°C)

D-94425 BEL (1M). Isolated from malting process, Finland. (Medium 4, 25°C)

D-95519 BEL (*Geotrichum candidum*). Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95527 BEL (*Geotrichum candidum*). Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95550 BEL (*Geotrichum candidum*). Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95473 BEL (11) (*Geotrichum candidum*). Isolated from salad, Finland. (Medium 4, 25°C)

D-97648 MUCL 9125 (*Geotrichum candidum*). Isolated from brie cheese, Leuven, Belgium. (Medium 4, 25°C)

D-99683 DSM 1240 (*Geotrichum candidum*). Isolated from tomato, USA. Quality control strain according to DIN 58959-7. Bioassay for *Pseudomonas syringae* toxic peptides, disinfectant testing in milk processing machines. **Teatching strain. Test strain**. (Medium 4, 25°C)

Geotrichum candidum Link & Fries
See *Galactomyces geotrichum*

Geotrichum capitatum (Diddens & Lodder) von Arx
See *Dipodascus capitatus*

Gibberella acuminata Wollenweber
Anam. *Fusarium acuminatum*

D-81072 IMI 136675 (*Fusarium acuminatum*) (= ATCC 24359 = CBS 120.73). Isolated from grain of *Oryza sativa*, Denmark. At CBS *Fusarium longipes*. (Medium 24, 25°C, daylight)

Gibberella avenacea R.J. Cook
Anam. *Fusarium avenaceum*

D-77054 MTTK 76384 (*Fusarium avenaceum*). Isolated from grain, Finland. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-80141 BIO (4) (*Fusarium avenaceum*). Isolated from barley, Finland. Causative agent of beer gushing. Studies on beer gushing (131), artificial contamination (166, 190) and xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-80146 BIO (5) (*Fusarium avenaceum*). Isolated from barley, Finland. Studies on xylose fermentation (148, 181) and artificial contamination (166). (Medium 24, 25°C, daylight)

D-80147 BIO (19) (*Fusarium avenaceum*). Isolated from barley, Finland. Causative agent of beer gushing. Studies on beer gushing (131), artificial contamination (166, 190), xylose fermentation (148, 181), siderophores (527), growth inhibition (574). (Medium 24, 25°C, daylight)

D-82173 BIO (EBC-80 Jokioinen XIII) (*Fusarium avenaceum*). Isolated from germinating barley, Finland. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-96602 BEL (IV) (*Fusarium avenaceum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96604 BEL (X) (*Fusarium avenaceum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96605 BEL (XII) (*Fusarium avenaceum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96608 BEL (XIX) (*Fusarium avenaceum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

Gibberella baccata (Wallroth) Saccardo

Anam. *Fusarium lateritium* var. *lateritium*

D-81074 IMI 172217 (*Fusarium lateritium*). Isolated from *Sarothamnus scoparius*, UK. (Medium 24, 25°C, daylight)

D-82187 BBA 62245 (*Fusarium lateritium*). Isolated from rotting sprout of *Tillandsia latifolia*, Germany. (Medium 24, 25°C, daylight)

Gibberella intricans Wollenweber

Anam. *Fusarium equiseti*

D-82087 BBA 62208 (*Fusarium equiseti*). Isolated from rotting fruit of *Cucumis melo*, Turkey. (Medium 24, 25°C, daylight)

Gibberella moniliformis Wineland
Anam. *Fusarium verticillioides*

D-82186 BBA 63198 (*Fusarium verticillioides*). Isolated from leaf of sugarcane, Columbia. (Medium 24, 25°C, daylight)

Gibberella pulicaris (Fries : Fries) Saccardo
Anam. *Fusarium sambucinum*

D-77056 MTTK 76246/1/15 (*Fusarium sambucinum*). Isolated from grain. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82172 BBA 62397 (*Fusarium sambucinum*). Isolated from rotting tuber of *Solanum tuberosum*, Germany. (Medium 24, 25°C, daylight)

Gibberella tricincta El-Gholl
Anam. *Fusarium tricinctum*

D-80139 MTTK 76174/2/12 (*Fusarium tricinctum*). Isolated from grain. Studies on toxins (133), xylose fermentation (148, 181), siderophores (527). (Medium 24, 25°C, daylight)

D-82181 BBA 62448 (*Fusarium tricinctum*). Isolated from kernel of *Triticum aestivum* (wheat), Finland. (Medium 24, 25°C, daylight)

D-96600 BEL (I) (*Fusarium tricinctum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96603 BEL (V) (*Fusarium tricinctum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

D-96607 BEL (XVI) (*Fusarium tricinctum*). Isolated from barley, Finland. (Medium 24, 25°C, daylight)

Gibberella zeae (Schweinitz) Petch
Anam. *Fusarium graminearum*

D-76013 MTTK 7137-18-13 (*Fusarium graminearum*). Studies on toxins (32, 38, 133), xylose fermentation (148, 181), growth inhibition (574). (Medium 24, 25°C, daylight)

D-82081 BBA 62722 (*Fusarium graminearum*). Isolated from rotting base of *Lolium perenne*, Germany. (Medium 24, 25°C, daylight)

D-82082 BIO (EBC Jokioinen III) (*Fusarium graminearum*). Isolated from barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-82086 BIO (EBC-80 Jokioinen V) (*Fusarium graminearum*). Isolated from barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-79129 Carlsberg Central Laboratorium, Denmark (No 91) (*Fusarium graminearum*). Causative agent of beer gushing. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-80136 MTTK 72460 (*Fusarium avenaceum, Fusarium graminearum*). Studies on toxins (133) and xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-80137 MTTK 70142-II-17 (*Fusarium graminearum*). Studies on toxins (133) and xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-80143 IFO 4474 (*Fusarium graminearum*). Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82169 BIO (EBC-80 Jokioinen VIII) (*Fusarium graminearum*). Isolated from barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-82170 BIO (EBC-80 Jokioinen IX) (*Fusarium graminearum*). Isolated from germinating barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-82177 BIO (EBC-80 Jokioinen XVIII) (*Fusarium graminearum*). Isolated from germinating barley. Causative agent of beer gushing. (Medium 24, 25°C, daylight)

D-95470 NRRL 5883 (*Fusarium graminearun*). Studies on production of deoxynivalenol (521). (Medium 24, 25°C, daylight)

D-95471 NRRL 6206 (*Fusarium graminearun*). Studies on growth inhibition (574). (Medium 24, 25°C, daylight)

D-95472 NRRL 6207 (*Fusarium graminearun*). (Medium 24, 25°C, daylight)

Gilmaniella humicola Barron

D-94428 Finnish paper mill. Isolated from paperboard, Finland. (Medium 4, 25°C)

D-94429 Finnish paper mill. Isolated from paperboard, Germany. (Medium 4, 25°C)

D-95452 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

D-95453 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

D-95461 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

D-95462 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

D-95463 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

D-96595 BEL. Isolated from a recycled fibre board sample, Spain. (Medium 4, 25°C)

D-96597 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 4, 25°C)

D-96599 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 4, 25°C)

Gilmaniella sp.

D-95514 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95551 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 4, 25°C)

Gliocladium nigrovirens van Beyma

D-95548 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Gliocladium virens J.H. Miller et al.
Syn. *Trichoderma virens*

D-83215 ATCC 9645 (*Trichoderma* sp.) (= IMI 45553 = MUCL 19014 = QM 365 = NRRL 2314 = CBS 430.54 = DSM 1963 = IFO 6355 = IFO 9166 = Weston T-1). Isolated from soil, Madison, USA. Degrades plastics. Fungus resistance testing (US federal and military specifications; ASTM Std. G-21, 1980). Produces cattle feed from alkaline potato. Testing of varnish, wax, aircraft components, automotive components, electrical and electronic equipment, packing material, plastics, textile, aircraft transmission components, insulation and antifungal agents (paranitrophenol). Studies on biobleaching (520). (Medium 4, 25°C)

D-96565 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96588 BEL. Isolated from circulating water of paper mill, Spain. (Medium 4, 25°C)

D-96629 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Gliocladium roseum Bainier

D-96593 BEL. Isolated from circulating water of paper mill, Spain. (Medium 4, 25°C)

Gloeophyllum trabeum (Persoon : Fries) Murrill

D-90412 PUU (GL 109) (*Lenzites trabea*) (= DSM 3087 = MUCL 11353 = BAM-109 = Eberswalde 109). Wood preservative testing. Studies on hydrogen peroxide (381, 385), carbohydrate degrading enzymes (382, 393) and xylanase (455). (Medium 21, 25°C)

Hamigera avellanea (Thom & Turesson) Stolk & Samson

D-96554 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Helminthosporium inaequale Shear
See *Curvularia inaequalis*

Helminthosporium sativum Pammel et al.
See *Cochliobolus sativus*

Helminthosporium teres Saccardo
See *Pyrenophora teres*

Heterobasidion annosum (Fries : Fries) Brefeld
Syn. *Fomes annosus*

D-83213 Metsäntutkimuslaitos, Suonenjoki (FA 46) (*Fomes annosus*). (Medium 3 or 4 or 23, 25°C)

D-84225 PUU (Fan F10) (*Fomes annosus*). Isolated from *Pinus sylvestris*, Sysmä, Finland. (Medium 3 or 4 or 23, 25°C)

Hormoconis resinae (Lindau) von Arx & de Vries
See *Amorphotheca resinae*

Humicola grisea var. ***thermoidea*** Cooney & Emerson

D-96493^{T} IMI 126329 (= ATCC 16453 = Cooney 48-1). Isolated from dung of elephant, California, USA. Studies on thermostable laccase (laccase negative) (512). (Medium 4, 40°C)

Hypocrea jecorina

D-93421 Techische Universität Wien (= CBS 816.91). (Medium 4, 25°C, daylight)

Hypocrea rufa (Persoon : Fries) Fries
See *Trichoderma viride*

Inonotus weirii (Murrill) Kotlaba & Pouzar
Syn. *Poria weirii*

D-84229 ATCC 22568 (*Poria weirii*) (= Koenigs T-91). Isolated from douglas fir. Produces peroxidase. (Medium 4 or 23, 25°C)

D-84230 ATCC 14795 (*Poria weirii*) (= DSM 3558 = Lombard FP-91601-S). Isolated from sporophore tissue of douglas fir. Produces peroxidase. (Medium 4 or 23, 25°C)

D-84231 ATCC 22569 (*Poria weirii*) (= Koenigs T-103). Isolated from douglas fir. Produces peroxidase. (Medium 4 or 23, 25°C)

D-85244 ATCC 22570 (*Poria weirii*) (= Koenigs T-154). Isolated from douglas fir. Studies on glucuronidase (232) and peroxidase (264). (Medium 4 or 23, 25°C)

Irpex lacteus (Fries : Fries) Fries

D-79108 KY-2902 (= ATCC 44426 = Kawai OUT 3001). Isolated from dead hardwood. Produces cellulases. (Medium 4, 25°C)

Lecythophora hoffmannii (van Beyma) W. Gams

D-96624 BEL (U73/9K). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Lecythophora lignicola Nannfeldt

D-96484 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Lecythophora mutabilis (van Beyma) W. Gams

D-95454 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96486 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Lecythophora sp.

D-95536 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Lentinula edodes (Berkeley) Pegler
Syn. *Lentinus edodes*

D-86273 ELI 2095 (=Fujimoto Taiyo). Studies on cultivation (432). (Medium 32, 25°C)

D-86274 ELI 2096 (= Fujimoto Oosora). Studies on cultivation (432). (Medium 32, 25°C)

D-86277 ELI 2107 (= Fujimoto Wasetoshun). Studies on cultivation (432). (Medium 32, 25°C)

D-86278 ELI 2108 (= ATCC 38221 = Kurzman Le-1 = Mori Co. W-4). Commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-86280 ELI 2112 (= Fujimoto Yamato 958). Studies on cultivation (432). (Medium 32, 25°C)

D-86281 ELI 2113 (= Fujimoto Yamato 72). Studies on cultivation (432). (Medium 32, 25°C)

D-86282 ELI 2114 (= Fujimoto MDOG). Studies on cultivation (432). (Medium 32, 25°C)

D-86283 ELI 2115 (= Fujimoto Kasayamato). Studies on cultivation (432). (Medium 32, 25°C)

D-86284 ELI 2117 (= Fujimoto WD 09). Studies on cultivation (432). (Medium 32, 25°C)

D-86285 ELI 2118 (= Fujimoto HW 05). Studies on cultivation (432). (Medium 32, 25°C)

D-86286 ELI 2119 (= Fujimoto HIC A). Studies on cultivation (432). (Medium 32, 25°C)

D-86288 ELI 2121 (= Fujimoto HIC B). Studies on cultivation (432). (Medium 32, 25°C)

D-86289 ELI 2122 (= Fujimoto Shuko). Studies on cultivation (432). (Medium 32, 25°C)

D-86290 ELI 2123 (= Fujimoto Hinode). Studies on cultivation (432). (Medium 32, 25°C)

D-86292 ELI 2097 (= Fujimoto Wasetoshun). Studies on cultivation (432). (Medium 32, 25°C)

D-86293 ELI 2098 (= Fujimoto Hinode). Studies on cultivation (432). (Medium 32, 25°C)

D-86294 ELI 2099 (= Fujimoto Sanko). Studies on cultivation (432), production of spawn and degrading enzymes (439). (Medium 32, 25°C)

D-86296 ELI 2102 (= Thompson & Morgan = Meen strain II). Finnish commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-86297 ELI 2103 (= strain Takkinen). German commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-86298 ELI 2104 (= Fujimoto Taiyo). Studies on cultivation (432). (Medium 32, 25°C)

D-86299 ELI 2106 (= Fujimoto Wasetoshun). Studies on cultivation (432). (Medium 32, 25°C)

D-86300 ELI 2110 (= Fujimoto New Taiyo). Studies on cultivation (432). (Medium 32, 25°C)

D-86301 ELI 2111 (= Fujimoto Oosora). Studies on cultivation (432). (Medium 32, 25°C)

D-86302 ELI 2116 (= Fujimoto Sanko). Studies on cultivation (432). (Medium 32, 25°C)

D-86303 ELI 2124 (= Fujimoto Wasetoshun). Studies on cultivation (432). (Medium 32, 25°C)

D-87322 ELI 2088 (= Fujimoto Oosora). Studies on cultivation (432), production of spawn and degrading enzymes (439). (Medium 32, 25°C)

D-87323 ELI 2089 (= Fujimoto Taiyo). Studies on cultivation (432), production of spawn and degrading enzymes (439). (Medium 32, 25°C)

D-87325 ELI 2091 (= Fujimoto Sanko). Studies on cultivation (432), production of spawn and degrading enzymes (439). (Medium 32, 25°C)

D-87326 ELI 2092 (= Fujimoto Wasetoshun). Studies on cultivation (432), production of spawn and degrading enzymes (439). (Medium 32, 25°C)

D-88344 ELI 2087 (= Shi-taki Somycel, Siemen Oy, Finland, strain 4055). Commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-88345 ELI 2085 (= Tauber Mushroom, The Netherlands, strain S600). Commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-88346 ELI 2084 (= Mushroom People, USA, strain 841). Commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-88347 ELI 2086 (= Allergon Ab, Schweden). Commercial shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-88377 ELI 2084 I. Isolated from the basidiocarp of the strain VTT D-88346. Studies on cultivation (432). (Medium 32, 25°C)

D-88378 ELI 2087 I. Isolated from the basidiocarp of the strain VTT D-88344. Studies on cultivation (432). (Medium 32, 25°C)

D-88379 ELI 2119 I. Isolated from the basidiocarp of the strain VTT D-86286. Studies on cultivation (432). (Medium 32, 25°C)

D-88380 ELI 2120 I. Isolated from the basidiocarp of the strain VTT D-86287. Studies on cultivation (432). (Medium 32, 25°C)

D-90398 ELI 2076 (= Fujimoto, Sanko). Studies on cultivation (432). (Medium 32, 25°C)

D-90399 ELI 2077 (= Fujimoto, Taiyo). Studies on cultivation (432). (Medium 32, 25°C)

D-90400 ELI 2078 (= Fujimoto, Tenko). Studies on cultivation (432). (Medium 32, 25°C)

D-90402 ELI 2080 (= T. Toyomasu). Studies on cultivation (432). (Medium 32, 25°C)

D-90403 ELI 2081 (= T. Toyomasu). Studies on cultivation (432). (Medium 32, 25°C)

D-90404 ELI 2082 (= T. Toyomasu). Shiitake mushroom. Studies on cultivation (432). (Medium 32, 25°C)

D-90405 ELI 2127 (= Liao, Zhi). (Medium 32, 25°C)

D-98684 CBS 532.90. Spawn Company, Japan, Champighon-kwekerij RONDA. (Medium 32, 25°C)

D-98685 ATCC 96384 (= Chang TCE02). Isolated from sawdust log, Taichung, Taiwan. (Medium 32, 25°C)

D-98686 ATCC 200000 (= Maziero CCB 072). Commercial strain, Taiwan. Produces exopolysaccharides. (Medium 32, 25°C)

Lentinus edodes (Berkeley) Singer
See *Lentinula edodes*

Lentinus tigrinus (Bulliard : Fries) Fries
Syn. *Panus tigrinus* var. *tigrinus*

* D-90414 Institute of Plant Biochemistry, Georgian Academy of Sciences, Tbilisi (IPB-101) (*Cortinus tigrinus*, *Panus tigrinus* var. *tigrinus*). Growth on cellulose, xylan and gluconic acid. Produces Mn-dependent peroxidase, laccase, cellulase, xylanase and glucosidase. (Medium 21, 25°C)

Melanocarpus albomyces (Cooney & Emerson) von Arx

D-96490 IMI 255989. Isolated from soil, Saudi Arabia. Studies on thermostable laccase (good laccase +) (512). (Medium 23 or 24, 37-45°C)

Metarhizium glutinosum Pope
See *Myrothecium verrucaria*

Microascus cirrosus Curzi

D-95446 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Microdochium nivale var. ***majus*** (Wollenweber) Samuels & Hallet
See *Monographella nivalis* var. *neglecta*

Microsphaeropsis sp.

D-96657 BEL (113A) (*Coniothyrium* sp.). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Monascus ruber van Tieghem

D-88356 IMI 138019 (= Broadbent 2139). Isolated from *Zea mays*, Nigeria. (Medium 4, 25°C)

Monocillium bulbillosum W. Gams

D-96611 BEL (U53/2). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Monocillium curvisetosum W. Gams & Turhan

D-95456 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95457 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95460 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96485 BEL. Isolated from a recycled fibre pulp sample, Finland. Probably *M. curvisetosum*, but proportion of cylindrical conidia and slender phialides is higher. (Medium 4, 25°C)

D-96576 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Monocillium tenue W. Gams

D-96666 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Monographella nivalis var. ***neglecta*** (Krampe) Gerlach
Anam. *Microdochium nivale* var. *majus*
SynA. *Fusarium nivale* var. *majus*

D-94433 CBS 741.79 (*Microdochium nivale* var. *majus*) (= BBA 62281). Isolated from *Triticum aestivum* (wheat), Germany. (Medium 4, UV, 18°C)

Mucor circinelloides van Tieghem

D-95500 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95538 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96563 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Mucor circinelloides f. ***griseocyanus*** (Hagem) Schipper
Syn. *Mucor griseocyanus*

D-82202 BIO (V8). Isolated from compost soil, Vihti, Finland. Studies on milk clotting enzyme (208, 282). (Medium 4, 25°C)

Mucor griseocyanus Hagem
See *Mucor circinelloides* f. *griseocyanus*

Mucor hiemalis Wehmer

D-82200 BIO (V6). Isolated from compost soil, Vihti, Finland. Studies on milk clotting enzyme (208). (Medium 4, 25°C)

D-82203 BIO (V9). Isolated from compost soil, Vihti, Finland. Studies on milk clotting enzyme (208). (Medium 4, 25°C)

D-82204 BIO (V10). Isolated from compost soil, Vihti, Finland. Studies on milk clotting enzyme (208, 282). (Medium 4, 25°C)

D-95521 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95549 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96569 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96578 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96585 BEL. Isolated from cirulating water of paper mill, Spain. (Medium 4, 25°C)

Mucor miehei Cooney & Emerson
See *Rhizomucor miehei*

Mucor plumbeus Bonorden

D-94431 BEL. Isolated from leaf of *Hordeum vulgare* (barley) grown in greenhouse, Finland. (Medium 4, 25°C)

D-95499 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95507 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95520 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95525 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96568 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96645 BEL (LVK1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Mucor pusillus Lindt
See *Rhizomucor pusillus*

Mucor racemosus Fresenius

D-95517 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95546 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Mucor sp.

D-82191 ATCC 13606 (= Pfizer Inc. FD 11215). Studies on milk clotting enzyme (174, 282). (Medium 4, 25°C)

Myceliophthora fergusii (Klopotek) v. Oorschot

D-95523 BEL. Isolated from sterilized rye straw, France. Produces cellulolytic enzymes. (Medium 2, 25°C)

Myceliophthora thermophila (Apinis) van Oorschot
See *Thielavia heterothallica*

Mycosphaerella tassiana (de Notaris) Johanson
Anam. *Cladosporium herbarum*

D-76045 CBS 121.47 (*Cladosporium herbarum*). Isolated from frozen *Phaseolus vulgaris*. (Medium 4, 25°C)

Myrothecium gramineum Libert

D-84232 CBS 324.54 (= IMI 55309 = MUCL 11831 = QM 7979). Isolated from prairie soil, USA. (Medium 24, 25°C)

D-84233 CBS 449.71. Studies on extracellular peroxidase (198, 230). Produces roridin A toxin. (Medium 24, 25°C)

Myrothecium verrucaria (Albertini & Schweinitz : Fries) Ditmar
Syn. *Metarhizium glutinosum*

D-84234^{T} CBS 328.52 (*Metarhizium glutinosum*) (= CBS 253.47 = MUCL 19018 = DSM 2087 = ATCC 9095 = IMI 45541 = IMI 140058 = NRRL 1875 = NRRL 2003 = IFO 6113 = IFO 6133 = IFO 6351 = IZ 473 = QM 460 = USDA 1334.2 = CEB 3716.5 = Harvard 721 = EMPA 144 = Marsh 1334.2). Isolated from cotton bale, Washington DC, USA. Type strain for *M. glutinosum* and neotype for *M. verrucaria*. Fungus resistance testing (US federal specifications). Fungitoxicity of alcohols and fatty acids. Testing of textile, aircraft transmission components, aircraft components and sandbag. Produces cellulases. Urea hydrolyase inducable. Utilizes cyanamide. (Medium 24, 25°C)

Nectria haematococca var. ***brevicona*** (Wollenweber) Gerlach
Anam. *Fusarium solani*

D-77057 MTTK 76370 (*Fusarium solani*). Isolated from grain. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-79109 IMI 95994 (*Fusarium solani*). Isolated from tail of iguana, Bristol Zoo, UK. Studies on xylose fermentation (148, 181). (Medium 24, 25°C, daylight)

D-82185 BBA 62419 (*Fusarium solani*). Isolated from rotting root of *Cucumis melo*, Turkey. Studies on biobleaching (520). (Medium 24, 25°C, daylight)

D-96625 BEL (U92) (*Fusarium solani*). Isolated from mouldy house, Finland. (Medium 24, 25°C, daylight)

Nectria inventa Pethybridge
Anam. *Verticillium luteoalbum* (Link : Fries) Subramanian

D-96621 BEL (U62/A5). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Neurospora crassa Shear & B.O. Dodge
Anam. *Chrysonilia crassa*

D-75017 ATCC 9278 (= IMI 31288 = CBS 241.55 = FGSC 548 = IFO 6659 = DSM 894 = Beadle 1633). Mating type A. Assay of p-aminobenzoic acid. (Medium 4 or 25, 25°C)

D-94432 BEL. Isolated from leaf of *Hordeum vulgare* (barley) grown in greenhouse, Finland. (Medium 4 or 25, 25°C)

D-96561 BEL (*Chrysonilia crassa*). Isolated from a recycled fibre pulp sample, Spain. (Medium 4 or 25, 25°C)

Nigrospora sp.

D-79122 Japanese brewery (No 207). Causative agent of beer gushing. (Medium 4, 25°C)

Ochroconis gallopava (W.B. Cooke) de Hoog

D-96533 BEL. Isolated from a recycled fibre pulp sample, Finland. Potentially neurotropic pathogen. (Medium 4, 35°C)

Paecilomyces fulvus Stolk & Samson
See *Byssochlamys fulva*

Paecilomyces variotii Bainier
Syn. *Penicillium divaricatum*

D-83214 ATCC 18502 (*Penicillium divaricatum*) (= ATCC 10121 = CBS 284.48 = IMI 40025 = QM 6764 = DSM 1961 = NRRL 1115 = Thom 34). Isolated from mucilage bottle with library paste, USA. Fungus resistance tests. (Medium 4, 25°C)

D-95449 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95513 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96559 BEL. Isolated from circulating water of paper mill, Spain. (Medium 4, 25°C)

D-96573 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96596 BEL. Isolated from a recycled fibre board sample, Spain. (Medium 4, 25°C)

D-96628 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96639 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96654 BEL (VR2). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Panus tigrinus (Bulliard : Fries) Singer var. ***tigrinus***
See *Lentinus tigrinus*

Penicillium aurantiogriseum Dierckx

D-80142 BIO (1). Isolated from commercial barley malt, Finland. Causative agent of beer gushing. Studies on beer gushing (131, 158), growth inhibition (574). (Medium 4, 25°C)

D-95475 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95506 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium brevicompactum Dierckx

D-92032 BIO (2). Isolated from margarine, Finland. (Medium 4, 25°C)

D-94424 BEL. Isolated from paperboard, Finland. (Medium 4, 25°C)

D-95512 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96665 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Penicillium chrysogenum Thom

D-74021 Fermion Oy. NRRL A-51. Produces penicillin G. (Medium 4, 25°C)

D-88381 University of Bristol, UK (strain 1951) (= NRRL 1951 = ATCC 9480 = CBS 307.48 = IMI 40233 = QM 941). Prototype of high-yielding penicillin strains in submerged culture. Produces antiviral agent consisting of double-stranded RNA (US Pat. 3597318) and siderophores. (Medium 4, 25°C)

D-95496 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95531 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96558 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

D-96587 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96591 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96638 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96661 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Penicillium citrinum Thom

D-96594 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

Penicillium commune Thom

D-95497 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95530 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95541 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium corylophilum Dierckx

D-95441 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95537 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium crustosum Thom

D-95447 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95522 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96552 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96636 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Penicillium digitatum (Persoon : Fries) Saccardo

D-87328 BIO. Isolated from mouldy orange, Finland. Studies on hemicellulases (430). (Medium 4, 25°C)

Penicillium divaricatum Thom
See *Paecilomyces variotii*

Penicillium echinulatum Raper & Thom : Fassatiova

D-92031 BIO (1). Isolated from margarine, Finland. Less echinulate conidia. (Medium 4, 25°C)

Penicillium expansum Link

D-95539 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium glabrum (Wehmer) Westling

D-96557 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

D-96633 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96637 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Penicillium funiculosum Thom

D-81080 ATCC 11797 (= QM 474 = NRRL A-622 = NRRL A-1616 = NRRL 3647 = Marsh BPI 66). Fungus resistance testing (US military specifications). Produces dextranase. Studies on hemicellulases (430) and detection by impedance method (504). (Medium 4, 25°C)

Penicillium hirsutum Dierckx

D-98689 CBS 349.75 (= PD 73/1274). Isolated from bulb of *Tulipa* sp., Netherlands. Suspected of toxicity to cows. Studies on growth inhibition (574). (Medium 4, 25°C)

Penicillium janczewskii Zaleski

D-95450 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium roqueforti Thom

D-89393 VMTL. Isolated from blue mould cheese, Finland. (Medium 4, 25°C)

D-96662 BEL (LVK1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96670 BEL. Isolated from silage, Finland. (Medium 4, 25°C)

Penicillium rugulosum Thom

D-95498 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95511 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium solitum Westling

D-95515 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96669 BEL (LVK6). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Penicillium sp.

D-88329 BIO. Isolated from buffer solution of pH 1.9, Finland. (Medium 4, 25°C)

D-95526 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95547 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Penicillium spinulosum Thom

D-96553 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Penicillium steckii Zaleski

D-96571 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96581 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96658 BEL (114). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Penicillium verrucosum Dierckx

D-98494 IMI 260915. Isolated from *Pinus psudostrobus*, Nicaragua. Produces e.g. ochratoxin A. (Medium 4, 25°C)

D-98495 IMI 284410. Produces e.g. ochratoxin A. (Medium 4, 25°C)

Penicillium verruculosum Peyronel

D-82208 University of Budapest (WA 30). Western Australian Department of Agriculture, South Perth, Australia. Produces cellulases. (Medium 4, 25°C)

Phanerochaete chrysosporium Burdsall
Anam. *Sporotrichum pruinosum*
SynA. *Chrysosporium pruinosum*
Sporotrichum pulverulentum

D-76004 UAMH 885 (*Chrysosporium pruinosum*). Produces cellulases. (Medium 4 or 23, 37°C)

D-84237 HY, Department of Microbiology. ATCC 34541 (= DSM 1556 = IFO 31249 = Lombard ME-446 = PRL 2750). Isolated from wood chips of *Fagus grandifolia*, Waterville, Maine, USA. Produces ligninase and H_2O_2-dependent oxidases. Fruiting. Hydroxylation of estradiol. Utilizes trinitrotoluene. Studies on degradation of lignin (199). (Medium 4 or 23, 37°C)

D-85241 VKM F-1764 (*Sporotrichum pulverulentum*). Degrades lignin. (Medium 4 or 23, 37°C)

D-85242^T VKM F-1767 (= DSM 6909 = ATCC 24725 = CBS 481.73 = IMI 174727 = NRRL 6361 = MUCL 19343). Isolated from fruit and petioles of Vitis vinifera, Alma-Ata, Kazachstan, USSR. Type strain for *Sporotrichum pulverulentum*. Degrades pine. Produces ligninase and peroxidase. Studies on degradation of lignin (274, 400), lignin peroxidase gene (301) and activity (566), hemicellulases (430). (Medium 4 or 23, 37°C)

D-86270 Repligen Corporation, USA. Same as VTT D-85242. (Medium 4 or 23, 37°C)

Phellinus pini (Brotero : Fries) A. Ames

D-84223 PUU (T504) (= ATCC 44207). Isolated from *Pinus sylvestris*, Tammisaari, Finland. Degrades pine lignin. Produces peroxidase. (Medium 21 or 23, 25°C)

Phialemonium curvatum W. Gams & W.B. Cooke

D-95503 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Phialophora america (Nannfeldt) Hughes

D-96477 CBS 840.69 (= FMR 3247 = MUCL 15537). Isolated from decaying timber, Finland. (Medium 4 or 24, 25°C)

Phialophora cinerescens (Wollenweber) van Beyma

D-98671 BEL. Isolated from bottled drink water, Finland. (Medium 4, 25°C)

Phlebia radiata Fries : Fries

D-84236 HY, Department of Microbiology (Hatakka & Pirhonen strain 79 = ATCC 64658). Isolated from rotten *Alnus* sp., Vantaa, Finland. Studies on ligninolytic enzymes and delignification (199, 230, 232, 246, 248, 269, 270, 274, 292, 296, 303, 304, 316, 317, 323, 325, 326, 337, 345, 366, 415, 430), molecular biology of lignin-degrading enzymes (339, 358, 369, 397, 406) and modelling of lignin peroxidase LIII (419, 460). (Medium 4 or 23, 25°C)

Phoma exigua Desmaziéres

D-96626 BEL (U95). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Phoma macrostoma Montagne

D-89396 BIO. Isolated from air sample of brewery filling hall, Finland. (Medium 4, 25°C)

D-95504 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Phoma putaminum Spegazzini

D-95455 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Pithomyces cynodontis Ellis

D-96618 BEL (U61/A7). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Pleospora herbarum (Fries : Fries) Rabenhorst var. ***herbarum***
Anam. *Stemphylium herbarum*

D-76047 CBS 714.68 (= ATCC 18522 = IMI 135456 = QM 1379). Isolated from leaf of *Medicago sativa*, Canada, Ontario. (Medium 4, 25°C)

Pleurotus ostreatus (Jacquin : Fries) Kummer

D-85265 ATCC 44737. Slightly xylanolytic. (Medium 21 or 23, 25°C)

* D-90415 Institute of Plant Biochemistry, Georgian Academy of Sciences, Tbilisi (IPB-13) (= Leningrad Region Botanical Institute strain 0482). Growth on cellulose, xylan and gluconic acid. Produces Mn- dependent peroxidase, laccase, cellulase, xylanase and glucosidase. (Medium 21 or 23, 25°C)

Polyporus versicolor Linnaeus : Fries
See *Trametes versicolor*

Poria placenta (Fries) Cooke sensu J. Eriksson

D-90413 PUU (Prp 280) (= DSM 3088 = MUCL 20569 = FPRL 280). Wood preservative testing. Studies on oxalic acid and hydrogen peroxide (381, 385, 483, 497), wood degradation (394, 539) and biobleaching (520). Brown-rot fungus. (Medium 21, 25°C)

Poria weirii (Murrill) Murrill
See *Inonotus weirii*

Pseudallescheria boydii (Shear) McGinnis et al.

D-95445 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

* D-98677 BEL (H3). Isolated from compost, Finland. Unusual strain with yellow pigment; *Scedosporium* and *Graphium* anamorphs are produced. (Medium 4, 25°C)

Pullularia pullulans (de Bary) Berkhout
See *Aureobasidium pullulans* var. *pullulans*

Pyrenophora teres (Diedicke) Drechsler
Anam. *Drechslera teres*
SynA. *Helminthosporium teres*

D-89395 MTTK. Isolated from barley. (Medium 62, 20°C, daylight)

Pythium sp.

D-98687 Kemira Agro Oy. Isolated from dill, Finland. (Medium 4, 25°C)

Rhizoctonia solani Kühn

See *Thanatephorus cucumeris*

Rhizomucor miehei (Cooney & Emerson) Schipper

Syn. *Mucor miehei*

D-82193^{T} ATCC 16457 (*Mucor miehei*) (= CBS 182.67 = IMI 126334 = Cooney 21 = VKM F-1365). Type strain for *Mucor miehei*. Isolated from rotting *Parthenium argentatum*. Produces lipase. Studies on milk clotting enzyme (174, 282) and hemicellulases (430). (Medium 4, 37°C)

Rhizomucor pusillus (Lindt) Schipper

Syn. *Mucor pusillus*

D-70016 ELI (*Mucor pusillus).* Studies on milk clotting enzyme (18, 282). (Medium 4, 25°C)

Rhizopus microsporus var. ***oligosporus*** (Saito) Schipper & Stalpers

Syn. *Rhizopus oligosporus*

D-70022 NRRL 3271 (*Rhizopus oligosporus*). Produces lipase. Studies on milk clotting enzyme (18, 174, 282), hemicellulases (430) and enzymatic treatment of pine extractives (472). (Medium 4, 25°C)

D-82192 ATCC 22959 (*Rhizopus oligosporus*) (= MUCL 28419 = NRRL 2710 = CBS 338.62 = IMI 174457 = IFO 8631). Isolated from tempeh fermentation, Indonesia. Produces tempeh, acid protease and lipase. Studies on milk clotting enzyme (174, 282) and enzymatic treatment of pine extractives (472). (Medium 4, 25°C)

Rhizopus microsporus var. ***rhizopodiformis*** (Cohn) Schipper & Stalpers

D-96668 BEL (VR2). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Rhizopus oligosporus Saito

See *Rhizopus microsporus* var. *oligosporus*

Rhizopus oryzae Went & Prinsen Geerligs

D-96577 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Rhizopus stolonifer (Ehrenberg : Fries) Vuilleman

D-96562 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96584 BEL. Isolated from circulating water of paper mill, Spain. (Medium 4, 25°C)

Schizophyllum commune Fries : Fries

D-88362 ATCC 38548 (= Paice strain Delmer). Isolated from elm twig. Produces xylanase, cellulase and ß-glucosidase. Studies on hemicellulases (441, 484). (Medium 3 or 4, 25°C)

Scolecobasidium variabile Barron & Busch

D-95505 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Scopulariopsis brevicaulis (Saccardo) Bainier

D-95476 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96647 BEL (MU11). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Septoria avenae fsp. ***triticea*** Johnson

D-90408 ATCC 26373 (= Shearer UM 091). Isolated from *Hordeum vulgare*, USA, Minnesota. Used in host range studies. (Medium 4 with 0.1% beef extract, 20°C)

D-90409 ATCC 26376 (= Shearer UM 095). Isolated from *Hordeum vulgare*, USA, Minnesota. Used in host range studies. (Medium 4 with 0.1% beef extract, 20°C)

Serpula lacrimans (Wulfen : Fries) Schroeter

D-90410 PUU (Md1 = Sl1). Isolated from wooden construction, Finland. Studies on hydrogen peroxide (381, 385). Brown-rot fungus. (Medium 21, 25°C)

Sporotrichum pruinosum (Gilman & Abbott) Carmichael
See *Phanerochaete chrysosporium*

Sporotrichum pulverulentum Novobranova
See *Phanerochaete chrysosporium*

Sporotrichum thermophilum Apinis
See *Thielavia heterothallica*

Stachybotrys alternans Bonorden
See *Stachybotrys chartarum*

Stachybotrys chartarum (Ehrenberg : Link) S. Hughes
Syn. *Stachybotrys alternans*

D-83210 MTTK 72 (*Stachybotrys alternans*) (= MTTK 10T II 72). Isolated from grain. Produces stachybotrys toxin. Studies on toxins (33, 34, 39, 86, 92, 103, 106, 122, 153). (Medium 4, 25°C)

D-83218 MTTK 7011 (15a I 4) (*Stachybotrys alternans*). Produces stachybotrys toxin. (Medium 4, 25°C)

D-83219 MTTK 70134 (II-3 8) (*Stachybotrys alternans*). Produces stachybotrys toxin. (Medium 4, 25°C)

D-83220 MTTK 82-18 (*Stachybotrys alternans*). Produces stachybotrys toxin. (Medium 4, 25°C)

D-83221 MTTK 7273 (III-2 61) (*Stachybotrys alternans*). Produces stachybotrys toxin. (Medium 4, 25°C)

D-83222 MTTK 7294 (IV-7 69) (*Stachybotrys alternans*). Produces stachybotrys toxin. (Medium 4, 25°C)

D-96582 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96622 BEL (U86). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Stemphylium herbarum E. Simmons
See *Pleospora herbarum* var. *herbarum*

Stemphylium sp.

D-79123 Japanese brewery (No 103). Causative agent of beer gushing. (Medium 4, 25°C)

Stereum rugosum (Persoon : Fries) Fries

D-84235 HY, Department of Microbiology (Hatakka strain 10 = ATCC 64657). Isolated from rotten *Betula* sp., Helsinki, Finland. Decolorates growth media and newspaper. Studies on biobleaching (520). (Medium 4 or 23, 25°C)

Syncephalastrum racemosum Cohn : Schroeter

D-95518 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96555 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

Talaromyces helicus (Raper & Fennell) C.R. Benjamin

D-95465 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Talaromyces macrosporus (Stolk & Samson) Frisvad et al.

D-96598 BEL. Isolated from a recycled fibre board sample, France. (Medium 4, 25°C)

Talaromyces trachyspermus (Shear) Stolk & Samson

D-95448 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Thanatephorus cucumeris (Frank) Donk
Anam. *Rhizoctonia solani*

D-79114 CBS 627.77 (*Rhizoctonia solani*). Isolated from *Tulipa* sp. (Medium 4, 25°C)

Thermoascus aurantiacus Miehe

D-92041 ATCC 20882. Produces thermostable xylanase and cellulase (US Pat. 4966850). (Medium 4, 45°C)

D-93196 IMI 067936 (= FPRL S748). Isolated from sawdust of *Parana* pine. Laccase negative (512). (Medium 4 or 24, 37-40°C)

D-93197 IMI 188061. Isolated from soil, India. (Medium 4 or 23 or 24, 37°C)

Thermoascus thermophilus (Sopp) von Arx

D-96491 IMI 123298 (= BDUN394). Isolated from wood and bark of *Pinus* sp., Sweden. Laccase negative (512). (Medium 24, 30 C, daylight)

Thermomyces lanuginosus Tsiklinsky
Syn. *Humicola lanuginosa*

D-96488 IMI 140524. Isolated from mouldy hay, UK. Laccase negative (512). (Medium 4, 37°C)

Thielavia heterothallica von Klopotek
Anam. *Myceliophthora thermophila*
SynA. *Sporotrichum thermophilum*

D-76003 UAMH 2015 (*Sporotrichum thermophilum*). Studies on hemicellulases (430). (Medium 4, 37°C)

Thielavia terrestris (Apinis) Malloch & Cain
Syn. *Allescheria terrestris*

D-79107 NRRL 8126. (Medium 4, 37°C)

* D-90417 Institute of Plant Biochemistry, Academy of Sciences of the Georgian Republic, Tbilisi (*Allescheria terrestris*). Growth on cellulose. Produces microcrystalline cellulase (optimal at 48°C) and xylanase. Studies on thermostable endoglucanases (409). (Medium 21, 40°C)

D-96489 CBS 546.86. Produces amylase and cellulase. Laccase negative (512). (Medium 4, 37°C)

Trametes hirsuta (Wulfen : Fries) Pilát
Syn. *Coriolus hirsutus*

* D-90416 Institute of Plant Biochemistry of Georgian Academy Sciences, Tbilisi (IPB-11) (*Coriolus hirsutus*) (= Leningrad Region Botanical Institute strain 071). Growth on lignocellulose substrates. Produces Mn-dependent peroxidase, laccase, cellulase and xylanase. (Medium 21, 25°C)

D-95443 CBS 248.30. Isolated from *Betula verrucosa*, Russia. Tyrosinase negative, laccase positive (548). (Medium 21, 25°C)

Trametes versicolor (Linnaeus : Fries) Pilát
Syn. *Polyporus versicolor*

D-83211 ATCC 12679 (*Polyporus versicolor*) (= Lombard FP 72074 = Madison 697). Isolated from beech canker, Vermont. Degrades cellulose in the absence of wood. Wood decay resistance testing. Concentration of extracellular superoxide radical during lignin degradation. Degrades coal. Studies on α-arabinosidase (430). (Medium 3 or 4 or 23, 25°C)

D-84224 PUU (M39). Isolated from wood, Madeira. Studies on biobleaching (520). (Medium 21 or 23, 25°C)

D-84226 PUU (Ptvx1). Eberswalde Collection. (Medium 21 or 23, 25°C)

D-95474 DSM 1977 (*Polyporus versicolor*). (Medium 23, 25°C)

Trichoderma atroviride P. Karsten sensu Bissett

D-95529 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-95544 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96564 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96579 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

D-96592 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C)

D-96631 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Trichoderma citrinoviride Bissett
Teleom. *Hypocrea schweinizii*

D-95451 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

D-96583 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Trichoderma harzianum Rifai

D-80150 CBS 354.33 (= ATCC 48131). Isolated from soil, USA. Studies on cell wall lytic enzyme production (201). Mycoparasitic. Studies on biobleaching (520), siderophores (527). (Medium 4, 25°C, daylight)

D-95502 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C, daylight)

D-95543 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C, daylight)

D-96572 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C, daylight)

D-96589 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C, daylight)

Trichoderma inhamatum Veerkamp & W. Gams

D-96580 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C)

Trichoderma koningii Oudemans

D-95501 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C)

Trichoderma longibrachiatum Rifai
Syn. *Trichoderma reesei*

D-96570 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C, daylight)

D-96634 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 4, 25°C, daylight)

Trichoderma pseudokoningii Rifai

D-80145 ATCC 38586 (= Baker C-3). Produces xylanase. (Medium 4, 25°C, daylight)

D-95508 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C, daylight)

D-95516 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 4, 25°C, daylight)

D-96586 BEL. Isolated from process water of a paper mill, Spain. (Medium 4, 25°C, daylight)

Trichoderma reesei E. Simmons

Syn. *Trichoderma longibrachiatum*

D-78066 BIO (M 85/38a). dES-mutant from VTT D-78067. Produces cellulases. (Medium 4, 25°C, daylight)

D-78067 BIO (TVT 37A) (= VTT 304). Spontaneous mutant from VTT D-74075. Studies on cellulases (51, 52, 63, 70, 113). (Medium 4, 25°C, daylight)

D-74068 QM 9123 (*Trichoderma viride*) (= ATCC 24449 = T.V. B115 = IMI 192655). Gamma-radiation mutant from QM 6a. Studies on cellulases (52) and biobleaching (520). (Medium 4, 25°C, daylight)

D-78069 BIO (M 72/85 M1). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-74070 QM 9136 (*Trichoderma viride*) (= ATCC 26920 = DSM 770 = Mandels 178). Gamma-radiation mutant from QM 6a. Cellulase negative (51, 52, 84, 113, 220). (Medium 4, 25°C, daylight)

D-74075 QM 9414 (*Trichoderma viride*) (= ATCC 26921 = IMI 192656 = DSM 769 = Mandels 3019 = T.V. B118). Gamma-radiation mutant from QM 9123. Studies on cellulases (51, 52, 63, 70, 79, 84, 85, 113, 118, 135, 185, 220), enzymatic hydrolysis (46, 59, 66, 67, 68, 81, 82, 125, 293), cellulase complex (44, 77, 307), hemicellulases (85, 87, 89, 96, 97, 247, 259, 277, 290), production in pilot scale (109, 119, 120), use of cellulases in AIV-silage (91, 94, 100), brewing (121), protoplasts (149, 201), transformation (271), *pgk* gene (299, 357), karyotyping (396), gene expression (411, 529), *tef*1 gene (454), *egl*5 gene (460, 466), production of cellulases on glucose-containing media (454, 487), *cbh*1 promoter (525), siderophores (527). (Medium 4, 25°C, daylight)

D-78076 BIO (M 72/85-18). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-78077 BIO (M 72/85-13). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-74083^{T} QM 6a (*Trichoderma viride*) (= ATCC 13631 = IMI 192654 = CBS 383.78 = DSM 768 = T.V. B117). Isolated from canvas shelter, Bougainville, Solomon Islands. Studies on cellulases (51, 52) and karyotyping (396). (Medium 4, 25°C, daylight)

D-78089 BIO (M 72/85-9). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-78092 BIO (M 72/85-17). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-78093 BIO (M 72/85-16). NTG-mutant from VTT D-74075. Produces cellulases. (Medium 4, 25°C, daylight)

D-81152 BIO (28 cel^{-}18). Gamma-radiation mutant from VTT D-74075. Cellulase negative (84, 220). (Medium 4, 25°C, daylight)

D-81153 BIO (16 cel^{-}7). Gamma-radiation mutant from VTT D-74075. Cellulase negative (84, 220). (Medium 4, 25°C, daylight)

D-81154 BIO (M 54 cel^{-}1b). NTG-mutant from VTT D-74075. Cellulase negative (84, 220). (Medium 4, 25°C, daylight)

D-81155 BIO (M54 light cel^{-}1). NTG-mutant from VTT D-74075. Cellulase negative (84, 220). Used as host in expression studies (357). (Medium 4, 25°C, daylight)

D-81161 BIO (o.d. 63/4). NTG-mutant from VTT D-74075. Partially depressed production of cellulases. (Medium 4, 25°C, daylight)

D-81162 BIO (o.d. 66/2). NTG-mutant from VTT D-74075. Partially depressed production of cellulases. (Medium 4, 25°C, daylight)

D-81166 BIO (o.d. 34/13). Mutant from VTT D-74075. Partially depressed production of cellulases. (Medium 4, 25°C, daylight)

D-81167 BIO (o.d. 41/1). Mutant from VTT D-74075. Partially depressed production of cellulases. (Medium 4, 25°C, daylight)

D-81168 BIO (cel^{-}25). Mutant from VTT D-74075. Cellulase negative (84, 220). (Medium 4, 25°C, daylight)

D-82189 NRRL 11485 (= ATCC 56767 = RUT-NG 14). Studies on cellulases (185). (Medium 4, 25°C, daylight)

* D-93201 BIO (2-1a). Strain VTT D-74075 integrated with fragment (from plasmid pINT2) containing *amdS* gene of *Aspergillus nidulans* in *cbh1* locus (*cbh1* promoter and terminator of *Trichoderma*). CBH1 negative and amdS positive. Growth on acetamide. Used as fungal expression host (442, 475). (Medium 4 or 74, 25°C, daylight)

D-86271 ATCC 56765 (= NRRL 11460 = RUT C-30). Studies on esterases (275, 277, 280, 335, 343, 354, 484), hemicellulases and xylanases (281, 309, 338, 368, 384, 390, 392, 399, 401, 407, 408, 421, 430, 424, 441, 444, 445, 446, 449, 450, 451, 452, 462, 465), cellulases (457), expression of human tissue-type plasminogen activator (t-PA)(306), karyotyping (396), use as host strain (406, 482), α-glucuronidase (469) and biodegradation of microbial polysaccharides (470). (Medium 4, 25°C, daylight)

Trichoderma virens (Miller et al.) von Arx
See *Gliocladium virens*

Trichoderma viride Persoon : Fries
Teleom. *Hypocrea rufa*

D-82207 National Institute of Public Health, Budapest (OK1 B-1). Produces cellulases. (Medium 4, 25°C, daylight)

D-95542 BEL. Isolated from a recycled fibre pulp sample, Finland. *Trichoderma viride* aggregate with elongate conidia. (Medium 4, 25°C, daylight)

Trichophyton mentagrophytes (Robin) Blanchard

D-70023 Sanitized Testing Laboratory, Burgdorf, Switzerland (strain EMPA 199). Disinfectant test strain. (Medium 4 or 26, 25°C)

Trichothecium roseum (Persoon : Fries) Link

D-76042 HY, Department of Plant Pathology. Isolated from barley. Studies on biobleaching (520). (Medium 4, 25°C)

Tritirachium oryzae (Vincens) de Hoog

D-96610 BEL (U53/1). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Ulocladium chartarum (Preuss) E. Simmons

D-96615 BEL (U60/A2). Isolated from mouldy house, Finland. (Medium 4, 25°C)

D-96620 BEL (U62/A4). Isolated from mouldy house, Finland. (Medium 4, 25°C)

Ulocladium oudemansii E. Simmons

D-88357 IMI 240156. Isolated from *Hordeum vulgare*, New Zealand. (Medium 4, 25°C)

Unidentified

D-93198 IMI 155711 (= QM 806). (Medium 23, 25°C, daylight).

D-96487 BEL. Isolated from a recycled fibre pulp sample, Finland. The *Myrioconium* spermatial state of a member of the familie of the *Sclerotiniaceae (Ascomycotina)*. (Medium 4, 25°C)

D-96613 BEL (U56/2). Isolated from mouldy house, Finland. Sterile, not identifiable. (Medium 4, 25°C)

D-96641 BEL (113A). Isolated from mouldy house, Finland. Sterile, not identifiable. (Medium 4, 25°C)

Verticillium lamellicola (F.E.V. Smith) W. Gams

D-98696 BEL (13a). Isolated from catacomb, Italy. (Medium 4, 25°C)

Verticillium luteoalbum (Link : Fries) Subramanian
See *Nectria inventa*

Wallemia sebi (Fries) von Arx

D-96478 CBS 411.77. Isolated from decaying fruit of *Phoenix dactylifera*, Tunisia. (Medium 4, 25°C)

D-96651 BEL (PH8). Isolated from mouldy house, Finland. (Medium 4, 25°C)

BACTERIA AND ARCHAEA

Acetobacter aceti (Pasteur 1864) Beijerinck 1898[AL]

E-97734 BEL (N7). Isolated from brewery main fermentation, Finland. (Medium 61 or 98, 25°C)

E-97828[T] DSM 3508 (= ATCC 15973 = NCIMB 8621 = LMG 1261). Isolated from beech-wood shavings of vineagar plant. Alcohol turned to vineagar. (Medium 98, 26°C)

E-991171 BEL (II). Isolated from an immobilized beer main fermentation column, Finland. (Medium 98, 28°C)

E-991173 BEL (IVv). Isolated from an immobilized beer main fermentation column, Finland. (Medium 98, 28°C)

Acetobacter hansenii Gossele et al. 1983[VP]
Reclassified as *Gluconacetobacter hansenii*

Acetobacter pasteurianus (Hansen 1879) Beijerinck 1916[AL]

E-74002 ATCC 7839 (=ATCC 23762 = LMG 1613 = DSM 46617 = IFO 3191 = CCM 2374 = IAM 1825 = NCTC 7214 =NCIMB 7214 = NCIMB 8148 = NRRL B-65 = IMET 10599 = IMET 10733 = Porges 38 = Asai A-5 = Beijerinck 38) (*Acetobacter rancens*). Isolated from beer, The Netherlands. Studies on biofilms (522, 545). (Medium 61 or 98, 28°C)

E-78091 ATCC 9432 (= LMG 1607 = CECT 474 = NRRL B-55 = NCTC 7215 = NCIMB 7215 = NCIMB 8090 = NCIMB 8141) (*Bacterium orleanensis*). Isolated from vinegar. Vinegar production using both the "Orleans Method" and "Quick Vinegar Process". Produces resriction endonuclease *Apa*I. (Medium 61 or 98, 26°C)

E-97830[T] DSM 3509 (= ATCC 33445 = LMG 1262 = LMD 22.1 = Beijerinck 190) (*Acetobacter rancens*). Isolated from beer, The Netherlands. (Medium 98, 26°C)

Acetobacter xylinus subsp. ***xylinus*** (Brown 1886) Yamada 1984[VP]
Reclassified as *Gluconacetobacter xylinus* subsp. *xylinus*

Acetobacter sp.

E-74001 HAMBI. ATCC 8303 (= LMG 1665 = NCTC 1345 = NCIMB 1345 = strain Michigan) (*Acetobacter aceti*). Efficient in manufacturing vinegar from apple juice. Studies on xylonic acid (213). (Medium 61 or 98, 26°C)

E-89372 BIO (O27). Isolated from beer, Finland. (Medium 61 or 98, 26°C)

Acinetobacter baumannii Bouvet and Grimont 1986[VP]

E-981116[T] DSM 30007 (= ATCC 19606 = CIP 70.34 = Hugh 2208 = Schaub 81). Isolated from urine. Produces siderophore acinetobactin. (Medium 5, 30°C)

E-981142 BEL (6:6). Isolated from a paper mill, Finland. (Medium 5, 30°C)

Acinetobacter calcoaceticus (Beijerinck 1911) Baumann et al. 1968[VP]

E-981117[T] DSM 30006 (= ATCC 23055 = CIP 81.08). Isolated from quinate enrichment from soil. Produces isoprene. Quality control strain according to DIN 58959-7. (Medium 5, 30°C)

Acinetobacter genospecies 9

E-95591 TKK (B01). Isolated from ground barley kernel, Finland. (Medium 5, 30°C)

E-95594 TKK (B06). Isolated from ground barley kernel, Finland. (Medium 5, 30°C)

Acinetobacter genospecies 11

E-981118 DSM 590 (= ATCC 11171 = NCIMB 8250 = Evans *Vibrio* 01 = Baumann 94). Isolated from sewage, containing gas-works effluent. Breakdown of aromatic ring compounds. Utilizes phenol, phenylacetate. (Medium 5, 30°C)

Acinetobacter haemolyticus Bouvet and Grimont 1986[VP]

E-981119[T] DSM 6962 (= ATCC17906 = CIP 64.3 = NCTC 10305 = Stenzel 2446/60). Isolated from human sputum. (Medium 5 or 95, 28°C)

Acinetobacter johnsonii Bouvet and Grimont 1986[VP]

E-981120[T] DSM 6963 (= ATCC 17909 = CIP 64.6 = NCTC 10308 = Stenzel 3865/60 = Baumann 8). Isolated from human duodenum. (Medium 5 or 95, 28°C)

Acinetobacter junii Bouvet and Grimont 1986[VP]

E-981121[T] DSM 6964 (= ATCC 17908 = NCTC 10307 = Stenzel 2723/59 = Baumann 10). Isolated from human urine. Produces acid from glucose, differing from species description. (Medium 5 or 95, 28°C)

Acinetobacter lwoffii (Audureau 1940) Brisou and Prévot 1954 emend. Bouvet and Grimont 1986[AL]

E-84217 BIO (*Pseudomonas cepasia*). Isolated from a paper mill, Finland. Studies on biobleaching (520). (Medium 5, 30°C)

E-97855[T] DSM 2403 (= ATCC 15309, CIP 644.10, NCTC 5866). Quality control strain according to DIN 58959-7. (Medium 5, 30°C)

Acinetobacter radioresistens Nishimura et al. 1988[VP]

E-981122[T] DSM 6976 (= ATCC 43998 = IAM 13186 = Kairiyama FO-1). Isolated from cotton tampon. Resistant to radiation. (Medium 5 or 95, 28°C)

Actinoplanes missouriensis Couch 1963[AL]

E-82151[T] ATCC 14538 (= DSM 43046 = CBS 188.64 = IFO 13243 = KCC A-0121 = UNCC 431 = Couch 431). Isolated from Barnyard soil, USA. (Medium 7, 28°C)

Aeromonas veronii Hickman-Brenner et al. 1988[VP]

E-94528 ATCC 9071 (= CDC 360-60 = CDC-RH 36 = NCMB 37 = NCTC 7810 = CIP 57.49 = LMG 3785 = CCEB 702 = IAM 12333 = CCM 1242 = FIRDI 375 = RH 252 = Kulp P2 = BPE 16 = Canad-212 No 494 = Popoff 311) (*Proteus hydrophilus*). Isolated from frog with red-leg disease. Biogroup sobria. (Medium 5, 30°C)

Agrobacterium rhizogenes (Riker et al. 1930) Conn 1942[AL]

E-87291 HY (strain El Moore A4). Host for plasmid vector used for gene transfer into plants (447, 448). (Medium 37, 26°C, the plasmids may be lost at higher temperatures than 28°C)

Agrobacterium tumefaciens (Smith and Townsend 1907) Conn 1942[AL]

E-84182 Kungliga Tekniska Högskolan, Stockholm. Host for plasmid vector used for gene transfer into plants. Tumor formation. (Medium 5 or 37, 26°C)

Alcaligenes faecalis subsp. ***faecalis*** Castellani and Chalmers 1919[AL]

E-97056[T] DSM 30030 (= ATCC 8750 = LMG 1229 = NCIMB 8156 = CCM 1052 = CIP 60.80 = IFO 13111 = NCDO 868 = IAM 12369 = IAM 12586 = Conn 16 = Hugh 135). Produces nitrilase. Arginine test. Sensitivity to EDTA. (Medium 5, 30°C)

Alteromonas putrefaciens Lee et al. 1981[VP]
Reclassified as *Shewanella putrefaciens*

Ancylobacter aquaticus (Orskov 1928) Raj 1983[VP]

E-85236 Strand strain PIF (= DSM 3903). Isolated from aerobic waste water treatment pond of a kraft paper mill, Pacific northwest, USA. Degrades glucoisosaccharinic acid (GISA) in neutral and alkaline conditions. (Medium 5 or 28, 30°C)

Aneurinibacillus migulanus (Takagi et al. 1993) Shida et al.1996 emend. Heyndrikx et al. 1997[VP]

E-97187[T] DSM 2895 (= ATCC 9999 = IFO 3864 = NCTC 7096 = NCIMB 7096 = Smith 1137). Isolated from garden soil. Produces gramicidin S synthetase and restriction endonuclease *Bbv*I. Studies on characterization (200, 210). (Medium 5, 30°C)

Arthrobacter sp.

E-88302 ATCC 21859 (= Mitsuitoatsu Chem. Inc. B-1-1162-166 = FERM-P 1304). Isolated from soil. Produces L-lysine (US Pat. 3905867). (Medium 5 or 20, 30°C)

E-88303 ATCC 21861 (= Mitsuitoatsu Chem. Inc. B-1-874-75 = FERM-P 1302). Isolated from soil. Produces L-lysine (US Pat. 3905867). (Medium 5 or 20, 30°C)

Aureobacterium luteolum Yokota et al. 1993[VP]
Reclassified as *Microbacterium luteolum*

Aureobacterium testaceum (Komagata and Iizuka 1964) Collins et al. 1983[VP]
Reclassified as *Microbacterium testaceum*

Bacillus alcalophilus Vedder 1934[AL]

E-87298[T] DSM 485 (= ATCC 27647 = LMG 7120= NCIMB 8772 = NCIMB 10436 = NCTC 4553 = Vedder strain 1). Isolated from human faeces. Produces alkaline protease (Brit. Pat. 1205403). **Teaching strain**. (Medium 38, 37°C)

E-90409 ATCC 21522 (= FERM-P No 316 = Horikoshi 221). Isolated from soil. Produces alkaline protease (US Pat. 4052262). (Medium 38, 37°C)

Bacillus amyloliquefaciens Priest et al. 1987[VP]

E-71014 BIO (K-152) (*Bacillus subtilis*). Isolated from grain, Finland. Studies on α-amylase (21, 28, 35, 43), ß-glucanase and protease (28, 35, 43), xylanase (87, 89, 96, 97), two-phase system (196, 268). (Medium 5, 30°C)

E-71015 BIO (K-160) (*Bacillus subtilis*). Isolated from grain, Finland. Studies on α-amylase, ß-glucanase and protease (28, 31, 35, 36, 41, 43, 74) and xylanase (87, 89, 96, 97). Studies on automatic control of production in pilot scale (115). (Medium 5, 30°C)

E-73016 BIO (K-172) (*Bacillus subtilis*). Mutant from VTT E-71014. Studies on xylanase (87, 89, 96, 97), two-phase system (196, 268). (Medium 5, 30°C)

E-73017 BIO (K-192). Mutant from VTT E-71015. Studies on α-amylase (41, 43, 58), xylanase (87, 89, 96, 97). (Medium 5, 30°C)

* E-73018 BIO (K-197). Mutant from VTT E-71015. Studies on α-amylase (41, 43), xylanase (87, 89, 96, 97), cloning of α-amylase gene (194). (Medium 5, 30°C)

E-73019 BIO (K-199). Mutant from VTT E-71015. Studies on α-amylase (41, 43), xylanase (87, 89, 96, 97). (Medium 5, 30°C)

E-73052 BIO (K-200). Mutant from VTT E-73017. Produces α-amylase and ß-glucanase. Studies on xylanase (87, 89, 96, 97). (Medium 5, 30°C)

E-73053 BIO (K-201). Mutant from K-195. Produces α-amylase and ß-glucanase. Studies on xylanase (87, 89, 96, 97). (Medium 5, 30°C)

E-80124^{T} DSM 7 (= ATCC 23350 = LMG 9814 = NCIMB 12077 = CIP 103265 = NRRL B-14393 = Campbell F = Fukumoto F) (*Bacillus subtilis*). Isolated from soil. Produces α-amylase, inhibitors for glycoside hydrolases (Brit. Pat. 155409), 1-desoxynojirimycin (Brit. Pat. 155409), restriction endonuclease *Bam*FI (*Bam*HI). (Medium 5, 30°C)

E-90408 ATCC 23844 (= Campbell P). Isolated from Pfizer Fabrizyme HC concentrate. Produces amylase, protease, ribonuclease. (Medium 5, 30°C)

E-95603 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-96699 ATCC 8473 (= Smith 762 = Sealtest Labs. RBKr. 5) (*Bacillus subtilis*). Isolated from ropy bread. (Medium 5, 30°C)

E-97813 BEL (4 = GP6). Isolated from bread making process, Finland. (Medium 5, 30°C)

* E-991220 ALKO 2715 (4/d8). Mutant delta*npr*. Does not produce neutral protease (581). (Medium 8, 37°C)

* E-991221 ALKO 2716 (4/i1). Mutant delta*bgl*. Does not produce ß-glucanase (581). (Medium 8, 37°C)

* E-991222 ALKO 2717 (4/ia). Mutant delta*apr*. Does not produce alcaline protease (581). (Medium 8, 37°C)

* E-991223 ALKO 2718 (4/i3). Mutant delta npr and delta*apr*. Does not produce neutral and alcaline protease (581). (Medium 8, 37°C)

Bacillus brevis Migula 1900^{AL}

Reclassified as *Brevibacillus brevis*

Bacillus cereus Frankland and Frankland 1887^{AL}

E-92043 BIO. Isolated from 30% technical ammonium hydroxide solution, Finland. (Medium 5, 30°C)

E-93143^T DSM 31 (= ATCC 14579 = LMG 6923 = CCM 2010 = NCIMB 9373 = NCTC 2599 = Gibson 971 = Ford 13). Produces restriction endonuclease *Bce* 14579. Studies on biofilms (509), siderophores (510). (Medium 5, 30°C)

E-95600 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-96680 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96681 BEL. Isolated from process water of a mill, Spain. (Medium 5, 30°C)

E-96682 BEL. Isolated from a recycled fibre board sample, France. (Medium 5, 30°C)

E-96717 BEL (3) (= E-96717a = E-96717b). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-96727 ATCC 9139 (= ELI 153 = Smith NRS 232 = AMNH 724 = NCIMB 11925). Testing sporicidal effect of disinfectants. **Test strain**. (Medium 5, 30°C)

E-97747 BEL (BacC/5 = HD11-1). Isolated from a pea protein product. (Medium 5, 30°C)

E-97748 BEL (BacC/6 = 9.IPJ2-3). Isolated from a pea protein product. (Medium 5, 30°C)

E-97749 BEL (BacC/4.1 = IPJ3-2). Isolated from a pea protein product. (Medium 5, 30°C)

E-98968 BEL (1 PAST). Isolated from pastorized paper machine slime, Finland. Studies on slime (537). (Medium 5, 30°C)

E-981023 BEL (MR 3-2). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Bacillus cereus -group

E-95590 TKK (B08). Isolated from ground barley kernel, Finland. (Medium 5, 30°C)

E-95627 BEL (A). Isolated from baby food, Finland. (Medium 5, 30°C)

E-96677 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-97746 BEL (BacC/2 = E390-1). Isolated from a pea protein product. (Medium 5, 30°C)

* E-97816 SMR 181. Isolated from pasteurized milk, Sweden. (Medium 5, 30°C)

* E-97817 SMR 738. Isolated from pasteurized milk, Sweden. (Medium 5, 30°C)

* E-97818 SMR 747. Isolated from pasteurized milk, Sweden. (Medium 5, 30°C)

Bacillus circulans Jordan 1890[AL]

E-87305 ATCC 21783 (= Rikagaku Kenkyusho 38-2 = FERM-P 614). Isolated from soil. Produces alkaline amylase (US Pat. 3826715), cyclodextrin (US Pat. 3923598). Forms motile micro colonies. Studies on hemicellulases (285, 329, 388, 406, 430), enzymatic bleaching (361, 367, 417), xylanases (452), biodegradation of microbial polysaccharides (470). (Medium 5, 30°C)

E-95570[T] DSM 11 (= ATCC 4513 = ATCC 9140 = CCM 2048 = NCIMB 9374 = NCTC 2610 = CECT 10 = IAM 12462 = IFO 13626 = JCM 2504 = AMS X6 = Smith 726 = Ford 26). Isolated from soil. (Medium 5, 30°C)

E-95629 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95637 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95638 BEL (= E-95639). Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95640 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95641 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-96673 BEL. Isolated from a recycled fibre board sample, Spain. (Medium 5, 30°C)

E-96674 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 5, 30°C)

E-96675 BEL. Isolated from a recycled fibre board sample, France. (Medium 5, 30°C)

E-96676 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 5, 30°C)

Bacillus circulans -group (*B. lautus, B. circulans*)

E-96689 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

Bacillus coagulans Hammer 1915[AL]

E-98150[T] DSM 1 (=ATCC 7050 = NCTC 10334 = LMG 6326 = NCIMB 9365 = CCM 2013 = IFO 12583 = IAM 1115 = IAM 12463 = JCM 2257 = CN 2202 = USDA 609 = Smith 609 = E-82150). Isolated from evaporated milk. Produces inhibitors for glycoside hydrolases (Brit. Pat. 155409), L(+) lactic acid. **Teaching strain**. (Medium 5 or 66, 40°C)

E-97788 BEL (B-1). Isolated from process water of a paper mill, Finland. (Medium 5 or 66, 30°C)

Bacillus firmus Bredemann and Werner 1933[AL]

E-97061[T] DSM 12 (= ATCC 14575 = CCM 2213 = JCM 2512 = NCIMB 9366 = NCTC 10335 = Smith 613). (Medium 5 + 50% soil extract, 30°C)

Bacillus flexus Priest et al. 1989[VP]

E-97063[T] DSM 1320 (= ATCC 49095 = Gordon NRS 665 = Henry 131) (*Bacillus megaterium*). (Medium 5, 30°C)

E-96720 BEL (10). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

Bacillus halodurans Nielsen et al. 1995[VP]

E-87299[T] DSM 497 (= ATCC 27557 = LMG 7121= NRRL B-3881) (*Bacillus alcalophilus* subsp. *halodurans*). Isolated from dried sewage sludge. Produces alkaline ß-amylase. Studies on hemicellulolytic enzymes (329). (Medium 38, 37°C)

E-96719 BEL (5 = E-96719a = E-96719d). Isolated from a PE coated paperboard, Finland. (Medium 5 or 38, 30-37°C)

Bacillus lautus Nakamura 1984[VP]
Reclassified as *Paenibacillus lautus*

Bacillus licheniformis (Weigmann 1898) Chester 1901[AL]

E-80117 ATCC 27811 (= Saito 584 = FERM-P 1038). Isolated from soil, Japan. Produces thermostable α-amylase. (Medium 5, 45°C)

E-80118 KTL (RH 309) (= ATCC 9945a = NCIMB 11709 = Thorne CD-2). Produces glutamyl polypeptide (US Pat. 2895882). Studies on characterization (200, 210). (Medium 5, 37°C)

E-80119 KTL (RH 305) (= ATCC 25972 = NCIMB 11109 = Yudkin 749/C = Pollock 749/C). Derived by one-step mutation from *B. licheniformis* strain 749. Constitutive for penicillinase synthesis. Produces exogenous penicillinase. (Medium 5, 37°C)

E-83175 NRRL B-3723 (*Bacillus subtilis*). Produces protease (US Pat. 3623957). Studies on alkaline protease (202). (Medium 5, 37°C)

E-83179 ATCC 21424 (= DSM 1969). Isolated from soil. Produces alkaline protease (US Pat. 3748233). Studies on characterization (200), production of alkaline protease (202). (Medium 5, 37°C)

E-83180 ATCC 21415 (*Bacillus subtilis*) (= Kyowa Ferm. Ind. Co. Ltd strain NS 1). Produces alkaline, detergent-resistant protease (US Pat. 3838009). Studies on alkaline protease (202). (Medium 5, 37°C)

E-85224 NCIMB 8537 (= IFO 12202 = Verhoeven HO). (Medium 5, 37°C)

E-91446 HY, Department of General Microbiology (II P_4). Isolated from process water of a paper mill, Finland. Studies on biofilms (495, 533). (Medium 5 or 67, 30°C)

E-91450 HY, Department of General Microbiology (E2). Isolated from process water of a paper mill, Finland. Studies on biofilms (495). (Medium 5 or 67, 30°C)

E-95571^{T} DSM 13 (= ATCC 14580 = CCM 2145 = IFO 12200 = NCIMB 9375 = NCTC 10341 = CECT 20 = Smith 1264 = Gibson 46). Chitinase and chitobiase activity. Studies on siderophores (510). **Teaching strain**. (Medium 5, 37°C)

E-95602 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 37°C)

E-95605 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 37°C)

E-97814 BEL (12 = VP5). Isolated from wheat dough, Finland. (Medium 5, 37°C)

* E-97879 BEL (DAS/5). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97880 BEL (DAS/11). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97994 BEL (DAS/28). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97995 BEL (DAS/30). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

Bacillus macerans Schardinger 1905^{AL}
Reclassified as *Paenibacillus macerans*

"***Bacillus medusa***", invalid name

E-95606 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-97780^{T} DSM 609 (= ATCC 25621 = NCIMB 10437). Isolated from cow dung, Cambridge, UK. Nitrate reduction negative. (Medium 5, 30°C)

Bacillus megaterium de Bary 1884^{AL}

E-93055^{T} DSM 32 (= ATCC 14581 = LMG 7127 = CCM 2007 = NCTC 10342 = CCEB 633 = CIP 66.20 = NCIMB 9376 = CCUG 1817 = JCM 2506 = NCFB 1773 = FIRDI 608 = QM 1605 = Gibson 1060 = Ford 19). DNA homology group A. Studies on siderophores (510). (Medium 5, 30°C)

Bacillus mycoides Flügge 1886^{AL}

E-97206^{T} DSM 2048 (= ATCC 6462 = LMG 7128 = Smith 273). Isolated from soil. (Medium 5, 25°C)

E-95597 TKK (B05). Isolated from ground barley kernel, Finland. (Medium 5, 25°C)

E-97745 BEL (BacC/8 = Ferm E493-1). Isolated from a pea protein product. (Medium 5, 25°C)

Bacillus polymyxa (Prazmowski 1880) Macé 1889[AL]
Reclassified as *Paenibacillus polymyxa*

Bacillus pseudofirmus Nielsen et al. 1995[VP]

E-90383 DSM 2516 (= ATCC 21592 = Horikoshi A-40-2). Isolated from soil. Produces alkaline amylase. Alkalophilic. (Medium 38, 30°C)

Bacillus pumilus Meyer and Gottheil 1901[AL]

E-95572[T] DSM 27 (= ATCC 7061 = CCM 2144 = IFO 12092 = NCIMB 9369 = NCTC 10337 = CIP 52.67 = CN 2200 = IAM 12469 = JCM 2508 = Smith 272). Studies on siderophores (510). (Medium 5, 30°C)

Bacillus schlegelii Schenk and Aragno 1981[VP]

E-87279[T] DSM 2000 (= ATCC 43741 = LMG 7133 = Aragno MA-48). Isolated from lake mud, Switzerland. Chemolithotrophic growth with hydrogen. (Medium 36, 65°C, without agitation)

Bacillus simplex Priest et al. 1989[VP]

E-91434 HY, Department of General Microbiology (TR1). Isolated from process water of a paper mill, Finland. (Medium 5 or 67, 30°C)

E-95604 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-96678 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96679 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-97781[T] DSM 1321 (= ATCC 49097 = Gordon NRS 960 = Porter S8) (*Bacillus megaterium*). (Medium 5, 30°C)

Bacillus sp.

* E-80123 BIO (2) (*Bacillus fastidiosus*). Degrades uric acid. (Medium 5 or 59, 30°C)

E-81127 ATCC 31199 (= CPC International, Inc. B-968) (*Bacillus stearothermophilus*). Produces heat- and acid-stable α-amylase (US Pat. 4284722). (Medium 5 or 8, 55°C)

E-87278 DSM 2641 (= strain Heinen) (*Bacillus flavothermus*). Isolated from hot spring, New Zealand. Yellow pigment. (Medium 5, 60°C)

E-87304 ATCC 31408 (= Gist-Brocades PB-92 = FERM-P 3304 = OR-60). Isolated from soil, Zambia. Produces alkaline protease (US Pat. 4002572). Studies on hemicellulases (329). (Medium 5, 37°C)

E-88331 BIO (SS3-1). Isolated from waste water of a paper mill, Finland. Studies on isolation and utilization of acetate (360). (Medium 45, 65°C)

E-88333 BIO (MA). Isolated from a hot spring, Iceland. Studies on isolation and utilization of acetate (315, 359, 360). (Medium 45, 65°C)

E-90382 DSM 2514 (= ATCC 21536 = FERM-P 568 = Horikoshi 0-4). Isolated from soil. Produces alkaline protease (US Pat. 3052262), restriction endonuclease *Bsp*O41. Alkalophilic. (Medium 38, 30°C)

E-90384 DSM 2518 (= ATCC 21594 = Horikoshi 169). Isolated from soil. Produces alkaline amylase and cyclodextrin (US Pat. 3923598). (Medium 38, 30°C)

E-90385 DSM 2520 (= ATCC 21596 = Horikoshi 27-1). Isolated from soil. Produces alkaline amylase. (Medium 38, 30°C)

E-90386 JCM 2888 (= FRI 7220 = ICCTC 1721 = Akiba W1). Isolated from soil. Produces xylanase. (Medium 38, 45°C)

E-90387 JCM 2889 (= KCTC 1722 = Akiba W2). Isolated from soil. Produces xylanase. (Medium 38, 45°C)

E-91438 HY, Department of General Microbiology (III-89) (*Bacillus polymyxa*). Isolated from process water of a paper mill, Finland. (Medium 5 or 67, 30°C)

E-94547 NRRL B-29 (= ATCC 55294). Degrades welan and gellan. Studies on biodegradation of microbial polysaccharides (470). (Medium 5, 30°C)

E-94548 NRRL B-4533 (= strain 13-4). Degrades xanthan. Studies on biodegradation of microbial polysaccharides (470). (Medium 5, 30°C)

E-96711 BEL (1). Isolated from a Biopol coated paperboard, Finland. (Medium 5, 30°C)

E-96712 BEL (2). Isolated from a Biopol coated paperboard, Finland. (Medium 5, 30°C)

E-96713 BEL (3). Isolated from a Biopol coated paperboard, Finland. (Medium 5, 30°C)

E-96714 BEL (4). Isolated from a Biopol coated paperboard, Finland. (Medium 5, 30°C)

* E-981064 MMKEM (E50 L1). Isolated from a paper mill, Finland. (Medium 66, 50°C)

E-991240 BEL (T12/2). Isolated from glucose syrup, Finland. (Medium 5, 30°C)

E-991241 BEL (T14). Isolated from rinse water of soft drink bottling, Finland. (Medium 5, 30°C)

E-991242 BEL (T15). Isolated from low pH soft drink, Finland. (Medium 5, 30°C)

E-991243 BEL (T16). Isolated from cider, Finland. (Medium 5, 30°C)

Bacillus sphaericus Meyer and Neide 1904[AL]

E-95580 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95607 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95648 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-97782[T] DSM 28 (= ATCC 14577 = CCM 2120 = NCIMB 9370 = NCTC 10338 = Gibson1013). DNA homology group I. (Medium 5, 30°C)

Bacillus stearothermophilus Donk 1920[AL]

E-81128[T] DSM 22 (= ATCC 12980 = LMG 6939 = CCM 2062 = IAM 11062 = IFO 12550 = JCM 2501 = NCIMB 8923 = NCTC 10339 = NCA 26 = CCEB 641 = Smith T18). Isolated from deteriorated canned food. Produces restriction endonuclease *Bst*PI (*Bst*EII), phosphinothricin. Steam sterilization control. Studies on α-amylase (324). (Medium 5, 50-55°C)

E-81129 ATCC 29609 (= ATCC 7954 = DSM 2027 = NCA 1503 = LBG B4035 = NCIMB 8924 = Smith T19 = Smith T85). Isolated from canned peas. (Medium 5, 45-55°C)

E-84208 BIO. Isolated from a paper mill, Finland. (Medium 5, 50°C)

E-88318 ATCC 7953 (= DSM 5934 = NCA 1518 = NCTC 10007 = NCIMB 8157 = Smith T17). Steam sterilization control. **Test strain**. (Medium 5, 55°C)

Bacillus subtilis (Ehrenberg 1835) Cohn 1872[AL]

E-97009[T] DSM 10 (ATCC 6051 = LMG 7135 = IFO 13719 = NCIMB 3610 = CCM 2216 = NCTC 3610 = CIP 52.65 = CN 5638 = IAM 12118 = JCM 1465 = BGSC 3A1 = Smith 744 = Smith 1315 = CCEB 642 = IEM Bs 1866 = Hankey B12 = strain Marburg). Produces isoprene. Quality control strain according to DIN 58959-7. Assay of antibacterial agents in urine. Guthrie bioassay (detection of phenylketoneuria). Studies on xylanase (87, 89, 96, 97), alkaline protease (202), two-phase system (196, 268), biofilms (495), siderophores (510). **Teaching strain**. **Test strain**. (Medium 5, 30°C)

E-68010 IAM 1521 (H). Studies on xylanase (87, 89, 96, 97), α-amylase (21), alkaline protease (202), two-phase system (196, 268). (Medium 5, 30°C)

E-68011 IAM 1522 (N). Studies on xylanase (87, 89, 96, 97), α-amylase (21), alkaline protease (202), two-phase system (196, 268). (Medium 5, 30°C)

E-68012 IAM 1523 (K). Studies on α-amylase (21, 35, 43), ß-glucanase and protease (35, 43, 202), xylanase (87, 89, 96, 97), two-phase system (196, 268). (Medium 5, 30°C)

E-68013 NCIMB 8646 (= ATCC 12711 = NRC B92 = PRL B92 = strain McCoy Ra). Produces pentosanases. Used to remove pentosan gum from wheat flour (US Pat. 2821501). Studies on α-amylase (20, 21, 23, 35, 43), ß-glucanase (35, 43), protease (21, 35, 43, 202), hemicellulases (87, 89, 96, 97, 246, 247, 259, 277, 285, 290, 293, 329, 408, 430, 450), immunology (95, 145), detection (150), two-phase system (196, 268). (Medium 5, 30°C)

E-81139 Emiko. Statens Seruminstitut, Denmark. Sterilization testing by ethylene oxide. Studies on biobleaching (520). **Test strain**. (Medium 5, 30°C)

E-83172 NRRL B-3699. Produces protease (US Pat. 3622459). Studies on alkaline protease (202). (Medium 5, 30°C)

E-83173 NRRL B-3700. Produces protease (US Pat. 3622459). Studies on alkaline protease (202). (Medium 5, 30°C)

E-83174 NRRL B-3907. Produces protease (US Pat. 3740318). Studies on alkaline protease (202). (Medium 5, 30°C)

E-83176 NRRL B-3751. Produces protease (US Pat. 3622459). Studies on alkaline protease (202). (Medium 5, 30°C)

E-83177 ATCC 21394 (= DSM 1971 = Sanraku-Ocean Co. Ltd. 4-3-Ky) (*Bacillus subtilis* subsp. *sakainensis*). Isolated from soil or fermented soybean. Produces alkaline protease (US Pat. 3662458). Studies on alkaline protease (202). (Medium 5, 30°C)

E-83178 ATCC 21228 (= DSM 1970 = Squibb & Sons SC 8548 = SO-4). Isolated from soybeans. Produces alkaline protease (US Pat. 3576719). Studies on alkaline protease (202). (Medium 5, 30°C)

E-84207 ATCC 23059 (= Bott W23). Isolated from soil. Produces isoprene. (Medium 5, 30°C)

E-85231 DSM 347 (= ATCC 6633 = LMG 8197= CCM 1999 = IFO 3134 = IFO 13720 = JCM 2499 = IAM 1069 = NCIMB 8054 = NCIMB 8566 = NCTC 10400 = PCI 219 = WHO 9 = BUCSAV 425 = Hankey B 14 = Smith 231). Produces restriction endonuclease *Bsu* 6633, subtilin. Quality control strain according to DIN 58959-7. Assay of antibiotics. Sterility testing. Tests for antimicrobial compounds in paper, cardboard, etc.Test strain for growth media. Studies on disinfectant testing (489), biofilms (509). **Teaching strain**. **Test strain**. (Medium 5, 30°C)

E-94565 Merck 10649 (= DSM 618 = ELI 152). Official test strain for detection of antibiotic residues in meat. Studies on biofilms (481, 489, 490, 499), penetration (538). **Test strain**. (Medium 5, 30°C)

E-95601 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 5, 30°C)

E-95623 BEL (2). Isolated from salad, Finland. (Medium 5, 30°C)

E-96715 BEL (1). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-97815 BEL (8 = G30°C31). Isolated from bread, Finland. (Medium 5, 30°C)

E-991213 ALKO 0177 (Aij83 = BGSC 1A510). Mutant *hsr*M *hsr*R stp *rec*A4. MitomycinC sensitive. (Medium 8, 37°C)

* E-991214 ALKO 0258 (JV466). Mutant *amy*RI *pap*M9. Improved production of α-amylase and exoprotease (581). Forms filaments during exponential growth phase. (Medium 8, 37°C)

* E-991215 ALKO 0259 (JV468). Mutant *amy*R3 *pap*S (*amy*E). Improved production of α-amylase and exoprotease (581). (Medium 8, 37°C)

E-991216 ALKO 0321 (Aij10 = BGSC 1S40 = Schaeffer 11T). Mutant *spo*IVE11. (Medium 8, 37°C)

E-991217 ALKO 0327 (Aij116 = BGSC 1S51 = Piggot SL16, 85). Mutant *spo*VE85 *trp*C2. (Medium 8, 37°C)

* E-991218 ALKO 0902 (MK458 = IH6373 cured) (*Bacillus subtilis* var. *amylosacchariticus*). Mutant amyR3 amyS papS. Kanamycin sensitive. (Medium 8, 37°C)

E-991228 ALKO 3958 (MW10 = BGSC 1A751). Mutant *apr bgI*T/*bgI*SdeltaEV *egI*Sdelta102 *his npr*. Extracellular ß-glucanases (e.g. cellulase) and proteases negative. (Medium 8, 30°C)

E-991229 ALKO 3959 (MW10 = BGSC 1A752). Mutant *apr bgI*T/*bgI*SdeltaEV *egI*Sdelta102 *his lac*ZdeltaM15 *npr*. Extracellular ß-glucanases (e.g. cellulase) and proteases negative. (Medium 8, 30°C)

E-991237 RF 4947 (= BGSC 1A95 = QB136). Mutant *leu*B8 *sac*U(H)32(=*deg*U) *trp*C2. Hyperproduction of levansucrase, protease, amylase, decreases motility and competence. (Medium 8, 30-37°C)

E-991238 RF 4948 (= BGSC 1A165 = Dedonder RA). Mutant *sac*U(H)32(=*deg*U) *trp*C2. Hyperproduction of levansucrase, protease, amylase, decreases motility and competence. (Medium 8, 30-37°C)

E-991239 RF 4949 (= BGSC 1A456 = GB7068). Mutant *ilv*D6 *thy*Adelta *thy*B1. (Medium 8, 30-37°C)

Bacillus thuringiensis Berliner 1915[AL]

E-86245[T] DSM 2046 (= ATCC 10792 = LMG 7138 = CN 3624 = LBG B4034 = CCM 19 = CCEB 457 = CIP 53.137 = NCIMB 9134 = NCIMB 9207 = Smith 996). (*Bacillus cereus* subsp. *thuringiensis*) Isolated from Mediterranean flour moth. Studies on biofilms (509). (Medium 5, 30°C)

E-95624 BEL (34). Isolated from salad, Finland. (Medium 5, 30°C)

Bacteroides fragilis (Veillon and Zuber 1898) Castellani and Chalmers 1919[AL]

E-81133 National Veterinary Institute, Helsinki. Studies on immunology (145). (Medium 10, 37°C, strictly anaerobic)

Bacteroides hypermegas Harrison and Hansen 1963[AL]
Reclassified as *Megamonas hypermegale*

Bacteroides ruminicola subsp. ***ruminicola*** Bryant et al. 1958[AL]
Reclassified as *Prevotella ruminicola* subsp. *ruminicola*

Bacteroides sp.

E-81134 National Veterinary Institute, Helsinki. Isolated from chicken caecum. Studies on immunology (145). (Medium 10, 37°C, anaerobic)

Bifidobacterium adolescentis Reuter 1963[AL]

E-981074[T] DSM 20083 (= ATCC 15703 = NCTC 11814 = Reuter E194a). Isolated from intestine of adult. (Medium 93, 37°C, anaerobic)

Bifidobacterium animalis (Mitsuoka 1969) Scardovi and Trovatelli 1974[AL]

E-96663[T] DSM 20104 (= ATCC 25527 = LMG 10508 = CUETM 89-13 = CCUG 24606 = Jcm 1190 = NCFB 2242 = BF 32 = Mitsuoka R101-8) (*Bifidobacterium longum* subsp. *animalis*). Isolated from rat feces. Fructose-6-phosphate phosphoketolase activity. (Medium 93, 37°C, anaerobic)

Bifidobacterium bifidum (Tissier 1900) Orla-Jensen 1924[AL]

E-97795[T] LMG 13199 (= ATCC 29521 = DSM 20456 = JCM 1255 = LMG 11041 = LMG 13210 = Quest Q90464 = VPI 11241 = Tissier Ti). Isolated from breast-fed infant faeces. (Medium 6 or 93, 37°C, anaerobic)

Bifidobacterium breve Reuter 1963[AL]

E-981075[T] DSM 20213 (= ATCC 15700 = NCTC 11815 = Reuter S1). Isolated from intestine of infant. (Medium 93, 37°C, anaerobic)

Bifidobacterium infantis Reuter 1963[AL]

E-97796[T] LMG 13203 (= ATCC 15697 = DSM 20088 = LMG 10499 = Quest Q90435 = NCTC 11817 = Reuter S12). Isolated from intestine of infant. (Medium 6 or 93, 37°C, anaerobic)

Bifidobacterium lactis Meile et al. 1997[VP]

E-97847[T] DSM 10140 (= CIP 105265 = Rüger UR1). Isolated from yoghurt. (Medium 93, 37°C, anaerobic)

Bifidobacterium longum Reuter 1963[AL]

E-96664[T] DSM 20219 (= ATCC 15707 = LMG 10497 = CUETM 89-11 = CCTM 3068 = CIP 64.62 = BF 36 = NCTC 11818 = JCM 1217 = CCRC 11847 = NCFB 2259 = Reuter E194b, variant a). Isolated from intestine of adult. (Medium 6 or 93, 37°C, anaerobic)

Bordetella sp.

* E-97884 BEL (CYC/D). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

* E-97986 BEL (CRA/22B). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

Brevibacillus brevis (Migula 1900) Shida et al. 1996[VP]
Basonym *Bacillus brevis*

E-97188[T] DSM 30 (= ATCC 8246 = NCIMB 9372 = NCTC 2611 = LMG 7123 = CCM 2050 = CIP 52.86 = CCEB 624 = NCDO 1770 = PZH 737/55 = Smith 604 = Ford 27B). Studies on characterization (200, 210). (Medium 5, 30°C)

E-85223 ATCC 11031 (= Smith NRS 799). (Medium 5, 30°C)

Brevibacillus parabrevis (Takagi et al. 1993) Shida et al. 1996[VP]

E-83171 BIO. Isolated from beer, Finland. Causes ropiness in beer. Studies on characterization (200, 210), beer contamination (227), biofilms (522, 545). (Medium 5 or 9, 30°C, growth stimulated by thiamine)

* E-97983 BEL (CRA/13). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97988 BEL (DAS/26). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97992 BEL (DAS/37 bees). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

E-981069[T] DSM 8376 (= ATCC 10027 = CIP 103840 = IFO 12334 = JCM 8506 = Smith 605 0 Porter "*B. bellus*"). (Medium 5 + 0.2% yeast extract, 30°C)

Brevibacterium linens (Wolff 1910) Breed 1953[AL]

E-94529[T] ATCC 9172 (= DSM 20425 = NCIMB 9909= CIP 101125 = IAM 12437 = IFO 12142 = IMET 11075 = JCM 1327 = Breed 56b). Isolated from Harzer cheese, Kiel, Germany. (Medium 20, 30°C)

Brevibacterium sp.

E-88301 ATCC 21866 (= Mitsuitoatsu Chem. Inc. B-4-1506-13 = FERM-P 1297) (*Brevibacterium* sp.). Isolated from soil. Produces L-lysine (US Pat. 3905867). (Medium 5 or 20, 30°C).

Brevibacterium vitarumen (Bechdel et al.1928) Breed 1957
Reclassified as *Corynebacterium vitaeruminis*

Brevundimonas vesicularis (Busing et al. 1953) Segers et al. 1994[VP]
Basonym *Pseudomonas vesicularis*

* E-981024 BEL (MR 3-2 II). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

E-981070[T] DSM 7226 (=ATCC 11426 = CCM 3398 = CCUG 2032 = CECT 327 = IAM 12105 = JCM 1477 = LMG 2350 = NCMB 1945 = NCTC 10900). Isolated from leech (*Hirudo*), urinary-bladder epithelium. (Medium 81, 28°C)

Brochothrix thermosphacta (McLean and Sulzbacher 1953) Sneath and Jones 1976[AL]

E-94538[T] ATCC 11509 (= DSM 20171 = NCIMB 10018 = NCTC 10822 = CIP 103251 = NCDO 1676 = Sulzbacher SW 26) (*Microbacterium thermosphactum*). Isolated from fresh pork sausage. Produces restriction endonuclease *Mth*I. (Medium 20 or 81, 26-30°C)

Burkholderia cepacia (Palleroni and Holmes 1981) Yabuuchi et al. 1993[VP]
Basonym *Pseudomonas cepacia*

E-94512[T] PMS 166 (= ATCC 25416 = DSM 7288 = ICMP 5796 = NCPPB 2993= NCTC 10743 = LMG 1222 = ICPB PC25 = PDDCC 5796 = CNCTC Ps 156/77 = CCUG 12691 = CCUG 13226 = CCEB 669 = CIP 80.24 = RH 2796 = IFO 14074 = FIRDI 735 = JCM 5964 = Palleroni 717 = Burkholder 717 = Ballard 717 = Kosako 85005). Isolated from onion. Produces cepabactin. (Medium 5, 28°C)

Burkholderia gladioli (Severini 1913) Yabuuchi et al. 1993[VP]
Basonym *Pseudomonas gladioli*

E-94511 PMS 164 (*Pseudomonas cepacia*). Isolated from sporocarp of *Agaricus bisporus* (mushroom), New Zealand. Patovar *agariciola*. Causes cavity disease of *Agaricus bitorquis*. Does not produce fluorescent pigments. (Medium 5, 25-30°C)

Campylobacter jejuni subsp. ***jejuni*** (Jones et al. 1931) Veron and Chatelain 1973[AL]

E-94535 ATCC 29428 (= VPI H840 = NCTC 11322 = CIP 103778) (*Campylobacter fetus* subsp. *jejuni*). Isolated from diarrheic stool of child, Belgium. Biotype 1, Penner serotype 1. (Medium 82 or 85, 37°C, microaerophilic)

E-981008[T] LMG 8841 (= ATCC 33560 = CCUG 11284 = CIP 70.2 = DSM 4688 = NCTC 11351 = NIAH 1943 = Florent 91 = LMG 6444). Isolated from bovine faeces. (Medium 82 or 85, 37°C, microaerophilic)

E-981086[T] DSM 4688. Same as E-981008. (Medium 85, 37°C, microaerophilic)

Carnobacterium divergens (Holzapfel and Gerber 1983) Collins et al. 1987[VP]
Basonym *Lactobacillus divergens*

E-90388 BIO (VI) (*Lactobacillus paracasei*). Isolated from split barley kernel, Finland. Studies on mash filtration problems (378, 379). (Medium 6 or 63, 30°C)

E-97850[T] DSM 20623 (= ATCC 35677 = NCDO 2763 = Holzapfel 66). Isolated from vacuum-packed minced beef. (Medium 6 or 63, 30°C)

Caulobacter crescentus Poindexter 1964[AL]

E-93495[T] NCIMB 9787 (= ATCC 15252 = DSM 4727 = Poindexter CB 2). Isolated from tap water, California. (Medium 76, 25-30°C)

Cellulomonas fimi (McBeth and Scales 1913) Bergey et al. 1923[AL]

E-93020[T] DSM 20113 (= ATCC 484 = NCIMB 8980 = NCIMB 11341 = NCTC 7547 = QM B-527 = USDA 133 = IAM 12107 = JCM 1341 = CCUG 24087 = Smith NRS 133). Isolated from soil. Degrades cellulose. (Medium 20, 30°C)

Cellulomonas uda (Kellerman et al. 1913) Bergey et al. 1923[AL]

E-75021 ATCC 21399 (= DSM 20108 = NCIMB 11494 = CCUG 24088). Isolated from sugarcane field. Produces active cellulase, animal feedstuff protein from cellulose (US Pat. 3627095), single-cell protein (US Pat. 4278766). **Teaching strain**. (Medium 20, 30°C)

Chryseobacterium balustinum (Harrison 1929) Vandamme et al. 1994[VP]
Basonym *Flavobacterium balustinum*

E-91456 NCTC 11390 (*Flavobacterium balustinum*). Isolated from milk bottle rinse. (Medium 5 or 66, 30°C)

Chryseobacterium indologenes (Yabuuchi et al. 1983) Vandamme et al. 1994[VP]
Basonym *Flavobacterium indologenes*

E-90399 BIO (V) (*Flavobacterium indologenes*). Isolated from split barley kernel, Finland. Studies on mash filtration problems (378, 379). (Medium 5 or 66, 25°C)

E-91447 HY, Department of General Microbiology (E61) (*Flavobacterium indologenes*). Isolated from process water of a paper mill, Finland. (Medium 5 or 67, 30°C)

E-93496[T] NCTC 10796 (= ATCC 29897 = CDC 3716 = GIFU 1347 = RH 542). Isolated from trachea at autopsy. (Medium 5, 30°C)

Citrobacter freundii (Braak 1928) Werkman and Gillen 1932[AL]

E-96692 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-97778[T] DSM 30039 (= ATCC 8090 = IFO 12681 = NCTC 9750). Quality control strain according to DIN 58959-7. Cometabolism of α- and γ-HCH. Produces restriction endonuclease *Cfr*AI. Two colony types (large and small). (Medium 5, 30°C)

E-97954 BEL (2465-3). Isolate from poultry industry, Finland. (Medium 5, 30°C)

Citrobacter sp.

E-97826 BEL (17/10P). Isolated from paper machine slime, Finland. (Medium 5 or 95, 30°C)

Clavibacter michiganense subsp. ***michiganense*** (Smith 1910) Davis et al. 1984[VP]
Basonym *Corynebacterium michiganense*

E-97058[T] DSM 46364 (= ICPB CM 177 = IMET 11518 = LMG 7333 = NCPPB 2979 = PDDCC 2550 = Klement SO5). (Medium 101 or 81, 28°C)

E-91437 HY (E25). Isolated from process water of a paper mill, Finland. (Medium 67, 101 or 81, 30°C)

Clostridium acetobutylicum McCoy et al. 1926[AL]

E-77022[T] ATCC 824 (= DSM 792 = LMG 5710 = IFO 13948 = NCIMB 8052 = McCoy and McClung strain W = McClung 2291) (*Granulobacter pectinovorum*). Isolated from corn meal. Produces acetone, acidolysin, autobacteriocin, n-butanol, restriction endonuclease *Cac* 8241. Degrades xylan. Assay of p-aminobenzoic acid. (Medium 11, 37°C, strictly anaerobic)

E-93498 BIO (U156). Isolated from beer, South Africa. Studies on biofilms (522, 545). (Medium 11, 37°C, strictly anaerobic)

Clostridium aurantibutyricum Hellinger 1944[AL]

E-84185[T] DSM 793. ATCC 17777 (= VPI 10789 = NCIMB 10659 = McClung 2038). Produces pectinase. (Medium 11, 37°C, strictly anaerobic)

Clostridium beijerinckii Donker 1926[AL]

E-77057 ATCC 10132 (= DSM 1739 = LMG 5715 = NRRL B-594 = NCIMB 8049 = McCoy A-14 = McClung 2287) (*Clostridium acetobutylicum*). Produces acetone, n-butanol, ethanol. (Medium 11, 37°C, strictly anaerobic)

E-84183 VPI 2968 (*Clostridium butyricum*) (= McClung 1672). (Medium 11, 37°C, strictly anaerobic)

E-84184 VPI 13437 (= DSM 6423 = NRRL B-593 = McCoy A-21) (*Clostridium butylicum*). Produces 1,3-propanediol from glycerol, butanol, isopropanol. (Medium 11, 35°C, strictly anaerobic)

E-84189 ATCC 14823 (= VPI 2844 = McClung 629 = McCoy 79) (*Clostridium butylicum*). (Medium 11, 37°C, strictly anaerobic)

E-84190 ATCC 6014 (= McCoy 79) (*Clostridium butyricum*). (Medium 11, 37°C, strictly anaerobic)

E-84191 NRRL B-592 (= DSM 6422 = VPI 13436 = McCoy A-39) (*Clostridium butylicum*). Produces acetone, n-butanol. (Medium 11, 35°C, strictly anaerobic)

E-89367 BIO (T31/1). Isolated from starch slurry. Studies on brewery adjuncts (377). (Medium 11, 37°C, strictly anaerobic)

E-91425[T] DSM 791 (= ATCC 25752 = ATCC 17778 = NCIMB 9362 = LMG 5716 = VPI 5481 = McClung 1671 = McCoy A-67). (Medium 11, 37°C, strictly anaerobic)

E-95610 BEL. Isolated from brewery cold trub, Finland (488). (Medium 11, 30°C, strictly anaerobic)

E-96693 BEL. Isolated from process water of a mill, Spain. (Medium 11, 37°C, strictly anaerobic)

E-981083 BEL (P3). Isolated from processed rye, Finland. (Medium 11, 37°C, anaerobic)

Clostridium botulinum (van Ermengen 1896) Bergey et al. 1923[AL]

E-98821[T] ELTDK (103) (= ATCC 25763 = Smith VPI 1550). Type A. (Medium 11, 37°C, strictly anaerobic)

E-98822 ELTDK (106) (= ATCC 7949 = Hegarty NCA 213 B). Isolated from canned shallots (onions). Type B, proteolytic. (Medium 11, 37°C, strictly anaerobic)

E-98928 ELTDK (111) (= Dolman Beluga E). Type E. Isolated from fermented white whale flippers. (Medium 11, 37°C, strictly anaerobic)

Clostridium butyricum Prazmowski 1880[AL]

E-97426[T] DSM 10702 (= ATCC 19398 = IFO 13949 = NCIMB 7423 = NCTC 7423 = LMG 1217 = VPI 2969 = VPI 3266 = McClung 2391). Isolated from intestine of pig. Butyricin 7423. (Medium 11, 37°C, strictly anaerobic)

Clostridium perfringens (Veillon and Zuber 1898) Hauduroy et al. 1937[AL]

E-94526 ATCC 3626 (= NCIMB 10691 = LMG 10468 = McClung 1955 = Wilsdon type B, strain 34). Isolated from intestinal contents of lamb. Produces phospholipase C, haemolysins, lethal toxins. (Medium 11, 37°C, strictly anaerobic)

E-94532 ATCC 3624 (= McClung 1997 = Wilsdon type A, strain 26). Produces α-toxin (lecithinase). (Medium 11, 37°C, strictly anaerobic)

E-98861[T] ATCC 13124 (= ATCC 19408 = DSM 756 = NCIMB 6125 = NCTC 6125 = NCTC 8237) (*Clostridium welchii*). Isolated from bovine. Type A, α-toxigenic. Produces lecithinase, phospholipase C, haemolysins, lethal toxins. Quality control strain according to DIN 58959-7, control strain for antimicrobic susceptibility testing of anaerobic bacteria. **Test strain**. (Medium 11, 37°C, strictly anaerobic)

Clostridium sp.

E-77072 ATCC 27022 (= DSM 2152 = Ogata and Hongo N1-504) (*Clostridium saccharoperbutyacetonicum*). Isolated from soil, Japan. Produces acetone and n-butanol (US Pat. 2945786). Extracellular formation of o-butylhomoserine and alanine. (Medium 11, 37°C, strictly anaerobic)

* E-86252 BIO (170a). Isolated from carrot, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

* E-86253 BIO (178a). Isolated from potato, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

* E-86254 BIO (179a). Isolated from potato, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

* E-86255 BIO (207a). Isolated from birch forest soil, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

* E-86256 BIO (207b). Isolated from birch forest soil, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

* E-86257 BIO (208b). Isolated from birch forest soil, Finland. Produces butanol, isopropanol. (Medium 11 or 30, 37°C, strictly anaerobic)

E-89368 BIO (31/2) (*Clostridium sporogenes*). Isolated from starch slurry, Finland. Physiological properties close to *C. sporogenes* and molecular to *C. scatologenes*. Studies on brewery adjuncts (377). (Medium 11, 37°C, anaerobic)

E-981084 BEL (94/1). Isolated from processed rye, Finland. (Medium 11, 37°C, anaerobic)

E-981085 BEL (94/2). Isolated from processed rye, Finland. (Medium 11, 37°C, anaerobic)

Clostridium sporogenes (Metchnikoff 1908) Bergey et al. 1923[AL]

E-96697 DSM 1664 (= ATCC 19404 = NCIMB 532 = NCTC 532 = M. Robertson SR 5). Isolated from gas gangrene. Sterility testing. Reduces pyrimidines. **Test strain**. (Medium 11, 37°C, anaerobic)

E-97750 BEL (SEP/A = HD11-1). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97751 BEL (SEP/B = IPJ9/2-1). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97752 BEL (SEP/C = IPJ9/1-1). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97753 BEL (SEP/D = IPJ8/1-2). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97754 BEL (SEP/E = IPJ3/2-1). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97755 BEL (SEP/F = IPJ2-2). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

E-97756 BEL (SEP/G = IPJ2/1-1). Isolated from a pea protein product. Posibility of proteolytic *C. botulinum* (type A,B,F). (Medium 11, 37°C, anaerobic)

Clostridium symbiosum (Stevens 1956) Kaneuchi et al. 1976[AL]

E-981051[T] ATCC 14940 (= DSM 934 = Shaffer 2 = Sebald LSU) (*Bacteroides symbiosus*). Used in cultivation of *Entamoeba histolytica*. (Medium 11, 37°C, anaerobic)

Clostridium thermocellum Viljoen et al. 1926[AL]

E-81137[T] ATCC 27405 (= DSM 1237 = NCIMB 10682 = VPI 7372). Produces cellulase, restriction endonucleases *Cth*I and *Cth*II. (Medium 11 or 27, 55-60°C, gas atmosphere: 95% N_2 + 5% CO_2)

Comamonas acidovorans (den Dooren de Jong 1926) Tamaoka et al. 1987[VP]
Basonym *Pseudomonas acidovorans*

E-86250[T] DSM 39 (= ATCC 15668 = DSM 50251 = LMG 1226 = NCIMB 9681 = NCTC 10859 = NCTC 10683 = Hugh 2167 = Stanier 14 = den Dooren de Jong 7) (*Pseudomonas acidovorans*). Isolated from soil enriched with acetamide, The Netherlands. (Medium 5, 30°C)

* E-97882 BEL (CYC/B). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

Comamonas terrigena (Hugh 1962) De Vos et al. 1985[VP]

E-981067[T] DSM 7099 (= ATCC 8461 = CCUG 15327 = CIP 63.44 = LMG 5929 = NCIMB 8193 = NCTC 1937 = NRRL B-1055 = Mudd and Warren "*Vibrio percolans*"). Isolated from hay-infusion filtrate. (Medium 95, 30°C)

Comamonas testosteroni (Marcus and Talalay 1956) Tamaoka et al. 1987[VP]
Basonym *Pseudomonas testosteroni*

E-84214 BIO. Isolated form a paper mill, Finland. (Medium 5, 30°C)

E-86249[T] DSM 50244 (= ATCC 11996 = LMG 1800 = NCIMB 8955 = NCTC 10698 = NRRL B-2611 = CCM 1931 = ICPB 2741-78 = NCPPB 1969 = Stanier 78 = Hugh 1104). Isolated from soil, enrichment with testosterone. Produces β-lactamase, 9-α-hydroxy- steroids (US Pat. 3065146), oxoalkylxanthines (Can. Pat. 1022867, Ger. Pat. 2302772). (Medium 5, 30°C)

Corynebacterium fascians (Tilford 1936) Dowson 1942[AL]
Reclassified as *Rhodococcus fascians*

Corynebacterium glutamicum (Kinoshita et al. 1958) Abe et al. 1967[AL]

* E-80122 BIO (534). Degrades urea. (Medium 5 or 57, 30°C)

E-88300 ATCC 21801 (= Ajinomoto Co., Inc. AD-162) (*Brevibacterium lactofermentum*). Derived from ATCC 13869. Produces L-lysine (US Pat. 3825472). (Medium 20 or 40, 30°C)

E-991192 ATCC 21253 (Kyowa Ferm. Ind. Co., Ltd. M-901-No 2347). Produces L-lysine (US Pat. 3708395). (Medium 20 or 40, 30°C)

E-991193 ATCC 21799 (Ajinomoto Co., Inc. AC-73) (*Brevibacterium lactofermentum*). Derived from ATCC 13869. Produces L-lysine (US Pat. 3825472). (Medium 5 or 20, 30°C)

Corynebacterium michiganense (Smith 1910) Jensen 1934[AL]
Reclassified as *Clavibacter michiganense* subsp. *michiganense*

Corynebacterium sp.

E-82044 BIO (LK 100). Isolated from beer. Studies on biofilms (522, 545). (Medium 20, 30°C)

E-88311 ATCC 21863 (= Mitsuitoatsu Chem. Inc. 18S-738-26 = FERM-P 1300). Isolated from soil. Produces L-lysine (US Pat. 3905867). (Medium 20, 30°C)

Corynebacterium vitaeruminis (Bechdel et al. 1928) Lanéelle et al. 1980[VP]
Basonym *Brevibacterium vitarumen*

E-96671 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5 or 20, 30°C)

E-96672 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5 or 20, 30°C)

E-97777[T] DSM 20294 (= ATCC 10234 = NCIMB 9291) (*Flavobacterium vitarumen*). Reduces a dione (US Pat. 3562112). (Medium 20, 30°C)

Cytophaga sp.

* E-97984 BEL (CRA/14). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

Desulfovibrio desulfuricans subsp. ***desulfuricans*** (Beijerinck 1895) Kluyver and van Niel 1936[AL]

E-95573[T] DSM 642 (= ATCC 29577 = NCIMB 8307= VKM B-1799 = Essex 6). Isolated from tar and sand mix around corroded gas main, South Essex, UK. (Medium 87, 37°C, anaerobic)

Empedobacter brevis (Holmes and Owen 1982) Vandamme et al. 1994[VP]
Basonym *Flavobacterium breve*

E-91455[T] NCTC 11099 (= ATCC 43319 = LMG 4011 = CCM 3299 = CL 88/76). Isolated from human bronchial secretion, Switzerland. (Medium 5 or 66, 30°C)

Enterobacter aerogenes Hormaeche and Edwards 1960[AL]

E-88325[T] ATCC 13048 (= DSM 30053 = LMG 2094 = NCDC 819-56 = NCTC 10006 = IFO 13534) (*Aerobacter aerogenes*). Isolated from sputum. Fermentative cometabolism of γ-HCH. Assay of antimicrobial preservatives and slimicides. Quality control strain according to DIN 58959-7, control strain for media. Studies on penetration (538). **Test strain**. (Medium 5, 30°C)

Enterobacter agglomerans (Beijerinck 1888) Ewing and Fife 1972[AL]
Reclassified as *Pantoea agglomerans*

Enterobacter amnigenus Izard et al. 1981[VP]

E-90417 BIO (7) (*Hafnia alvei*). Isolated from split barley kernel. (Medium 5, 30°C)

E-97863[T] DSM 4486 (= ATCC 33072 = Leclerc 77-118). Isolated from soil. (Medium 5, 30°C)

E-981073 BEL (U129). Isolated from brewery, Sweden. (Medium 5 or 29, 30°C)

Enterobacter cancerogenus (Urosevic 1966) Dickey and Zumoff 1988[VP]
Basonym *Enterobacter taylorae*
Basonym *Erwinia cancerogena*

E-981124[T] ATCC 33241 (= NCPPB 2176 = Urosevic A-1) (*Erwinia cancerogena*). Isolated from *Populus canadensis* var. *negenerata* canker, Czechoslovakia. (Medium 5, 30°C)

E-981125 ATCC 35317 (= CDC 2126-81) (*Enterobacter taylorae*). Isolated from human arm wound, New York. Type strain of *E. taylorae* (Medium 5, 37°C)

Enterobacter cloacae (Jordan 1890) Hormaeche and Edwards 1960[AL]

E-74024 CCC-5. Studies on immunology (95). (Medium 5, 30°C)

E-84198[T] ATCC 13047 (= DSM 30054 = LMG 2783 = NCTC 10005 = NCIMB 10101 = CIP 60.85 = IFO 13535 = NCDC 279-56 = NCDC 442-68) (*Aerobacter cloacae*). Isolated from spinal fluid. Quality control strain according to DIN 58959-7 and for API products. **Test strain**.(Medium 5, 30°C)

E-84199 ATCC 27613 (= Yadov B-87) (*Arthrobacter diacetylicum*). Isolated from river bed soil. (Medium 5, 30°C)

E-84209 ATCC 7256 (= IFO 3320) (*Aerobacter aerogenes*). Isolated from well water. (Medium 5, 30°C)

E-86247 BIO (M8III). Isolated from a brewery, Finland. Studies on biofilms (522, 545). (Medium 5, 30°C)

E-87292 University of Leuven. Isolated from spontaneous Lambic beer fermentation, Belgium. Studies on the α-*ald* (*bud*A) gene (395, 420). (Medium 5, 30°C)

E-96669 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96684 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96685 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96686 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

Enterobacter intermedius Izard et al. 1980[VP]

E-97862[T] DSM 4581 (= ATCC 33110 = CIP 79.27 = CUETM 77.130 = IAM 14238 = JCM 1238 = Gavini E86). Isolated from surface water. (Medium 5, 30°C)

Enterobacter sp.

E-86263 BIO M8I (*Enterobacter agglomerans*). Isolated from a brewery, Finland. Studies on detection (340) and survival in immobilized yeast bioreactor (397, 544). (Medium 5 or 66, 30°C)

E-90396 BIO (II) (*Enterobacter agglomerans*). Isolated from malt of split barley kernel, Finland. Studies on mash filtration problems (378, 379), microbicidic activity (436, 464, 503, 504, 521). (Medium 5 or 66, 30°C)

E-95622 BEL (29). Isolated from salad, Finland. (Medium 5, 30°C)

E-95643 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 30°C)

E-95645 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 30°C)

E-95649 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 30°C)

E-96688 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

Enterobacteriaceae

E-84213 BIO. Isolated from a paper mill, Finland. (Medium 5, 30°C)

E-96668 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96683 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96691 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-96694 BEL. Isolated from cream filling of biscuit, Finland. (Medium 5, 30°C)

E-981026 BEL (MR 4-2 I = E-981027). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

* E-981031 BEL (MR 7d-2 II = E-981030). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Enterococcus avium Collins et al. 1984[VP]

E-84197 ATCC 9274 (= Kubes 2) (*Streptococcus avium*). Isolated from brain of hen. (Medium 5, 26°C)

E-97804[T] DSM 20679 (= ATCC 14025 = LMG 10744 = NCDO 2369 = NCTC 9938 = Jones W17 = Guthof E6844). Isolated from human faeces. Sreological group Q. Quality control strain for API products. (Medium 63, 37°C)

Enterococcus casseliflavus Collins et al. 1984[VP]
Basonym *Streptococcus casseliflavus*

E-97775[T] DSM 20680 (= ATCC 25788 = NCDO 2372 = JCM 8723 = NCIMB 11449 = Mundt 20). Isolated from plant material. Serological group D. (Medium 63, 37°C)

Enterococcus dispar Collins et al. 1991[VP]

E-97810[T] DSM 6630 (= ATCC 51266 = NCFB 2821 = NCIMB 1300 = Facklam E18-1). Human clinical isolate. (Medium 63, 37°C)

Enterococcus durans Collins et al. 1984[VP]

E-97805[T] DSM 20633 (= ATCC 19432 = LMG 10746 = CCM 5612 = NCDO 596 = NCTC 8307 = Sherman 98D). Isolated from dried milk. Serological group D. (Medium 63, 37°C)

Enterococcus faecalis (Andrewes and Horder 1906) Schleifer and Kilpper-Bälz 1984[VP]
Basonym *Streptococcus faecalis*

E-93203[T] DSM 20478 (= ATCC 19433 = LMG 7937 = NCDO 581 = NCIMB 775 = NCTC 775 = NIRD strain Tissier). Serological group D. Studies on human intestinal microbial ecosystem (558). (Medium 6 or 20 or 81, 37°C)

E-87280 NCTC 10927 (*Streptococcus faecalis* var. *zymogenes*). Laundry disinfectant strain. **Test strain**. (Medium 6 or 20 or 81, 37°C)

E-97801 BEL (2). Isolated from human faeces, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C, anaerobic)

E-97802 BEL (3). Isolated from human faeces, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C, anaerobic)

E-97846 BEL (237). Isolated from human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C, anaerobic)

E-991208 BEL (TVA-17a). Isolated from poultry industry, Finland. (Medium 6, 37°C, anaerobic)

Enterococcus faecium (Orla-Jensen 1919) Schleifer and Kilpper-Bälz 1984[VP]
Basonym *Streptococcus faecium*

E-93204[T] DSM 20477 (= ATCC 19434 = LMG 11423 = NCDO 942 = NCTC 7171 = Grumbach serotype 11). Serological group D. Quality control strain according to DIN 58959-7. (Medium 20, 37°C)

E-90381 BIO (M19) (*Lactococcus lactis*). Isolated from a beer dispense apparatus, Finland. Studies on biofilms (522, 545). (Medium 12 or 20, 30°C)

E-97803 BEL (4). Isolated from human faeces, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C)

E-981096 BEL (NUT 103/3). Isolated from pea flour, Finland. (Medium 6, 30°C)

E-981097 BEL (NUT 103/4). Isolated from pea flour, Finland. (Medium 6, 30°C)

Enterococcus flavescens Pompei et al. 1992[VP]

E-96690 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-97774[T] DSM 7370 (= ATCC 49996 = CCM 4239 = Pompei CA 2). Isolated from human sepsis in diabetic patient, Cagliari, Italy. Serological group D. (Medium 63, 37°C)

Enterococcus gallinarum (Bridge and Sneath 1982) Collins et al. 1984[VP]
Basonym *Streptococcus gallinarum*

E-97776[T] DSM 20628 (= ATCC 49573 = NCDO 2313 = NCTC 11428 = JCM 8728 = Barnes F87/268 = Sneath PB21). Isolated from chicken intestine. (Medium 63, 37°C)

Enterococcus hirae Farrow and Collins 1985[VP]

E-97046[T] DSM 20160 (= ATCC 8043 = LMG 6399 = IFO 3181 = NCTC 6459 = NCIMB 6459 = NCIMB 8123 = BUCSAV 308 = CCM 2424 = NCDO 1258 = NCFB 1258 = Snell strain R) (*Streptococcus lactis* R). Serological group D. Assay of folic acid, pyridoxal, pyridoxamin. Studies on disinfectant testing (489). **Test strain**. (Medium 20, 37°C)

E-75047 ELI (*Streptococcus lactis*). (Medium 20, 37°C)

Enterococcus pseudoavium Collins et al. 1989[VP]

E-97811[T] DSM 5632 (= ATCC 49372 = LMG 11426 = CIP 103331 = NCDO 2138 = Roguinsky 47-16) (*Streptococcus bovis*). Isolated from bovine mastitis, France. (Medium 63, 37°C)

Enterococcus raffinosus Collins et al. 1989[VP]

E-97812[T] DSM 5633 (= ATCC 49427 = NCTC 12192 = Facklam 1789/79). Isolated from blood culture. (Medium 63, 37°C)

Enterococcus sp

* E-90416 BIO (6XX) (*Lactococcus* sp.). Isolated from split barley kernel, Finland. Studies on microbicidic activity (414, 433, 435, 464, 521, 531, 542). (Medium 6, 30°C, anaerobic)

E-95579 BEL (O = NIK). Isolated from beer, Finland. (Medium 6, 30°C, anaerobic)

Erwinia carotovora subsp. ***carotovora*** (Jones 1901) Bergey et al. 1923[AL]
Reclassified as *Pectobacterium carotovorum* subsp. *carotovorum*

Erwinia herbicola (Löhnis 1911) Dye 1964[AL]
Reclassified as *Pantoea agglomerans*

Escherichia adecarboxylata Leclerc 1962[AL]
Reclassified as *Leclercia adecarboxylata*

Escherichia coli (Migula 1895) Castellani and Chalmers 1919[AL]

E-70026 Sanitized Testing Laboratory, Burgdorf, Switzerland. ATCC 4352 (= DSM 789 = IFO 13277 = NCIMB 10341 = LMG 3128) (*Escherichia coli* var. *communior*) (*Klebsiella pneumoniae* subsp. *pneumoniae*). Isolated from cow's milk. Test strain for detection of bacteriostatic activity in fabrics etc. (Medium 5 or 8, 37°C)

E-76039 ATCC 8739 (= DSM 1576 = LMG 8063 = NCIMB 8545 = IFO 3972 = CIP 53.126 = NCDO 904 = Gunsalus strain Crooks). Isolated from faeces. Reduces dehydroascorbic acid. Quality control strain according to DIN 58959-7. Preservative-testing of parenteral and ophtalmic preparations. Studies on immunology (95), detection (150). **Test strain**. (Medium 5 or 8, 37°C)

E-81094 NCTC 8196 (= DSM 10233 = NCIMB 8277 = NCDO 745 = strain C3 = ELI 53). Serotype O103:K?:H. Disinfectant test strain (Kelsey test). **Teaching strain**. **Test strain**. (Medium 5 or 8, 37°C)

E-87296 ALKO 623 (= strain K-12-Yale). (Medium 5, 37°C)

E-90418 ATCC 31608 (= Genentech, K-12 strain RV308). (Medium 5, 37°C)

E-94533 ATCC 29532 (= Mahony 23). Clinical isolate. Produces 7-α-hydroxysteroid dehydrogenase. (Medium 5 or 81, 37°C)

E-95543 GM 2929. Institute of Biotechnology, Finland. Recombinant DNA vector host. (Medium 5, 37°C)

E-94564^{T} DSM 30083 (= ATCC 11775 = NCTC 9001 = NCIMB 11943 = CIP 54.8 = IAM 12119 = JCM 1649 = CCM 5172 = NCDO 1989 = CN 4382 = Kauffmann U5/41 = ELI 50). Isolated from urine of cystitis patient, Copenhagen, Denmark. Serovar O1:K1:H7. Pathogenic to chickens. Cometabolism of γ-HCH. (Medium 5, 37°C)

E-95569 DH5α. Bethesda Research Laboratories, USA. Recombinant DNA vector host. (Medium 5, 37°C)

E-95644 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 37°C)

E-96658 DSM 1328 (= Monod ML 308). Serotype O13:H11, Lac^{+} ($i^{+}z^{+}y^{+}$). Produces galactosidase-permease. (Medium 5, 37°C)

E-97757 ATCC 51739 (= DUP-101). Quality control for DuPont/Qualicon RiboPrinter® Microbial Characterization System. (Medium 5 or 81, 37°C)

E-97835 ATCC 25922 (= DSM 1103 = NCIMB 12210 = FDA strain Seattle 1946 = ELI 51). Clinical isolate. Quality control strain according to DIN 58959-7, control strain for susceptibility testing of bacteria to antibiotics, etc. **Test strain**. (Medium 5, 37°C)

E-97836 ATCC 35150 (= serotype O157:H7 = EHEC = Morris EDL 931). Isolated from human feces. Hemorrhagic colitis. Cytotoxic activity. Studies on outer membrane (547), essential oils (562). (Medium 5 or 95, 37°C)

E-97867 MG 1655. Strain K-12. (Medium 8, 37°C)

E-97868 LMM 1010. Barotolerant mutant of MG 1655. (Medium 8, 37°C)

E-97869 LMM 1020. Barotolerant mutant of MG 1655. (Medium 8, 37°C)

E-97870 LMM 1030. Barotolerant mutant of MG 1655. (Medium 8, 37°C)

E-98998 ATCC 33965 (= Rosenberg N100 = Meselson 152). Genotype *F⁻ rpsL galK2 recA13λ⁻⁻*. Host for pKO series vectors. (Medium 5 or 95, 37°C)

E-991030 DSM 787 (= ATCC 11229 = AMC 198). Testing of bacterial resistance of latex paint, disinfectants, sanitisers, antimicrobial handwashing formulations, membrane filters with absorbent pads and membrane filters with ink grids. **Test strain**. (Medium 5, 37°C)

E-991191 ATCC 55101 (Univ. Texas Syst. SF110). Genotype: F- delta (*lac*IPOZY)74 *gal*E *gal*K *thi rps*L delta*Pho*A(*Pvu*II) delta(*omp*T) *deg*P41(delta*Pst*I-*Kan*R). Protease-deficient transformation host. Deficient in proteases OmpT and DegP. Useful for expressing recombinant proteins. (Medium 8 with 25 mg/ml kanamycin, 37°C)

Faenia rectivirgula (Krassilnikov and Agre 1964) Kurup and Agre 1983[VP]
Reclassified as *Saccharopolyspora rectivirgula*

Flavobacterium balustinum Harrison 1929[AL]
Reclassified as *Chryseobacterium balustinum*

Flavobacterium breve Holmes and Owen 1982[VP]
Reclassified as *Empedobacter brevis*

Flavobacterium capsulatum Leifson 1962[AL]
Reclassified as *Sphingomonas capsulata*

Flavobacterium indologenes Yabuuchi et al. 1983[VP]
Reclassified as *Chryseobacterium indologenes*

Flavobacterium sp.

E-94544 NRRL B-14010. Patent strain. (Medium 5, 30°C)

Flavobacterium -group

E-981028 BEL (MR 6-2b). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Gluconacetobacter hansenii (Gossele et al. 1983) Yamada et al. 1998[VP]
Basonym *Acetobacter hansenii*

E-97829[T] DSM 5602 (= ATCC 35959 = CCUG 18123 = LMG 1527 = NCIMB 8746) (*Acetobacter aceti* subsp. *orleanensis*). Isolated from vineagar, Jerusalem. Type strain of *Acetobacter hansenii*. Celluloseless mutant 1 derived from NCIMB 8745. (Medium 61 or 98, 28°C)

Gluconacetobacter xylinus subsp. ***xylinus*** (Brown 1886) Yamada et al. 1998[VP]
Basonym *Acetobacter xylinus* subsp. *xylinus*

E-92004 CNRS/CERMAV (presumably same as ATCC 12733). (Medium 49 or 98, 30°C)

E-92101 ATCC 23769 (= NCIMB 8246 = BU 336 = CCM 1808 = CCTM 1670 = FIRDI 589 = IMET 10313 = LMG 1524 = RIA 813 = Senez = Aschner) (*Acetobacter aceti* subsp. *xylinum*). Isolated from vinegar, Israel. Produces cellulose (US Pat. 4942128). (Medium 61 or 98, 26°C)

E-92102 ATCC 53263 (= Cetus Corp. CMCC 2145). Mutant derived from ATCC 53264. Produces cellulose (US Pat. 4863565, EPO 289993). (Medium 48 or 98, 30°C)

E-89370 DSM 2004 (= ATCC 23768 = LMG 1521 = CCM 1809= NCIMB 7029 = NCTC 7029 = LBG B4168) (*Acetobacter xylinum* var. *africanum*). Isolated from a mixed culture NCTC 6716 from a vinegar brew, Nairobi, Kenya. Produces cellulose. **Teaching strain**. (Medium 61, 26°C)

E-97831[T] DSM 6513 (= ATCC 23767 = LMG 1515 = NCIMB 11664 = NCTC 4112). Isolated from mountains ash berries. (Medium 61 or 98, 28°C)

Gluconacetobacter sp.

E-991175 BEL (X). Isolated from an immobilized beer main fermentation column, Finland. (Medium 61 or 98, 28°C)

Gluconobacter oxydans (Henneberg 1897) De Ley 1961[AL]

E-89363 DSM 2003 (= LBG B 4099 = CN 1221) (*Acetobacter suboxydans*). Studies on xylonic acid (342). (Medium 61 or 98, 26°C)

E-89364 DSM 2343 (= LMG 1403 = LMG 1681 = ATCC 621H = NCIMB 8036). (*Acetomonas suboxydans*). Derived from ATCC 621. Assay of panthenol. (Medium 61, 26°C)

E-97820 BEL (28). Isolated from apple wine, Finland. (Medium 61 or 98, 28°C)

E-97864[T] DSM 7145 (= ATCC 19357 = NCIMB 9013 = Carr 1) (*Acetomonas oxydans*). Isolated from beer. (Medium 98, 28°C)

E-991170 BEL (Ib). Isolated from an immobilized beer main fermentation column, Finland. (Medium 61 or 98, 28°C)

Gluconobacter oxydans subsp. ***oxydans*** (Henneberg 1897) De Ley 1961[AL]

E-89365[T] DSM 3503 (= ATCC 19357 = IAM 14436 = LMG 1408 = NCIMB 9013 = Carr 1) (*Acetomonas oxydans*). Isolated from beer. Studies on xylonic acid (342), biofilms (522, 545). (Medium 98, 26°C)

Gluconobacter oxydans subsp. ***suboxydans*** (Kluyver and de Leeuw 1924) De Ley and Frateur 1974[AL]

E-97003 DSM 50049 (=ATCC 621 = ATCC 23774 = LMG 1673 = NCIMB 7069 = NCIMB 8035 = NCTC 7069 = NRRL B-72 = IFO 3172 = IFO 12528 = CCM 1783 = CIP 53.162 = BUCSAV 124 = IAM 1829 = Lockwood 953) (*Acetobacter suboxydans*). Assay of p-aminobenzoic, nicotinic and pantothenic acids. Produces sorbose. Studies on xylonic acid (213, 235, 252, 276, 279, 289, 300, 342), hemicellulose hydrolysate (350), detoxification (362), aldose dehydrogenase and electrochemical detection (363, 412, 425, 428, 485). **Teaching strain**. (Medium 61, 26°C)

Gluconobacter sp.

E-89366 DSM 3504 *(Acetobacter melanogenes*) (= ATCC 15163 = IFO 3292 = IFO 3292). Produces 2-keto-L-gulonic acid from sorbitol (US Pat. 3234105). Studies on xylonic acid (342). (Medium 98, 26°C)

Gordonia terrae (Tsukamura 1971) Stackebrandt et al. 1989[VP]
Basonym *Rhodococcus terrae*

E-96732 BEL (AO623-4). Isolated from an arabic gum sample. (Medium 5, 30°C)

Hafnia alvei Moller 1954[AL]

E-91440 HY, Department of General Microbiology (V-11). Isolated from process water of a paper mill, Finland. (Medium 5, 67 or 81, 30°C)

E-91448 HY, Department of General Microbiology (VI-41). Isolated from process water of a paper mill, Finland. (Medium 5, 67 or 81, 30°C)

Klebsiella oxytoca (Flügge 1886) Lautrop 1956[AL]

E-95642 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 37°C)

E-97766[T] DSM 5175 (= ATCC 13182 = IAM 14201 = JCM 1665 = Hugh 479-2) (*Klebsiella pneumoniae*). Isolated from pharyngeal tonsil. (Medium 5, 37°C)

Klebsiella planticola Bagley et al. 1982[VP]

E-981077[T] DSM 3069 (= ATCC 33531 = IAM 14202 = IFO 14939 = JCM 7251 = Seiler V-236). Isolated from radishroot. (Medium 5, 30°C)

Klebsiella pneumoniae subsp. ***ozaenae*** (Abel 1893) Oerskov 1984[VP]

E-96667 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 30°C)

E-97790[T] LMG 3113 (= ATCC 11296 = NCTC 5050 = CCTM 2096 = CUETM 78-309 = JCM 1663 = AMC 35-E-5 = CCM 5792 = CNCTC Klo 10/67 = CNCTC Klp 11/65 = CCUG 15938 = CIP 52.211 = Snijders 03 = Véron 47 = Kauffmann D5050 = Kosako 82058 = LMG 3118). Isolated from nose, Sumatra. (Medium 5, 30-37°C)

Klebsiella pneumoniae subsp. ***pneumoniae*** (Schroeter 1886) Trevisan 1887[AL]

E-84210 BIO. Isolated from a paper mill, Finland. (Medium 5, 37°C)

E-84211 BIO. Isolated from a paper mill, Finland. (Medium 5, 37°C)

E-87293 University of Leuven (*Klebsiella aerogenes*). Isolated from spontaneous Lambic beer fermentation, Belgium. (Medium 5, 37°C)

E-96687 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 5, 37°C)

E-97767[T] DSM 30104 (= ATCC 13883 = NCTC 9633 = NCDC 298-53). Serovar 3. Assay of antimicrobial agents in aqueous metal working fluids (ASTM E686-80). Quality control strain according to DIN 58959-7. (Medium 5, 37°C)

E-97824 BEL (15/8). Isolated from paper machine slime, Finland. (Medium 5 or 95, 37°C)

E-97859 BEL (PK8). Isolated from paper machine slime, Finland. (Medium 5 or 95, 37°C)

* E-97860 BEL (E212b). Derived from the mixed culture E-84212, isolated from a paper mill, Finland. Studies on biofilms (534), slime (537). (Medium 5, 37°C)

* E-97885 BEL (CYC/E). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

E-981021 BEL (MR 1 V S). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Klebsiella pneumoniae subsp. ***rhinoscleromatis*** (Trevisan 1887) Oerskov 1984[VP]

E-981126[T] ATCC 13884 (= NCTC 5046 = Snijders R-70). Isolated from nose of patient, Sumatra. Produces α-1,6-glucosidase (US Pat. 3766014). (Medium 5, 37°C)

Klebsiella sp.

E-95647 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 30°C)

Klebsiella terrigena Izard et al. 1981[VP]

E-74023 LMG (*Aerobacter aerogenes*). Isolated from ditch water, The Netherlands. Studies on the α-*ald* (*bud*A) gene (242, 395, 420). (Medium 5, 30°C)

E-96695 BEL (A3). Isolated from immobilized beer fermentation, Finland. (Medium 5, 30°C)

E-96696 BEL (A4). Isolated from immobilized beer fermentation, Finland. (Medium 5, 30°C)

E-97854[T] DSM 2687 (= ATCC 33257 = CIP 80.07 = CUETM 77.176 = Gavini L84). Isolated from drinking water. Fixes nitrogen. (Medium 5, 30°C)

Kluyvera ascorbata Farmer et al. 1981[VP]

E-981078[T] DSM 4611 (= ATCC 33433 = CIP 82.95 = IAM 14203 = CDC 0648-74). Isolated from human sputum, North Carolina, USA. (Medium 5, 30°C)

Kluyvera cryocrescens Farmer et al. 1981[VP]

E-981079[T] DSM 4588 (= ATCC 33435 = CIP 82.96 = IAM 14204 = CDC 2065-78 = Holmes CL 248/74). Human isolate. (Medium 5, 30°C)

Kocuria kristinae (Kloos et al. 1974) Stackebrandt et al. 1995[VP]
Basonym *Micrococcus kristinae*

E-82147 KC 169. Isolated from beer, UK. (Medium 20 or 81, 30°C)

E-97856[T] DSM 20032 (= ATCC 27570 = CCM 2690 = Kloos PM 129). Isolated from human skin. (Medium 20 or 81, 37°C)

Kocuria varians (Migula 1900) Stackebrandt et al. 1995[VP]
Basonym *Micrococcus varians*

E-82148 KC 181. Isolated from brewery pitching yeast, UK. Studies on viability assessment (477), penetration (538). (Medium 20 or 81, 30°C)

E-97857[T] DSM 20033 (= ATCC 15306 = CCM 884 = NCDO 777 = NCTC 7564 = Gibson G 33) (*Staphylococcus lactis*). Isolated from milk. (Medium 20 or 81, 30°C)

Kocuria sp.

E-84205 BIO (*Acinetobacter anitratus*). Isolated from a paper mill, Finland. Studies on biobleaching (520). (Medium 5 or 81, 30°C)

Lactobacillus acidophilus (Moro 1900) Hansen and Mocquot 1970[AL]

E-96276[T] DSM 20079 (= ATCC 4356 = NCDO 1748 = NCIMB 8690 = CIP 76.13 = LMG 7943 = LMG 9433 = IFO 13951 = IID 893 = NRRL B-4495 = VPI 6032 = Hansen L917 = Kulp strain Scav = Rogosa 210X). Human isolate. Produces hydrogen peroxide. Studies on microbicidic activity (521, 531, 542). (Medium 6, 37°C)

Lactobacillus amylolyticus Bohak et al. 1999[VP]

E-991039[T] DSM 11664 (= LA5). Isolated from acidified beer malt or acidified beer wort. (Medium 6, 48°C)

Lactobacillus amylophilus Nakamura and Crowell 1981[VP]

E-95574[T] DSM 20533 (= NRRL B-4437). Isolated from swine waste-corn fermentation. Starch fermentation. (Medium 6, 28°C)

Lactobacillus amylovorus Nakamura 1981[VP]

E-95576[T] DSM 20531 (= ATCC 33620 = NRRL B-4540). Isolated from cattle waste-corn silage. Degrades starch. (Medium 6, 37°C)

E-981145 BEL (P3). Isolated from starch slurry, Finland. (Medium 6, 37°C)

Lactobacillus animalis Dent and Williams 1983[VP]

E-981130 BEL (JM-UK1F). Isolated from dog, Finland. (Medium 6, 37°C)

Lactobacillus brevis (Orla-Jensen 1919) Bergey et al. 1934[AL]

E-64028 BIO. Isolated from beer, Finland. Studies on immunology (95), detection (150), viability assessment (477), PCR (511, 526, 556). (Medium 6, 30°C)

E-62029 BIO. Isolated from beer, Finland. Studies on immunology (95), detection (150), PCR (511, 526). (Medium 6, 30°C)

E-64030 BIO (*Lactobacillus buchneri*). Isolated from beer, Finland. Studies on immunology (95). (Medium 6, 30°C)

E-64032 BIO (B10) (*Lactobacillus cellobiosus*). Isolated from a brewery, UK. Studies on immunology (95). (Medium 6, 30°C)

E-75038 BIO. Isolated from beer, Finland. Studies on growth factor (95, 110), immunology (95, 145), detection (150), survival in immobilized yeast bioreactor (397). (Medium 12, 30°C, anaerobic)

E-78074 BRi (BSO 86). Isolated from beer, UK. Studies on immunology (95), detection (150). (Medium 6, 30°C)

E-78075 BRi (BSO 88). Isolated from beer, UK. Studies on immunology (95), detection (150). (Medium 6, 30°C)

E-82152 ATCC 367 (= LMG 11437 = NCTC 947 = NCIMB 947 = NCIMB 8169 = NCDO 477 = BUCSAV 252 = strain 118-8) (*Lactobacillus pentoaceticus*). Isolated from silage. Assay of cytosine and uracil. Produces acetic acid from pentoses. Studies on xylose catabolism (163, 181), preferments (504). (Medium 6, 30°C)

E-82153 ATCC 4006 (= NCDO 391 = LMG 11495 = NCIMB 4036 = NCTC 4036 = strain A4) (*Lactobacillus fermentatae*). (Medium 6, 30°C)

E-85232 BIO (1). Isolated from keg beer, Finland. Studies on detection (229). (Medium 6, 30°C)

E-85233 BIO (2). Isolated from keg beer, Finland. (Medium 6, 30°C)

E-88326 BIO (T21m). Isolated from beer, Finland. Studies on PCR (556). (Medium 6, 30°C)

E-88338 BIO (B22). Isolated from beer, Finland. Studies on ribotyping (552, 557). (Medium 6, 30°C)

E-88343 BIO (R26). Isolated from beer, Finland. Studies on PCR (556). (Medium 6, 30°C)

E-89346 BIO (M16 light). Isolated from beer, Finland. Studies on PCR (556). (Medium 6, 30°C)

E-89347 BIO (M16 dark). Isolated from beer, Finland. (Medium 6, 30°C)

E-89348 BIO (M14). Isolated from a beer dispense apparatus, Finland. Studies on biofilms (545), ribotyping (552). (Medium 6, 30°C)

E-89349 BIO (M15 light). Isolated from a beer dispense apparatus, Finland. Studies on biofilms (522). (Medium 6, 30°C)

E-91458^{T} DSM 20054 (= ATCC 14869 = LMG 7944 = LMG 6906 = NCIMB 11973 = JCM 1059 = IMET 10711 = NCDO 1749 = Hansen Bb 14 = Orla-Jensen 14) (*Betabacterium breve*). Isolated from faeces. Serological group E. Studies on PCR (511, 526), ribotyping (552). (Medium 6, 30°C)

* E-95612 Primalco (TSB 307). Isolated from sour dough seed, Finland. Studies on preferments (504), sour dough (536). (Medium 6, 30°C)

* E-95617 Primalco (TSB 304). Isolated from sour dough seed, Finland. Studies on preferments (504). (Medium 6, 30°C)

E-981048 Swedish brewery (strain 192). Isolated from beer, Sweden. Studies on PCR (556). (Medium 6, 30°C)

E-981134 BRi (BSO 496 = ABBC 37). Isolated from a brewery, Japan. Carries a possible hop-resistance gene (*hor*A) on a plasmid. (Medium 6, 30°C)

E-981136 BRi (BSO 499 = ABBC 206) (*Lactobacillus casei*). Isolated from a brewery, Japan. (Medium 6, 30°C)

E-981149 NCIMB 8840 (= Hayward 68 C4). Isolated from human saliva, Italy. (Medium 6, 30°C)

E-981150 LMG 12023 (= JCM 1068 = IPCR S2-56 = Reuter F275b) (*L. buchneri*). Isolated from human intestine. (Medium 6, 30°C)

E-991154 ABBC 78. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991155 ABBC 408. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991190 BRi (BSO 494 = ABBC 44). Carries a possible hop-resistance gene (*hor*A) on a plasmid. (Medium 6, 30°C)

E-991248 BEL (ATU-760). Isolated from silage, Finland. (Medium 6, 30°C)

"***Lactobacillus brevisimilis***" Back 1987, invalid name

E-91457 DSM 6265 (= LMG 14527 = Back L215). Isolated from beer, Germany. (Medium 6, 30°C)

Lactobacillus buchneri (Henneberg 1903) Bergey et al. 1923[AL]

E-75036 BIO (*Lactobacillus sanfrancisco*). Isolated from sour dough seed, Ilomantsi, Finland. (Medium 6, 30°C)

E-93445[T] DSM 20057 (= ATCC 4005 = CCM 1819 = NCFB 110 = NCIMB 8007 = LMG 6892 = BU 222 = IMET 10692 = JCM 1115 = Hansen L858) (*Lactobacillus lycopersici*). Isolated from tomato pulp. Serological group E. (Medium 6, 30°C)

Lactobacillus bulgaricus (Orla-Jensen 1919) Rogosa and Hansen 1971[AL]
Reclassified as *Lactobacillus delbrueckii* subsp. *bulgaricus*

Lactobacillus casei subsp. ***alactosus*** Mills and Lessel 1973[AL]
Reclassified as *Lactobacillus paracasei* subsp. *paracasei*

Lactobacillus casei subsp. ***casei*** (Orla-Jensen 1916) Hansen and Lessel 1971[AL]
Most strains are reclassified as *Lactobacillus paracasei* subsp. *paracasei*

E-85225[T] DSM 20011 (= ATCC 393 = LMG 6904 = NCDO 161 = IAM 12473 = NCIMB 11970 = JCM 1134 = Hucker 03 = Orla-Jensen 7 = Orland L-323 = Tittsler 303) (*Streptobacterium casei*). Isolated from cheese. Produces diacetyl and acetoin. (Medium 6, 30°C)

E-96710[NT] LMG 17314 (= ATCC 334). Isolated from emmental cheese. Proposed new type strain. (Medium 6, 30°C)

E-991156 ABBC 96. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991157 ABBC 376. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus casei subsp. ***pseudoplantarum*** Abo-Elnaga and Kandler 1965[AL]
Reclassified as *Lactobacillus paracasei* subsp. *paracasei*

Lactobacillus casei subsp. ***rhamnosus*** Hansen 1968[AL]
Reclassified as *Lactobacillus rhamnosus*

Lactobacillus cellobiosus Rogosa et al. 1953[AL]
Synonym *Lactobacillus fermentum*

E-98167[T] DSM 20055 (= ATCC 11739 = LMG 9846 = NCDO 928 = Rogosa 19 LC 3 = Hansen L 872). Isolated from saliva. (Medium 6, 30°C)

* E-97957 BEL (PiaK161). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 30°C)

* E-97958 BEL (PiaK167). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 30°C)

* E-98997 BEL (PiaK237). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 30°C)

* E-981003 BEL (PiaK 257). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 30°C)

Lactobacillus collinoides Carr and Davies 1972[AL]

E-95060[T] DSM 20515 (= ATCC 27612 = NCIMB 10925 = Carr C13a). Isolated from fermenting apple juice. (Medium 6 + maltose or 14, 26°C)

E-91472 BIO (M9) (*Lactobacillus brevis*). Isolated from soft drink, Finland. (Medium 6 + maltose or 14, 25°C)

E-981133 BRi (BSO 495 = ABBC 216) (*Lactobacillus brevis*). Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991162 ABBC 227. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus confusus (Holzapfel and Kandler 1969) Sharpe et al. 1972[AL]
Reclassified as *Weissella confusa*

Lactobacillus coryniformis subsp. ***coryniformis*** Abo-Elnaga and Kandler 1965[AL]

E-93487[T] DSM 20001 (= ATCC 25602 = NCIMB 9711 = LMG 9196 = NCFB 2741 = JCM 1164 = Abo-Elnaga 34 = Kandler 34). Isolated from silage. (Medium 6, 30°C)

E-991163 ABBC 94. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus crispatus (Brygoo and Aladame 1953) Moore and Holdeman 1970[AL]

E-97819[T] DSM 20584 (= ATCC 33820 = LMG 9479 = NCFB 2752 = Cato VPI 3199 = Prevot IPP II) (*Eubacterium crispatum*). Isolated from eye. (Medium 6, 37°C, anaerobic)

Lactobacillus curvatus subsp. ***curvatus*** (Troili-Petersson 1903) Abo-Elnaga and Kandler 1965, emend. Klein et al. 1996[AL]

E-90391[T] DSM 20019 (= ATCC 25601 = LMG 9198 = NCIMB 9710 = JCM 1096 = Abo-Elnaga 1). Isolated from milk. Produces lactic acid racemase. Studies on microbicidic activity (433, 493, 521, 524, 531, 542), preferments (504). (Medium 6, 30°C)

* E-91423 ELI 2 (*Lactococcus lactis* subsp. *diacitilactis*). Studies on microbicidic activity (433, 493, 524, 531, 542), preferments (504). (Medium 6, 30°C)

Lactobacillus delbrueckii subsp. ***bulgaricus*** (Orla-Jensen 1919) Weiss et al. 1984[VP]
Basonym: *Lactobacillus bulgaricus*

E-96662[T] DSM 20081 (ATCC 11842 = LMG 6901 = NCIMB 11778 = FIRDI 696 = IAM 12472 = IFO 13953 = IMET 10708 = IPCR S1-3 = JCM 1002 = NCFB 1489 = Hansen Lb 14 = Orla-Jensen 14) (*Thermobacterium bulgaricum*). Isolated from Bulgarian yoghurt. Serological group E. Studies on ribotyping (552). **Teaching strain**. (Medium 6, 37°C, anaerobic)

Lactobacillus delbrueckii subsp. ***delbrueckii*** (Leichmann 1896) Beijerinck 1901[AL]

E-98097[T] DSM 20074 (=ATCC 9649 = LMG 6412 = NCDO 213 = NCIMB 8130 = IFO 3202 = JCM 1012 = BUCSAV 232 = Tittsler 730 = USDA 730 = strain Calvert). Isolated from distillery sour grain mash. Produces D-lactic acid from corn sugar and molasses. Assay of alanine and pyridoxal. (Medium 6, 37°C)

E-991164 ABBC 281. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus delbrueckii subsp. ***lactis*** (Orla-Jensen 1919) Weiss et al. 1984[VP]
Basonym *Lactobacillus lactis*

E-87277 Valio. ATCC 8000 (= NCIMB 7278 = CIP 57.5 = JCM 1105 = NCDO 270 = NCTC 7278). Assay of vitamin B_{12}. (Medium 6, 37°C)

E-93488[T] DSM 20072 (= ATCC 12315 = LMG 7942 = LMG 6905 = CCTM 3035 = NCFB 1438 = NCIMB 11972 = IAM 12476 = JCM 1248 = Hansen L110 = Orla-Jensen 10) (*Thermobacterium lactis*). Isolated from Emmental (Swiss) cheese. Serological group E. (Medium 6, 37°C)

Lactobacillus divergens Holzapfel and Gerber 1984[VP]
Reclassified as *Carnobacterium divergens*

Lactobacillus farciminis Reuter 1983[VP]

* E-95611 Primalco (TSB 262). Isolated from sour dough seed, Finland. Studies on preferments (504), sour dough (536). (Medium 6, 30°C)

* E-95614 Primalco (TSB 316). Isolated from sour dough seed, Finland. Studies on preferments (504). (Medium 6, 30°C)

Lactobacillus fermentum Beijerinck 1901[AL]

E-71033 TY. ATCC 9338 (= DSM 20391 = BUCSAV 233 = NCDO 215 = IFO 3071 = NCIMB 6991 = NCIMB 8028 = NCTC 6991 = CCM 91 = CIP 53.163 = PZH 256/51 = OUT 8128 = JCM 1560 = Sarett 36). Assay of thiamine, pyrithiamine, histidine, alanine. (Medium 6, 37°C)

E-78077 BRi (BSO 80). Isolated from beer, Finland. Studies on immunology (95), detection (150). (Medium 6, 30°C)

E-93489[T] DSM 20052 (= ATCC 14931 = LMG 6902 = NCIMB 11840 = JCM 1173 = NCFB 1750 = Hansen Bb28 = Orla-Jensen 28) (*Betabacterium longum*). Isolated from fermented beets. Serological group F. Produces L-serine dehydratase. (Medium 6, 37°C)

E-991165 ABBC 228. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus fructivorans Charlton et al. 1934[AL]

E-91473[T] DSM 20203 (= ATCC 8288 = LMG 9201 = NCIMB 8039 = IFO 13954 = NCFB 2167 = JCM 1117 = NRRL B-3796). Studies on ribotyping (552). (Medium 6, 30°C)

Lactobacillus gasseri Lauer and Kandler 1980[VP]

E-991245[T] CCUG 31451 (= ATCC 33323 = DSM 20243 = NCIB 11718 = NCDO 2233 = Gasser AM 63) (*Lactobacillus acidophilus*). Human isolate. (Medium 6, 37°C)

Lactobacillus hilgardii Douglas and Cruess 1936[AL]

E-981135 BRi (BSO 500 = ABBC 217) (*Lactobacillus brevis*). Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus iners Falsen et al. 1999[VP]

E-991244[T] CCUG 28746 (= CIP 105923). Isolated from human urine, Sweden. (Medium 85, anaerobic, 37°C)

Lactobacillus johnsonii Fujisawa et al. 1992[VP]

E-97851[T] DSM 10533 (= ATCC 33200 = NCFB 2241 = VPI 7960) (*Lactobacillus acidophilus*). Isolated from human blood. Homology group B2. (Medium 6, 37°C)

Lactobacillus kefiri Kandler and Kunath 1983[VP]

E-93520[T] DSM 20587 (= ATCC 35411 = Kunath AK). Isolated from kefir. (Medium 6, 30°C)

Lactobacillus lactis (Orla-Jensen 1919) Bergey et al. 1934[AL]
Reclassified as *Lactobacillus delbrueckii* subsp. *lactis*

Lactobacillus lindneri Back et al. 1997[VP]

E-92006 BIO (U38) (*Lactobacillus fructivorans*). Isolated from a brewery, Japan. Studies on detection (418, 552). (Medium 56, 28°C, anaerobic)

E-92007 BIO (K18). Isolated from beer, Finland. Two stable colony types t1 and t2. Studies on detection (418, 552), PCR (556). (Medium 56, 28°C, anaerobic)

E-82166 Döhler GmbH & Co. KG. Studies on detection (418, 552). (Medium 56, 28°C, anaerobic)

E-89362 BIO (R10). Isolated from beer, Finland. Studies on detection (418, 552), PCR (511, 526), ribotyping (557). (Medium 56, 28°C, anaerobic)

E-90380 BIO (M14). Isolated from a beer dispense apparatus, Finland. Studies on detection (418, 552), biofilms (522, 545). (Medium 56, 28°C, anaerobic)

E-91454 BIO (Y7). Isolated from beer, Finland. Studies on detection (418, 552) and PCR (511, 526). Studies on biofilms (522, 545), PCR (556). (Medium 56, 28°C, anaerobic)

E-91460^{T} DSM 20690 (= Back KPA). Isolated from beer, Germany. Studies on detection (418, 552), PCR (511, 526, 556). (Medium 56, 28°C, anaerobic)

E-94546 BEL (U90). Isolated from beer, Sweden. Studies on detection (552). (Medium 56, 28°C, anaerobic)

E-95588 BEL (T19). Isolated from a brewing process, Finland. Studies on detection (552), PCR (556). (Medium 56, 28°C, anaerobic)

E-95589 BEL (T22). Isolated from a brewing process, Finland. Studies on biofilms (522, 545), detection (552), PCR (556). (Medium 56, 28°C, anaerobic)

E-981137 BSO 493 (= ABBC 276). Isolated from a brewery, Japan. Carries a possible hop-resistance gene (*hor*A) on a plasmid. (Medium 56, 28°C, anaerobic)

E-991160 ABBC 277. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991161 ABBC 278. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus parabuchneri Farrow et al. 1989^{VP}

E-76054 BRi (BSO 165) (*Lactobacillus brevis*). Isolated from beer, UK. Studies on growth factor (95, 110), immunology (95), bioluminescence (114), detection (150). (Medium 6, 28°C)

E-91469 BIO (M24/9) (*Lactobacillus buchneri*). Isolated from soft drink, Finland. (Medium 6, 28°C)

E-93503^{T} DSM 5707 (= ATCC 49374 = NCDO 2748 = NCIMB 8838 = Hayward 6E). Isolated from human saliva. (Medium 6, 28°C)

Lactobacillus paracasei subsp. ***paracasei*** Collins et al. 1989^{VP}
Basonym *Lactobacillus casei* subsp. *alactosus*
Basonym *Lactobacillus casei* subsp. *pseudoplantarum*

E-78078 BRi (BSO 60). Isolated from beer, UK. Studies on immunology (95), detection (150, 340). (Medium 6, 30°C)

E-90377 BIO (P5). Isolated from beer, Finland. Studies on biofilms (522, 545). (Medium 12, 30°C)

E-91466 BIO (M5). Isolated from soft drink extract. Studies on microbicidic activity (493, 524), preferments (504). (Medium 6, 30°C)

E-91467 BIO (M17). Isolated from soft drink, Finland. (Medium 6, 30°C)

E-93490^{T} DSM 5622 (= ATCC 25302 = NCDO 151 = LMG 11459 = NCFB 327 = NCTC 1407 = NCIMB 1407 = CIP 103132 = McIntosh strain Type 2) (*Lactobacillus acidophilus-odontolyticus*). Isolated from dental caries. (Medium 6, 30°C)

* E-97949 BEL (PiaK32). Isolated from a human biopsy sample, Finland. Studies on probiotics (575). (Medium 6, 30°C)

* E-981004 BEL (PiaK262). Isolated from a human biopsy sample, Finland. Studies on probiotics (575). (Medium 6, 30°C)

E-991153 ABBC 426 (*Lactobacillus brevis*). Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus pentosus Zanoni et al. 1987^{VP}

E-98168^{T} DSM 20314 (= ATCC 8041 = LMG 10755= NCDO 363 = NCIMB 8026 = JCM 1558 = Snell 124-2) (*Lactobacillus plantarum*). Ferments pentose. Assay of biotin, nicotinic acid, pantothenic acid. **Teaching strain**. (Medium 6, 30°C)

Lactobacillus plantarum (Orla-Jensen 1919) Bergey et al. 1923^{AL}

E-71034 TY. ATCC 8014 (= DSM 20205 = LMG 1284 = BUCSAV 217 = BUCSAV 449 = ICPB 2080 = NCDO 82 = CIP A 159 = IAM 1401 = IFO 3070 = JCM 1057 = NCTC 6376 = NCIMB 6376 = NCIMB 8014 = NCIMB 8030 = NCIMB 8864 = NCIMB 8951 = NCIMB 8960 = CCM 1904 = OUT 8124 = PZH 588154 = Glaxo 664 = McCoy 17-5) (*Lactobacillus arabinosus*). Assay of amino acids and vitamins. Studies on viability assessment (477). (Medium 6, 30°C)

* E-78076 BIO. Isolated from beer, UK. Studies on immunology (95), detection (150), microbicidic activity (433, 435, 436, 438, 464, 467, 491, 492, 493, 503, 514, 521, 524, 531, 542), preferments (504), starter/protective cultures (535, 553), antimicrobial compounds (579). (Medium 6, 30°C)

E-78079 BRi (BSO 35) (*Lactobacillus casei* subsp. *alactosus*). Isolated from beer, UK. Studies on immunology (95), detection (150). (Medium 6, 30°C)

E-79098^{T} DSM 20174 (= ATCC 14917 = LMG 6907 = IAM 12477 = NCIMB 11974 = NCDO 1752 = JCM 1149 = Hansen Lp 39 = Orla-Jensen 39) (*Streptobacterium plantarum*). Isolated from pickled cabbage. Serological group D. Studies on microbicidic activity (433, 435, 436, 464, 493, 513, 524, 531, 542, 574), preferments (504), probiotics (516, 560, 575), xylo-oligosaccharides (577), intestinal microbial ecosystem (578). **Teaching strain**. (Medium 6, 30°C)

E-98098^{T} DSM 20174 (= E-79098). Same as E-79098. (Medium 6, 30°C)

E-91468 BIO (M10). Isolated from soft drink, Finland. (Medium 6, 30°C)

E-94566 BEL (U181) (*Alicyclobacillus acidoterrestris*). Isolated from orange soft drink extract, Brazil. (Medium 5, 30°C)

* E-95618 Primalco (TSB 199). Isolated from sour dough seed, Finland. Studies on preferments (504), sour dough (536). (Medium 6, 30°C)

E-981138 BRi (BSO 497 = ABBC 213). Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991158 ABBC 55. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991159 ABBC 58. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus reuteri Kandler et al. 1982[VP]

E-92142[T] DSM 20016 (= ATCC 23272 = LMG 9213 = NCIMB 11951 = JCM 1112 = NCFB 2589 = Reuter F275) (*Lactobacillus fermentum* Typ II). Isolated from intestine of adult. Studies on probiotics (575). (Medium 6, 37°C)

* E-95615 Primalco (TSB 131). Isolated from sour dough seed, Finland. Studies on preferments (504). (Medium 6, 30°C)

Lactobacillus rhamnosus (Hansen 1968) Collins et al. 1989[VP]
Basonym *Lactobacillus casei* subsp. *rhamnosus* Hansen 1968[AL]

E-96031[T] DSM 20021 (= ATCC 7469 = LMG 6400 = BUCSAV 227 = NCDO 243 = CIP A 157 = IAM 1118 = PZH 91/50 = IFO 3425 = CCM 1825 = NCIMB 6375 = NCIMB 8010 = NCTC 6375 = NRC 488 = Hansen 300 = Rogosa V300 = Sharpe H2 = Tittsler 300) (*Lactobacillus casei* "*epsilon*", later *L. helveticus*). Serological group C. Assay of amino acids and vitamins. Microbiological assay of azathioprine and 6-mercaptopurine in aqueous solution. (Medium 6, 37°C)

E-78080 BRi (BSO 29). Isolated from beer, UK. Studies on immunology (95). (Medium 6, 30°C)

E-93444 ATCC 11443 (= NCDO 1856) (*Lactobacillus delbrueckii*). Produces L(+)lactic acid. Enzymatic determination of optically active isomers of lactic acid. (Medium 6, 37°C)

E-96666 ATCC 53103 (= New England Med. Ctr. Hospitals strain GG, Gorbach-Goldin) (*Lactobacillus acidophilus*). Isolated from human feaces. Produces an antibacterial substance. Inhibits colon disorders (US Pats. 4839281 and 5032399). Studies on colonic biopsis (528), probiotics (559, 560, 573). (Medium 6, 37°C)

* E-97800 BEL (PiaK1). Isolated from human faeces, Finland. Studies on probiotics and probiotic carbohydrates (575). (Medium 6, 37°C)

* E-97948 BEL (PiaK1). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-97951 BEL (PiaK5). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-97959 BEL (PiaK204). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-97960 BEL (PiaK208). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-97962 BEL (PiaK214). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-981000 BEL (PiaK138). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

Lactobacillus ruminis Sharpe et al. 1973[AL]

E-91470 BIO (M16). Isolated from soft drink, Finland. (Medium 6 or 99, 30°C)

E-97852[T] DSM 20403 (= ATCC 27780 = Sharpe RF1). Isolated from bovine rumen. (Medium 99, 37°C, anaerobic)

Lactobacillus sakei Katagiri et al. 1934 emend. Klein et al. 1996[AL]

E-991032[T] DSM 20017 (= ATCC 15521. Isolated from "Moto" starter of sake. (Medium 6, 30°C)

Lactobacillus salivarius subsp. ***salivarius*** Rogosa et al. 1953[AL]

E- 97853[T] DSM 20555 (= ATCC 11741 = NCDO 929 = Rogosa HO66). Isolated from saliva. (Medium 6, 37°C)

* E-97950 BEL (PiaK50). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-97955 BEL (PiaK46). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-98999 BEL (PiaK302). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-981006 BEL (PiaK315). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-981007 BEL (PiaK317). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

* E-981020 BEL (PiaK290). Isolated from a human biopsy sample, Finland. Studies on probiotic carbohydrates (575). (Medium 6, 30°C)

Lactobacillus sanfranciscensis Weiss and Schillinger 1984[VP]

E-93491[T] DSM 20451 (= ATCC 27651 = NRRL B-3934 = LMG 7946 = Kline L-12 = VTT E-95491). Isolated from San Francisco sour dough. Studies on preferments (504). (Medium 6 or 15, 30°C, 5% CO_2)

E-95491[T] ATCC 27651. Same as E-93491. (Medium 6 or 15, 30°C, 5% CO_2)

E-95587 ATCC 43347 (= Spicher L 281) (*Lactobacillus brevis* subsp. *lindneri*). Isolated from rye sour dough. (Medium 6 or 15, 30°C, 5% CO_2)

* E-95613 Primalco (TSB 299). Isolated from sour dough seed, Finland. Studies on preferments (504), sour dough (536). (Medium 6 or 15, 30°C, 5% CO_2)

Lactobacillus sp.

E-76070 Carlsberg (144) (*L. coprophilus*). Isolated from soft drink, Denmark. (Medium 6, 30°C)

E-76071 Carlsberg (153) (*L. coprophilus*). Isolated from soft drink, Denmark. (Medium 6, 30°C)

E-84192 VLB (L70) (*L. coryniformis*). Isolated from beer. (Medium 6, 30°C)

E-84193 VLB (L72) (*L. coryniformis*). Isolated from beer. Studies on detection (229). (Medium 6, 30°C)

E-88324 BIO (P12) (*L. coryniformis*). Isolated from beer, Finland. Studies on biofilms (522, 545). (Medium 6, 30°C)

E-89344 BIO (B22 small) (*L. coryniformis*). Isolated from beer, Finland. (Medium 6, 30°C)

E-89345 BIO (T21 curved). Isolated from beer, Finland. (Medium 6, 30°C)

E-90376 BIO (P1). Isolated from beer, Finland. (Medium 12, 30°C)

E-90378 BIO (P6). Isolated from beer, Finland. (Medium 12, 30°C)

E-991168 ABBC 71. Isolated from a brewery, Japan. (Medium 6, 30°C)

E-991169 ABBC 74. Isolated from a brewery, Japan. (Medium 6, 30°C)

Lactobacillus xylosus Kitahara 1938[AL]
Reclassified as *Lactococcus lactis* subsp. *lactis*

Lactobacillus zeae Dicks et al. 1996[VP]

E-96709[T] DSM 20178 (= ATCC 15820 = RIA 482) (*Lactobacterium zeae*). Isolated from steep liquor. (Medium 6, 37°C)

Lactococcus lactis subsp. ***cremoris*** (Orla-Jensen 1919) Schleifer et al. 1986[VP]
Basonym *Streptococcus cremoris*
Basonym *Streptococcus lactis* subsp. *cremoris*

E-96275[T] DSM 20069 (= ATCC 19257 = NCFB 607 = LMG 6897 = NCIMB 8662 = IMET 10707 = USCC 1786 = strain HP = Whitehead HP 607). Isolated from cheese starter culture, New Zealand. Serological group N. (Medium 6 or 63, 30°C)

Lactococcus lactis subsp. ***hordniae*** Schleifer et al.1986[AL]

E-90394[T] DSM 20450 (= ATCC 29071 = LMG 8520 = NCDO 2181 = NCFB 2181 = Latorre-Guzman HC-1) (*Lactobacillus hordniae*). Isolated from leafhopper, California. (Medium 6 or 63, 30°C)

Lactococcus lactis subsp. ***lactis*** (Lister 1873) Schleifer et al.1986[VP]
Basonym *Streptococcus lactis*
Basonym *Lactobacillus xylosus*
Basonym *Streptococcus lactis* subsp. *diacitilactis*

E-82169 DSM 20175 (= ATCC 15577 = LMG 7760 = Kitahara 117). Isolated from Anchu mash, Formosa. Formerly type strain of *Lactobacillus xylosus*. Ferments xylose. (Medium 6 or 63, 30°C)

E-85222 DSM 20384 (= LMG 9471 = Kiel 54296) (*Streptococcus diacetilactis*). Isolated from curd. Serological group N. (Medium 6 or 63, 30°C)

E-90395[T] DSM 20481 (= ATCC 19435 = LMG 6890 = CCM 1877 = NCDO 604 = NCIMB 6681 = NCTC 6681 = Orla-Jensen strain OJ). Serological group N. (Medium 20, 30°C)

* E-90414 BIO (6X). Isolated from barley malt (33% split kernel), Finland. Studies on microbicidic activity (414, 433, 435, 493, 521, 524, 531, 542), probiotics (516, 560, 575), human intestinal microbial ecosystem (558), xylo-oligosaccharides (577). (Medium 6, 30°C)

* E-91422 ELI 3. (Medium 6 or 63, 30°C)

E-94527 ATCC 11454 (= DSM 20729 = NCFB 496 = NCIMB 8586 = LMG 7930 = LMG 7948 = BU 453 = CCM 1881 = FIRDI 791 = Tittsler strain Berridge X13). Produces nisin. Used in Swiss cheece manufacture to suppress gas production by clostridia. (Medium 63, 30°C)

E-991172 BEL (IV). Isolated from an immobilized beer main fermentation column, Finland. (Medium 6, 28°C)

E-991174 BEL (VIt). Isolated from an immobilized beer main fermentation colums, Finland. (Medium 6, 28°C)

Lactococcus plantarum (Collins et al. 1984) Schleifer et al. 1986[VP]
Basonym *Streptococcus plantarum*

E-90411[T] DSM 20686 (= ATCC 43199 = LMG 8517= NCDO 1869 = NCFB 1869 = Cavett 5L). Isolated from frozen peas. Serological group N. (Medium 63, 30°C)

Lactococcus raffinolactis Schleifer et al. 1988[VP]
Basonym S*treptococcus raffinolactis*

E-91453[T] NCFB 617 (= ATCC 43920 = DSM 20443 = LMG 9463 = NCDO 617 = Garvie 23.C.5). Isolated from raw milk. Serological group N. (Medium 6 or 63, 30°C)

Leclercia adecarboxylata (Leclerc 1962) Tamura et al. 1987[VP]
Basonym *Escherichia adecarboxylata*

E-95646 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5, 30 °C)

Leuconostoc carnosum Shaw and Harding 1989[VP]

E-98971[T] DSM 5576 (= NCFB 2776 = ATCC 49367 = Shaw SML40 = E-97971). Isolated from vacuum packed meat. Studies on ribotyping (561). (Medium 6, 28°C)

Leuconostoc citreum Farrow et al. 1989[VP]

* E-90389 BIO (VII) (*Leuconostoc mesenteroides* subsp. *mesenteroides*). Isolated from split kernel of *Hordeum vulgare*, Finland. Studies on mash filtration problems (378, 379), microbicidic activity (493, 521, 524, 531, 542), penetration (538). (Medium 6, 28°C)

* E-90415 BIO (9) (*Leuconostoc mesenteroides* subsp. *mesenteroides*). Isolated from split kernel of *Hordeum vulgare*, Finland. Studies on microbicidic activity (435, 493, 531, 542). (Medium 6, 28°C)

E-91451 BIO (9 M/1) (*Leuconostoc mesenteroides* subsp. *mesenteroides*). Isolated from barley malt, Finland. (Medium 6, 28°C)

E-91452 BIO (9 M/2) (*Leuconostoc mesenteroides* subsp. *dextranicum*). Isolated from barley malt, Finland. (Medium 6, 28°C)

E-93497 BIO (E7/5). Isolated from malting process, Finland. (Medium 6, 28°C)

E-93504^{T} DSM 5577 (= ATCC 49730 = NCDO 1837 = Hayward B2399). Isolated from honey dew of rye ear. (Medium 6, 28°C)

E-981082 BEL (1L-1D). Isolated from processed oat, Finland. (Medium 6, 28°C)

Leuconostoc dextranicum (Beijerinck 1912) Hucker and Pederson 1930^{AL}
Reclassified as *Leuconostoc mesenteroides* subsp. *dextranicum*

Leuconostoc fallax Martinez-Murcia and Collins 1992^{VP}

E-98973^{T} DSM 20189 (= CCUG 30061 = E-97973). Isolated from sauerkraut. Studies on ribotyping (561). (Medium 6, 28°C)

Leuconostoc gelidum Shaw and Harding 1989^{VP}

E-98972^{T} DSM 5578 (= NCFB 2775 = ATCC 49366 = Shaw SML9 = E-97972). Isolated from vacuum packed meat. Studies on ribotyping (561). (Medium 6, 28°C)

Leuconostoc lactis Garvie 1960^{AL}

E-98974^{T} DSM 20202 (= CCUG 30064 = ATCC 19256 = NCFB 533 = E-97974). Isolated from milk. Studies on ribotyping (561). (Medium 6, 28°C)

Leuconostoc mesenteroides subsp. ***cremoris*** (Knudsen and Sorensen 1929) Garvie 1983^{VP}
Basonym *Leuconostoc cremoris*

E-97975^{T} DSM 20346 (= CCUG 21965 = ATCC 19254 = CCM 2078 = NCFB 543 = Garvie LF2). Isolated from dried cheese starter powder. Studies on ribotyping (561). (Medium 6, 28°C)

Leuconostoc mesenteroides subsp. ***dextranicum*** (Beijerinck 1912) Garvie 1983^{VP}
Basonym *Leuconostoc dextranicum*

E-93492^{T} DSM 20484 (= ATCC 19255 = CCM 2086 = NCFB 529 = NRRL B-3469 = LMG 6908 = NCIMB 12007 = IMET 10694 = VKM 1225) (*Betacoccus bovis*). Studies on ribotyping (561). (Medium 6, 30°C)

Leuconostoc mesenteroides subsp. ***mesenteroides*** (Tsenkovskii 1878) van Tieghem 1878^{AL}

E-91461^{T} DSM 20343 (= ATCC 8293 = LMG 8205= CCM 1803 = NCDO 523 = NCIMB 8023 = Vaughn 37Y). Isolated from fermenting olives. Produces class C dextran. Studies on ribotyping (561). **Teaching strain**. (Medium 6, 30°C)

Leuconostoc oenos Garvie 1967[AL]

Reclassified as *Oenococcus oeni*

Leuconostoc paramesenteroides Garvie 1967[AL]

Reclassified as *Weissella paramesenteroides*

Leuconostoc pseudomesenteroides Farrow et al. 1989[VP]

E-98970[T] DSM 284 (= DSM 20193 = ATCC 12291 = CCM 2083 = NCFB 768 = NCIMB 8699 = De Moss 39 = E-97970) (*Leuconostoc mesenteroides*). Isolated from cane juice. Preparation of D-lactic acid dehydrogenase for the enzymatic determination of lactic acid configuration. Used for determination of isotopic carbon patterns in glucose and in mannose. Studies on ribotyping (561). **Teaching strain**. (Medium 6, 28°C)

E-981034 BEL (U68/1). Isolated from aromatic mineral water, Sweden. (Medium 6, 30°C)

Listeria grayi Errebo Larsen and Seeliger 1966[AL]

E-98931[T] DSM 20601 (= ATCC 19120 = Seeliger Li 2080). Isolated from faeces of chinchilla, Denmark.(Medium 81, 37°C)

Listeria innocua Seeliger 1983[VP]

E-96670 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 81, 37°C)

E-97760 ATCC 51742 (= DUP-104 = LCDC 81-861). Isolated from cabbage. Quality control for DuPont /Qualicon RiboPrinter® Microbial Characterization System. (Medium 81, 37°C)

E-97772[T] DSM 20649 (= ATCC 33090 = NCTC 11288 = Seeliger 58 = SLCC 3379). Isolated from cow brain. Serovar 6a. Quality control strain for API products. (Medium 81, 37°C)

E-97877 BEL (5005). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981009 BEL (HLR8 = IE 1V). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-981010 BEL (HLR16 = IE 2V). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-981011 BEL (HLR73 = IE 6V). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-981060 BEL (APK-B = HYGBNE2). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981091 BEL (KA-BL30 = 20B). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981129 BEL (KA-BY67 = 6.5). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981131 BEL (KA-HYGEHT1 = 1b). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981132 BEL (KA-HYGFKR1 = 1a). Isolated from fish industry, Finland. (Medium 81, 37°C)

Listeria ivanovii subsp. ***ivanovii*** Seeliger et al. 1984[VP]

E-97771[T] DSM 20750 (= ATCC 19119 = SLCC 2379 = Seeliger Li 1979). Isolated from sheep, Bulgaria. Serovar 5. (Medium 81, 37°C)

Listeria monocytogenes (Murray et al. 1926) Pirie 1940[AL]

E-94328 Matforsk 299. Disinfectant test strain. (Medium 81, 37°C)

E-95628 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 81, 37°C)

E-96652 KTL 4002 (= ELI 301). Studies on biofilms (489, 490, 495, 499). (Medium 81, 37°C)

E-96724 ATCC 7644 (= Pelczar strain Gibson). Human isolate. (Medium 81, 37°C)

E-97783[T] DSM 20600 (= ATCC 15313 = NCTC 10357 = E. Murray 53 XXIII). Isolated from rabbit, Cambridge, UK. Not hemolytic. Serovar 1/2a. (Medium 81, 37°C)

E-97840 BEL (3357). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-97841 BEL (3358). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-97842 BEL (3529). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-97876 BEL (5011). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-97878 BEL (5007). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-97953 BEL (TE 7E). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981012 BEL (HLR122 = IR 16V). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-981033 BEL (HLR130 = IR 18V). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-981036 BEL (KA-HL1 = 3.2.B/1). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981037 BEL (KA-HY1 = 3.18.B/1). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981038 BEL (KA-HY4 = 6.1/1). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981053 BEL (KA-RL1 = 47A/1). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981054 BEL (KA-RL4 = 13B/1). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981055 BEL (KA-RL10 = 38B/1). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981056 BEL (KA-RL15 = 47B1/3). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981057 BEL (KA-RL18 = 47B2/3). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981058 BEL (KA-RL28 = 83B/1). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981059 BEL (KA-RY4 = 82A/1). Isolated from meat industry, Finland. (Medium 81, 37°C)

E-981061 BEL (APK-1 = HYGBNL1). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981063 BEL (KA-2b/3 = HYGBNT6). Isolated from fish industry, Finland. (Medium 81, 37°C)

E-981089 BEL (KA-BL1 = 23A). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981090 BEL (KA-BL6 = 31A). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981093 BEL (KA-BL14 = 53A). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981094 BEL (KA-BY12 = 59A). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981095 BEL (KA-BY43 = 51B). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981127 BEL (KA-BY57 = 4.4). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981128 BEL (KA-BY76 = 6.11). Isolated from poultry industry, Finland.(Medium 81, 37°C)

E-981139 BEL (KA-BY66 = 6.5). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-981146 ICE-83. Isolated from seafood industry, Iceland. (Medium 81, 37°C)

E-981147 ICE-1. Isolated from seafood industry, Iceland. (Medium 81, 37°C)

E-981148 ICE-7. Isolated from seafood industry, Iceland. (Medium 81, 37°C)

E-981152 BEL (KA-BY78 = 6.11). Isolated from poultry industry, Finland.(Medium 81, 37°C)

E-991205 BEL (TVA-N1a). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-991206 BEL (TVA-4a). Isolated from dairy industry, Finland. (Medium 81, 37°C)

E-991209 ICE-133. Isolated from seafood industry, Iceland. (Medium 81, 37°C)

E-991210 ICE-119. Isolated from seafood industry, Iceland. (Medium 81, 37°C)

Listeria seeligeri Rocourt and Grimont 1983[VP]

E-98996[T] DSM 20751 (= ATCC 35967 = CIP 100100 = NCTC 11856 = SLCC 3954 = Weis 1120). Isolated from soil, Germany. Serovar 1/2b. Avirulent. (Medium 81, 37°C)

Listeria welshimeri Rocourt and Grimont 1983[VP]

E-98956[T] DSM 20650 (= ATCC 35897 = CIP 8149 = Welshimeri V8). Isolated from decaying plant material. Serovar 1/2b. (Medium 81, 37°C)

E-981092 BEL (KA-BT4 = 3L/3). Isolated from poultry industry, Finland. (Medium 81, 37°C)

E-991207 BEL (TVA-10). Isolated from poultry industry, Finland.(Medium 81, 37°C)

Megamonas hypermegale (Harrison and Hansen 1963) Shah and Collins 1983[VP]
Basonym *Bacteroides hypermegas*

E-81135[T] ATCC 25560 (= DSM 1672 = DSM 20631= LMG 3890 = NCTC 10570 = VPI 2366 = Barnes EB F/61/42). Isolated from chicken caecum, UK. (Medium 10, 37°C, strictly anaerobic)

Megasphaera cerevisiae Engelmann and Weiss 1986[VP]

E-79110 DSM 20461 (= ATCC 43236 = Seidel Sp III 2e). Isolated from beer, Germany. Studies on beer contamination (227), characterization (263, 404), maintenance (322), PCR (511, 526, 556, 572). (Medium 41, 30°C, strictly anaerobic)

E-79111[T] DSM 20462 (= ATCC 43254 = Seidel PAT 1). Isolated from beer, Germany. Studies on characterization (263, 311, 404, 479), maintenance (322), PCR (511, 526, 572). (Medium 41, 30°C, strictly anaerobic)

E-84195 BIO (B). Isolated from beer, Finland. Studies on detection (211), beer contamination (227), characterization (263, 311, 404, 479), maintenance (322), PCR (511, 526, 556, 572), biofilms (522, 545), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-85230 BIO. Isolated from beer, Finland. Studies on beer contamination (227), characterization (263, 311, 404, 486), maintenance (322). (Medium 41, 30°C, strictly anaerobic)

E-86267 BIO (0). Isolated from brewer´s yeast culture, Finland. Studies on characterization (311), maintenance (322). (Medium 41, 30°C, strictly anaerobic)

E-86272 BIO (K20). Isolated from beer, Finland. Studies on characterization (311), maintenance (322). (Medium 41, 30°C, strictly anaerobic)

E-87297 BIO (M7). Isolated from beer, Finland. Studies on maintenance (322). (Medium 41, 30°C, strictly anaerobic)

E-87308 BIO (M25). Isolated from water on the floor of a brewery bottling hall, Finland. Studies on maintenance (322). (Medium 41, 30°C, strictly anaerobic)

E-88336 BIO (Y11). Isolated from beer, Finland. Studies on maintenance (322), PCR (556, 572). (Medium 41, 30°C, strictly anaerobic)

E-89375 BIO (O29). Isolated from washing water of a brewery CO_2 line, Finland. Studies on PCR (556). (Medium 41, 30°C, strictly anaerobic)

E-90412 BIO (U50). Isolated from beer, Australia. (Medium 41, 30°C, strictly anaerobic)

E-97791 BEL (SP II). Isolated from beer, Sweden. (Medium 41, 30°C, strictly anaerobic)

E-981087 BEL (M10/1M). Isolated from a beer process, Finland. (Medium 41, 30°C, strictly anaerobic)

Megasphaera elsdenii (Gutierrez et al. 1959) Rogosa 1971[AL]

E-84221[T] DSM 20460 (= ATCC 25940 = NCIMB 8927 = Elsden LCI). Isolated from rumen of sheep. Studies on characterization (263, 311, 404, 479), PCR (511, 526, 572). (Medium 41, 37°C, strictly anaerobic)

Methylobacterium mesophilicum (Austin and Goodfellow 1979) Green and Bousfield 1983[VP]
Basonym *Pseudomonas mesophilica*

E-981080[T] DSM 1708 (=ATCC 29983 = ICPB 4095 = Austin A 47). Isolated from phylloplane of *Lolium perenne*. Utilizes methanol. (Medium 5 with 1% methanol, 26°C)

Methylobacterium sp.

E-97827 BEL (18/12). Isolated from paper machine slime, Finland. Studies on slime (537). (Medium 5 or 95, 30°C)

* E-97990 BEL (DAS/34). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97991 BEL (DAS/37). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

Microbacterium luteolum (Yokota et al. 1993) Takeuchi and Hatano 1998[VP]
Basonym *Aureobacterium luteolum*

E-97042[T] DSM 20143 (= IFO 15074 = NCIMB 9568 = Topping 69, coryneform organism group 2a). Isolated from soil. (Medium 20, 30°C)

E-84212 BIO. Derived from the mixed culture E-84212, isolated from a paper mill, Finland. (Medium 5 or 20, 30°C)

Microbacterium testaceum (Komagata and Iizuka 1964) Takeuchi and Hatano 1998[VP]
Basonym *Aureobacterium testaceum*

* E-97809 BEL. Isolated from paper machine slime, Finland. Studies on slime (537). (Medium 5 or 95, 30°C)

Microbacterium sp.

E-95636 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5 or 20, 30°C)

E-98969 BEL (6 PAST). Isolated from pastorized paper machine slime, Finland. Studies on slime (537). (Medium 5, 30°C)

E-981141 BEL (1:5) (= E-981143 = E-981144). Isolated from a paper mill, Finland. (Medium 5, 30°C)

Microbispora mesophila (Nonomura and Ohara 1971) Zhang et al. 1998[VP]
Basonym *Thermomonospora mesophila*

E-89374[T] DSM 43048 (= ATCC 27303 = KCC A-0151 = Nonomura T-1). Isolated from soil, Japan. (Medium 7 or 18, 37-45°C)

Micrococcus kristinae Kloos et al. 1974[AL]
Reclassified as *Kocuria kristinae*

Micrococcus luteus (Schroeter 1872) Cohn 1872[AL]

E-84215 ATCC 10773 (= Institute of Paper Chemistry strain 861) (*Sarcina lutea*). Assay of slime-control agents in a pulp and paper mill system. Studies on biofilms (533). (Medium 5, 30°C)

E-93442[T] DSM 20030 (= ATCC 4698 = CCM 169 = NCIMB 9278 = NCTC 2665 = LMG 4050) (*Micrococcus lysodeikticus*). Testing lysozyme. Produces 6-aminopenicillanic acid (US Pat. 3239427) and L-aspartyl-L-phenyl-alanine esters (US Pat. 4666838). **Teaching strain**. (Medium 5, 30°C)

E-91474 ELI 113 (= ATCC 9341 = DSM 348 = LMG 8816 = PCI 1001) (*Sarcina lutea*). Isolated from soil. Produces L-sorbosone (US Pat. 3912592), 6-aminopenicillanic acid (US Pat. 3239427). Utilizes 1-butanol. Application in exhaust gas biofilter. Assay of antibiotics, penicillin G in milk. Sterility testing. Detection of antibiotic residues in meat. Microbicidic activity testing by "555" method (VTT 4278-91). Comment: identified as *Kocuria varians* (*Micrococcus varians*). Name has not been altered because of its use in many publications. **Teaching strain**. **Test strain**. (Medium 5, 30°C)

E-97823 BEL (14/2). Isolated from paper mill slime, Finland. Studies on slime (537). (Medium 5 or 95, 30°C)

Micrococcus sp.

E-84216 BEL. Isolated from a paper mill, Finland. (Medium 5 or 20, 30°C)

Micrococcus varians Migula 1900[AL]
Reclassified as *Kocuria varians*

Micropolyspora rectivirgula (Krassilnikov and Agre 1964) Prauser and Momirova 1970[AL]
Reclassified as *Saccharopolyspora rectivirgula*

Nocardiopsis dassonvillei (Brocq-Rousseau 1904) Meyer 1976[AL]

E-981108 BEL (1/TN). Isolated from a Siporex wall, Finland. (Medium 18, 30°C)

E-981109 BEL (11/TN). Isolated from an old concrete wall, Finland. (Medium 18, 30°C)

E-981110 BEL (12/TN). Isolated from an old concrete wall, Finland. (Medium 18, 30°C)

E-981111 BEL (7/TN). Isolated from office air, Finland. (Medium 18, 30°C)

Nocardiopsis sp.

E-95633 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5 or 18, 30°C)

E-97897 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 30°C)

E-97898 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 30°C)

E-97899 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 30°C)

E-97900 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 18, 30°C)

E-97901 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 18, 30°C)

E-97902 BEL. Isolated from process water of a paper mill, Spain. (Medium 18, 30°C)

E-97903 BEL. Isolated from process water of a paper mill, Spain. (Medium 18, 30°C)

E-97904 BEL. Isolated from process water of a paper mill, Spain. (Medium 18, 45°C)

E-97905 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 45°C)

E-97906 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 45°C)

E-97907 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 18, 45°C)

* E-981015 BEL (CRA21). Isolated from compost, Finland. (Medium 18, 37°C)

E-981112 BEL (14/TN). Isolated from a concrete wall, Finland. (Medium 18, 30°C)

E-981113 BEL (2/TN). Isolated from a concrete wall, Finland. (Medium 18, 30°C)

E-981114 BEL (20/TN). Isolated from an old red brick wall, Finland. (Medium 18, 30°C)

Obesumbacterium proteus Shimwell 1963[AL]

E-74027 CCC-4 (*Hafnia protea*). Isolated from beer. Studies on immunology (95, 145), detection (150), survival in immobilized yeast bioreactors (544). (Medium 5, 30°C)

E-78073^{T} ATCC 12841 (= DSM 2777 = NCIMB 8771 = LMG 3054 = Shaefer Brewing Corp. 42 = Priest 502) (*Flavobacterium proteus*). Isolated from ale brewer's yeast, UK. Biogroup 1. Studies on immunology (95, 145), detection (150), biofilms (522, 545). (Medium 5, 30°C)

Ochrobactrum anthropi Holmes et al. 1988^{VP}

* E-91435 ELI 105 (*Pseudomonas fluorescens*). Isolated from wood logs of *Alnus incana* (alder). Studies on siderophores (426, 459, 468), microbicidic activity (440). (Medium 5 or 95, 25°C)

E-95619 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 5 or 95, 25°C)

E-97773^{T} DSM 6882 (= ATCC 49188 = NCTC 12168 = CIP 149-70 = CIP 82.115 = LMG 3331 = Holmes CL 350/82) (*Achromobacter denitrificans*). (Medium 5 or 95, 25°C)

* E-97887 BEL (CYC/F2). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

* E-97993 BEL (DAS/61). Isolated from compost, Finland. Medium 5 or 19, 30°C)

Oenococcus oeni (Garvie 1967) Dicks et al. 1995^{VP}
Basonym *Leuconostoc oenos*

E-97761 LMG 11329 (= NCFB 1705 = Fourtet 2). Isolated from wine, France. (Medium 97, 30°C)

E-97762 LMG 13708 (= Patarata 7B). Isolated from table wine, Portugal. (Medium 97, 30°C)

E-97832^{T} DSM 20252 (= ATCC 23279 = LMG 9851 = NCDO 1674 = NCIMB 11648 = Baudry 1). Isolated from wine. Assay of tomate juice factor. (Medium 97, 30°C)

Paenibacillus lautus (Nakamura 1984) Heyndrickx et al. 1996^{VP}
Basonym *Bacillus lautus*

E-97779^{T} DSM 3035 (= ATCC 43898 = Gordon NRS 666 = Smith 666 = Henry 160) (*Bacillus circulans*). Isolated from intestinal tract of child. (Medium 5, 30°C)

Paenibacillus macerans (Schardinger 1905) Ash et al. 1994^{VP}
Basonym *Bacillus macerans*

E-81138^{T} DSM 24 (= ATCC 8244 = LMG 6324 = NCIMB 9368 = NCTC 6355 = CCM 2012 = CCEB 632 = HMS R.A.12.9 = IAM 1227 = IAM 12467 = JCM 2500 = LMD 48.19 = NCDO 1764 = Smith NRS 888). Produces amylase. Studies on hemicellulases (430). (Medium 5, 30°C)

Paenibacillus polymyxa (Prazmowski 1880) Ash et al. 1994[VP]
Basonym *Bacillus polymyxa*

E-97008[T] DSM 36 (= ATCC 842 = LMG 6319 = NCIMB 8158 = NRC B-94). Two stable colony types. Produces inhibitors for glycoside hydrolases (Brit. Pat. 155409). Enzymatic assay of galacturonic acid. Studies on α-amylase and protease (21). **Teaching strain**. (Medium 5 or 8, 30°C)

Paenibacillus sp.

E-95592 TKK (B02). Isolated from ground barley kernel, Finland. (Medium 5, 30°C)

E-95593 TKK (B09). Isolated from ground barley kernel, Finland. (Medium 5, 30°C)

E-96716 BEL (2). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-96718 BEL (4). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-96721 BEL (11). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-96722 BEL (14). Isolated from a PE coated paperboard, Finland. (Medium 5, 30°C)

E-981022 BEL (MR 1 V SP). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

* E-981029 BEL (MR 7a SP II) (= E-981032). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Pantoea agglomerans (Ewing and Fife 1972) Gavini et al. 1989[VP]
Basonym *Enterobacter agglomerans*
Basonym *Erwinia herbicola*

E-89373 NCPPB 2971 (= ATCC 33243 = DSM 4609 = LMG 2565 = CIP 82.100 = NCIMB 12126 = Dye ZP11 = Hagborg 4834 = Roslycky 19 = PDDCC 272). Isolated from stored wheat, Canada. Formerly type strain of *Erwinia herbicola*. (Medium 5 or 66, 30°C)

E-90398 BIO (IV) (*Enterobacter agglomerans*). Isolated from split barley kernel, Finland. Studies on mash filtration problems (378, 379). (Medium 5 or 66, 30°C)

E-90413[T] DSM 3493 (=ATCC 27155 = LMG 1286 = CIP 57.51 = NCTC 9381 = ICPB 3435 = Pareira strain Graham Price = Ewing CDC 1461-67) (*Enterobacter agglomerans*). Isolated from knee laceration, Zimbabwe. Biogroup I. (Medium 5 or 66, 30°C)

E-94561 TKK (B01). Isolated from ground kernel of *Hordeum vulgare* (barley), Finland. (Medium 5 or 66, 30°C)

E-94563 TKK (B08). Isolated from ground kernel of *Hordeum vulgare* (barley), Finland. (Medium 5 or 66, 30°C)

E-981098 DSM 4609 (= ATCC 33243 = CIP 82.100 = NCPPB 2971 = Dye ZP11 = Hagborg 4834). Type strain of *Erwinia herbicola*. (Medium 5 or 66, 30°C)

Pectinatus cerevisiiphilus Lee et al. 1978 emend. Schleifer et al. 1990[AL]

E-79103[T] ATCC 29359 (= DSM 20467 = CCC B-1022). Isolated from beer, USA. Studies on characterization (128, 136, 145, 177, 404, 479), surface protein (175, 195), lipopolysaccharides (160, 177, 389, 517, 518, 519), immunology (170, 177), detection (209), hybridization (311), maintenance (322), PCR (511, 526, 550, 572), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-79105 DSM 20466 (= Seidel Wa/1b). Isolated from beer, Germany. Studies on characterization (128, 136, 145, 177, 404), surface protein (175, 195), immunology (170, 177), hybridization (311), maintenance (322), PCR (511, 526, 550), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-81132 BIO (Y1). Isolated from beer, Finland. Studies on characterization (145, 177), contamination in brewery (151), surface protein (175, 195), immunology (170, 177), hybridization (311), maintenance (322), PCR (511, 526, 550, 556, 572), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-88329 BIO (Y). Isolated from air of a brewery bottling hall, Finland. Studies on maintenance (322), PCR (511, 526, 550), biofilms (522, 545), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-88330 BIO (T). Isolated from air of a brewery bottling hall, Finland. Studies on maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-89371 BIO (Y21). Isolated from beer, Finland. Studies on PCR (511, 526, 550, 556, 572), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-98912 DSM 20762 (= Seidel BH 1). Isolated from beer. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-97913 DSM 20763 (= Seidel WK 2). Isolated from beer. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

Pectinatus frisingensis Schleifer et al. 1990[VP]

E-79100[T] BIO (V1) (= ATCC 33332 = DSM 6306 = CCM 6217). Isolated from beer, Finland. Produces propionic and acetic acids and sulphur compounds. Studies on characterization (128, 136, 145, 177, 404, 479), contamination in brewery (151), surface protein (175, 195), detection (150, 177, 209, 211, 340), lipopolysaccharides (160, 177, 389, 517, 518, 519), immunology (170, 177), hybridization (311), maintenance (322), PCR (511, 526, 550, 556, 572), biofilms (522, 545), starter/protective cultures (535, 553), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-79104 DSM 20465 (= Seidel MKK 1). Isolated from beer, Germany. Studies on characterization (128, 136, 145, 177, 404), surface protein (175, 195), lipopolysaccharide (160, 177), immunology (170, 177), hybridization (311), maintenance (322), PCR (511, 526, 550), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-80121 Weihenstephan (E1). Isolated from beer, Germany. Studies on characterization (145, 177), surface protein (175, 195), immunology (170, 177), maintenance (322), PCR (511, 526, 550, 572), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-81140 BIO (O1). Isolated from beer, Finland. Studies on surface protein (175, 195), contamination in brewery (151), immunology (170, 177), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-81141 BIO (K1). Isolated from beer, Finland. Studies on contamination in brewery (151), surface protein (175, 195), lipopolysaccharide (160, 177), immunology (170, 177), hybridization (311), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-82164 BIO (K2). Isolated from beer, Finland. Studies on surface protein (175, 195), lipopolysaccharide (160, 177), immunology (170, 177), hybridization (311), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-82165 BIO (K3). Isolated from beer, Finland. Studies on immunology (170, 177), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-83170 BIO (V2). Isolated from beer, Finland. Studies on immunology (170, 177), surface protein (195), hybridization (311), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-84194 BIO (K4). Isolated from beer, Finland. Studies on detection (209), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-84196 BIO (Y2). Isolated from beer, Finland. Studies on maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-86268 BIO (029). Isolated from beer, Finland. Studies on characterization (311), maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-87294 BIO. Isolated from beer, The Netherlands. Studies on maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-87295 BIO (M15). Isolated from beer, Finland. Studies on maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-87307 BIO (M26). Isolated from water on the floor of a brewery bottling hall, Finland. Studies on maintenance (322), PCR (511, 526, 550). (Medium 41, 30°C, strictly anaerobic)

E-88310 BIO (N1). Isolated from beer, Finland. Studies on maintenance (322), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-91350 BIO (U36/T). Isolated from beer, Finland. Studies on PCR (511, 526, 550, 556), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-91471 BIO (T71). Isolated from a crowner of a brewery, Finland. Studies on PCR (511, 550, 556, 572), biofilms (522, 545), ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-93499 BIO (U181). Isolated from beer, Belgium. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-97909 DSM 20759 (= Seidel MU2). Isolated from beer. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-97910 DSM 20760 (= Seidel WL2). Isolated from beer. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-981088 BEL (M10/1P). Isolated from a beer process, Finland. (Medium 41, 30°C, strictly anaerobic)

Pectinatus sp.

E-97875 BEL (T29). Isolated from low alcohol beer, Finland. Studies on ribotyping (557). (Medium 41, 30°C, strictly anaerobic)

E-97914 DSM 20764 (= Seidel KO1). Isolated from beer. (Medium 41, 30°C, strictly anaerobic)

Pectobacterium carotovorum subsp. ***carotovorum*** (Jones 1901) Hauben et al. 1999[VP]
Basonym *Erwinia carotovora* subsp. *carotovora*

E-89360 IFO 13921 (= Hatanaka W2). Isolated from sewage. Produces two exopectinases: exopectate lyase and oligo-D-galactosiduronate lyase. (Medium 5, 30°C)

E-89361 IFO 14082 (= Takahashi C33). Isolated from shoot soft rot of mulberry. (Medium 5, 30°C)

E-981115^{T} DSM 30168 (= ATCC 15713 = CCM 1008 = NCPPB 312 = Hellmers 904). Isolated from potato, Denmark. Produces asparaginase, glutaminase. (Medium 5, 26°C)

Pediococcus acidilactici Lindner 1887^{AL}

E-76062 BRi (BSO 75) (*Pediococcus* sp.). Isolated from beer, UK. Studies on immunology (95) and detection (150). (Medium 6, 25°C)

E-76066 BRi (BSO 244) (*Pediococcus* sp.). Isolated from beer, UK. (Medium 6, 25°C)

* E-76068 BRi (BSO 51) (*Micrococcus* sp.). Isolated from beer, UK. Studies on microbicidic activity (370, 414, 433, 435, 493, 521, 524, 531, 542). (Medium 6, 25°C)

E-84186 BIO. Isolated from malt, Finland. (Medium 6, 25°C)

E-82145 KP 262 (*Pediococcus pentosaceus*). Isolated from beer, UK. (Medium 6, 25°C)

E-93493^{T} DSM 20284 (= LMG 11384 = NCFB 2767 = NCIMB 12174 = CIP 103408 = Back B213c). Isolated from barley. (Medium 6, 30°C)

E-95609 BEL. Isolated from brewery cold trub, Finland (488). (Medium 6, 45°C)

Pediococcus damnosus Claussen 1903^{AL}

* E-76065 BRi (BSO 208 = ELI 611). Isolated from beer, UK. Cellobiose negative. Studies on microbicidic activity (370, 414, 433, 493, 514, 521, 524, 531, 542), siderophores (468), viability assessment (477), preferment (504), sour dough (536), ribotyping (557). (Medium 100, 26°C)

* E-76067 BRi (BSO 254 = ELI 612) (*Pediococcus pentosaceus*). Isolated from beer, UK. Studies on microbicidic activity (370, 414, 433, 435, 493, 514, 521, 524, 531, 542), biofilms (463, 480, 481, 489, 490), detection (495), siderophores (468), viability assessment (477), ribotyping (557). (Medium 100, 26°C)

E-82144 KP 148 (*Pediococcus cerevisia*). Isolated from beer, UK. Studies on ribotyping (557). (Medium 100, 26°C)

* E-86251 BIO. Isolated from beer, Finland. Studies on ribotyping (557). (Medium 100, 26°C)

* E-86274 BIO (R/SS III). Isolated from beer, Finland. Studies on detection (340), survival in immobilized yeast bioreactor (397, 544). Studies on ribotyping (557). (Medium 100, 26°C)

E-88309 BIO (M24). Isolated from beer, Finland. Studies on biofilms (522, 545). Studies on ribotyping (557). (Medium 100, 26°C)

E-90419 BIO (U70). Isolated from beer, USSR. Studies on ribotyping (557). (Medium 100, 26°C)

E-93441 BIO (M). Isolated from an immobilized beer main fermentation column, Finland. Studies on biofilms (522, 545), ribotyping (557). (Medium 100, 26°C, anaerobic/CO_2)

E-91459^T DSM 20331 (= ATCC 29358 = LMG 11484 = NCIMB 12011 = CIP 102264 = CCM 3453 = JCM 5886 = NCDO 1832 = Coster Be1). Isolated from lager beer yeast. Studies on ribotyping (557). (Medium 100, 26°C)

E-97848 BEL (3c). Isolated from beer fermentation, Finland. Studies on ribotyping (557). (Medium 100, 25°C)

Pediococcus dextrinicus (Coster and White 1964) Back 1978^{AL}

E-76064 BRi (BSO 172). Isolated from beer, UK. (Medium 6, 28°C)

E-88313 DSM 20293 (= Back 315b). Isolated from beer. L-LDH activated by FDP. (Medium 6, 30°C)

E-93494^T DSM 20335 (= ATCC 33087 = LMG 10649 = LMG 11485 = CCUG 18834 = CCM 3457 = NCFB 1561 = JCM 5887 = CCRC 12842 = Günther L95) (*Pediococcus cerevisiae* var. *dextrinicus*). Isolated from silage. L-LDH activated by FDP. (Medium 6, 30°C)

Pediococcus halophilus Mees 1934^{AL}

Reclassified as *Tetragenococcus halophilus*

Pediococcus inopinatus Back 1988^{VP}

E-91424 BIO (K9) (*Pediococcus damnosus*). Isolated from beer, Finland. (Medium 6, 25-30°C)

E-96661^T DSM 20285 (= ATCC 49902 = LMG 11409 = CCM 3451 = NCIMB 1256 4 = CIP 102406 = Back 236b). Isolated from brewery yeast, Germany. (Medium 6, 30°C)

Pediococcus parvulus Günther and White 1961[AL]

E-88315 DSM 20332?. Studies on microbicidic activity (433, 435, 436, 464, 493, 521, 524, 531, 542). (Medium 6, 30°C)

E-96315[T] DSM 20332 (= ATCC 19371 = LMG 11486 = NCDO 1634 = IFO 12235 = NCIMB 9447 = Coster QEC 106 = White S182). Isolated from silage. (Medium 6, 30°C)

Pediococcus pentosaceus Mees 1934[AL]

E-88312 DSM 20333 (= ATCC 33314 = IFO 3884 = NCDO 1859). Isolated from sake mash. No microbicidic activity. (Medium 6, 30°C)

E-88316 DSM 20280 (= Back 243d) (*Pediococcus pentosaceus* subsp. *intermedius*). Isolated from brewery yeast. Does not ferment arabinose or xylose. (Medium 6, 30°C)

E-88317 DSM 20336?. Studies on microbicidic activity (433, 435, 436, 438, 493, 521, 524, 531, 542). Lactose negative. (Medium 6, 30°C)]

E-96317[T] DSM 20336 (LMG 11488 = NCDO 990 = ATCC 33316 = NCIMB 12012). Isolated from dried American beer yeast. (Medium 6, 30°C)

* E-90390 BIO (VIII). Isolated from split barley kernel, Finland. Studies on mash filtration problems (378, 379), microbicidic activity (433, 435, 436, 438, 464, 467, 491, 492, 493, 503, 521, 524, 531, 542), preferments (504), starter/protective cultures (535, 553). (Medium 6, 25-30°C)

* E-96659 Primalco (TSB 285). Isolated from sour dough seed, Finland. (Medium 6, 25-30°C)

E-991027 BEL (AT1). Isolated from sprouting water, Finland. (Medium 6, 30°C)

E-981081 BEL (1L-M45C). Isolated from processed oat, Finland. (Medium 6, 25-30°C)

Pediococcus urinaeequi Garvie 1988[VP]

E-981001[T] DSM 20341 (= ATCC 29723 = NCDO 1636 = Mees PUE). Isolated from horse urine. (Medium 63, 30°C)

Peptostreptococcus asaccharolyticus (Distaso 1912) Ezaki et al. 1983[VP]

E-981052[T] ATCC 14963 (= DSM 20463 = NCIMB 10074 = NCTC 11461 = Douglas UW 228 = Prevot BAI) *(Peptococcus aerogenes*). Quality control strain according to DIN 58959-7. (Medium 11, 37°C, anaerobic)

Photobacterium leiognathi Boisvert et al. 1967[AL]

E-981072 ATCC 33469 (= Varon E28). Isolated from red sea. Strongly bioluminescent. Studies on toxicity test (562). (Medium 104, 25°C)

Prevotella ruminicola subsp. ***ruminicola*** (Bryant et al. 1958) Shah and Collins 1990[VP]
Basonym *Bacteroides ruminicola* subsp. *ruminicola*

E-81136[T] ATCC 19189 (= Bryant and Burkey 23). Isolated from bovine rumen. (Medium 10, 37°C, strictly anaerobic)

Propionibacterium acidipropionici Orla-Jensen 1909[AL]

E-79096 DSM 20272 (= ATCC 4875 = IFO 12425 = NCDO 570 = NCIMB 8070 = VPI 0402 = HMS E.2.1 = van Niel 4) (*Propionibacterium pentosaceum*). Isolated from Emmental cheese. Studies on characterization (128), starter/protective cultures (535, 553). (Medium 17, 30°C, anaerobic)

Propionibacterium thoenii van Niel 1928[AL]

E-79095[T] DSM 20276 (= ATCC 4874 = CCM 1865 = NCDO 568 = NCIMB 5966 = VPI 0412 = BUCSAV 444 = HMS E.3.1 = van Niel 15). Isolated from Emmental cheese. Studies on biochemical characterization (128), starter/protective cultures (535, 553). **Teaching strain**. (Medium 17, 30°C, anaerobic)

Proteobacteria

* E-93485 BIO (13). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 72, 30°C)

* E-97883 BEL (CYC/C). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

* E-97987 BEL (CRA/26B). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

* E-97989 BEL (DAS/31). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

E-981025 BEL (MR 4-4). Isolated from a paper mill, Finland. (Medium 5 or 95, 30°C)

Proteus mirabilis Hauser 1885[AL]

E-85229 ATCC 14153 (= DSM 788 LMG 9077 = NCIMB 12596 = PCI 765). Disinfectant and preservation testing. Assay of mandelamine diagnostic discs. **Test strain**. (Medium 5, 37°C)

Proteus vulgaris Hauser 1885[AL]

E-81092 NCTC 4635 (LMG 9008 = NCIMB 11833 = CIP 54.162 = CN 2765 = strain OXL = ELI 55). Disinfectant test strain (Kelsey test). **Test strain**. (Medium 5, 37°C)

Pseudomonas acidovorans den Dooren de Jong 1926[AL]
Reclassified as *Comamonas acidovorans*

Pseudomonas aeruginosa (Schroeter 1872) Migula 1900[AL]

E-97041[T] DSM 50071 (= ATCC 10145 = CCEB 481 = NCPPB 965 = CIP 63.52 = IAM 1514 = NCIMB 8295 = IFO 3756 = IFO 12689 = BUCSAV 277 = AJ 2116 = NCTC 10332 = LMG 1242 = ICPB 2523 = CCM 481 = CCM 1960 = NRRL B-771 = CECT 110 = NCDO 1369 = RH 815 = Hugh 815). Produces lipase active at pH 5.5, 7.5 and 9.0 at 60°C. Bacterial resistance testing. API quality control strain. **Test strain**. (Medium 5, 30°C)

E-83181 ATCC 13388 (LMG 10268 = QM B1468 = NCIMB 10938 = RH 1188 = Hugh 1188). Bacterial resistance testing of plastics. Assay of antibacterial activity of fabrics. **Test strain**. (Medium 5, 37°C)

E-84219 ATCC 15692 (= ATCC 17503 = ATCC 25247 = ATCC 25375 = LMG 12228 = NCIMB 10548 = PA01 = CIP 104116 = Stanier 131 = PRS 101 = Holloway 1C). Isolated from infected wound. Produces pyochelin. (Medium 5, 37°C)

E-96656 DSM 1117 (= ATCC 27853 = Madeiros strain Boston 41501). Isolated from blood culture. Quality control strain according to DIN 58959-7 and for antibiotics susceptibility tests. Assay of tobramycin. MIDI/CLIN and API quality control strain and control strain for media. **Test strain**. (Medium 5, 37°C)

E-96726 ATCC 15442 (= DSM 939 = ELI 101 = NCIBM 10421 = PCI 812 = Beloian PRD-10). Isolated from animal room water bottle. Broad spectrum of resistance to various commercial germicides. Disinfectant and preservation testing. Assay of slimicides. Pyocyanin not produced. **Test strain**. (Medium 5, 30°C)

E-96728 DSM 1128 (= ATCC 9027 = DSM 1385 = BUCSAV 278 = CCM 1961 = CIP 82.118 = IAM 10374 = IFO 13275 = NCIMB 8626 = NRRL B-800 = Hugh 813). Isolated from outer ear infection. Produces rhamnolipid surfactant. Utilizes octadecane. Quality control strain according to DIN 58959-7, test strain in preservation testing of parenteral and ophthalmic preparations, quality control strain for media. Studies on outer membrane (547). **Test strain**. (Medium 5, 37°C)

"***Pseudomonas aeruginosa*** subsp. ***erythrogenes***" Sherris et al., invalid name

E-81090 NCTC 6749 (= ATCC 19582 = NCIMB 11835 = NRRL B-997 = KM 760 = ELI 100). Isolated from urine. Disinfectant test strain (Kelsey test). Studies on xylonic acid (213, 235). Produces pyomelanin and pyorubin. **Test strain**. (Medium 5, 37°C)

Pseudomonas agarici Young 1970[AL]

E-94513[T] PMS 601 (= ATCC 25941 = ICMP 2656 = NCPPB 2289 = ICPB PA144 = LMG 2112 = PDDCC 2656 = USCC 1921 = NZRCC 2656 = Young 71A = Dye 2656). Isolated from mushroom (*Agaricus bisporus*), New Zealand. Causes drippy gill of cultivated mushrooms. Produces fluorescent pigments. (Medium 5, 26°C)

E-94514 PMS 752. Isolated from mushroom (*Agaricus bisporus*), New Zealand. Causes drippy gill of cultivated mushrooms. Produces fluorescent pigments. (Medium 5, 26°C)

E-94515 PMS 133 (= PV 29 = ICMP 9522). Isolated from mushroom (*Agaricus bisporus*), New Zealand. Causes drippy gill of cultivated mushrooms. Produces fluorescent pigments. (Medium 5, 26°C)

Pseudomonas aureofaciens Kluyver 1956[AL]
Reclassified as *Pseudomonas chlororaphis*

"***Pseudomonas azelaica***", invalid name

* E-93477 BIO (3). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 66 or 72, 30°C)

* E-93481 BIO (9). Isolated from sewage sludge by styrene enrichment, Finland. (Medium 66 or 72, 30°C)

Pseudomonas cepacia (Burkholder 1950) Palleroni and Holmes 1981[VP]
Reclassified as *Burkholderia cepacia*

Pseudomonas chlororaphis (Guignard and Sauvageau 1894) Bergey et al. 1930[AL]
Basonym *Pseudomonas aureofaciens*

E-95581[T] ELI 109 (= ATCC 9446 = DSM 50083 = NRRL B-560 = BUCSAV 286 = CCEB 292 = IFO 3904 = NCIMB 9392 = CCM 1975 = ICPB 2392 = Stanier 30). Plate contaminant. Produces DAHP synthetase, 6-aminopenicillanic acid (US Pat. 4650759), L-carnitine, chlororaphin, 2-keto-L-gulonic acid (US Pat. 3922194), PHA (poly-β-hydroxyalkanoates). Studies on siderophores (501). (Medium 5, 26°C)

Pseudomonas citronellolis Seubert 1960[AL]

* E-97881 BEL (CYC/A). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

Pseudomonas fluorescens Migula 1895[AL]

E-91439 HY, Deparment of General Microbiology (iv). Isolated from white water of a paper mill, Finland. (Medium 5 or 67, 30°C)

E-93443[T] DSM 50090 (= ATCC 13525 = LMG 1794 = NCIMB 9046 = NCTC 10038 = ICPB 3200 = MMCA 40 = PDDCC 3512 = ICPB 3200 = IAM 12022 = CIP 69.13 = CNCTC Ps 154/77 = CCEB 488 = CCEB 546 = CCM 2115 = Hugh 818 = Stanier 193). Isolated from pre-filter tanks, UK. Biovar I. Utilizes 1-butanol, isopropanol, methanol. Application in exhaust gas biofilter. Studies on siderophores (459). **Teaching strain**. (Medium 5, 30°C)

* E-94558 ELI 94 (= ELI 112). Isolated from forest soil, Otaniemi, Finland. Studies on siderophores (468, 501). (Medium 5, 25°C)

E-94562 TKK (B05). Isolated from ground kernel of *Hordeum vulgare* (barley), Finland. (Medium 5, 25°C)

E-95596 TKK (B06). Isolated from ground barley kernel, Finland. (Medium 5, 25°C)

E-95598 TKK(B06). Isolated from ground barley kernel, Finland. (Medium 5, 25°C)

E-99639 DSM 6147 (= WS 1760). Quality control strain for disinfectant testing (DLG). **Test strain**. (Medium 5, 30°C)

E-981050 Isolated from dairy industry, UK. (Medium 5, 25°C)

Pseudomonas fragi (Eichholz 1902) Gruber 1905[AL]

E-98200[T] DSM 3456 (= ATCC 13221 = ATCC 4973 = LMG 2191 = CCEB 387 = NCDO 752 = CIP 55.4 = BUCSA 370 = IFO 3458 = NRRL B-25 = NCTC 10689 = NCIMB 8542 = CCM 1974 = ELI 104). Studies on xylonic acid (213, 235, 252, 272, 276, 279), siderophores (459, 468), biofilms (463, 480, 481, 489, 490, 495, 499). New culture in March 1998. (Medium 5, 26°C)

"***Pseudomonas gingeri***" Preece and Wong 1982, invalid name

E-94517 PMS 628 (= LMG 5328 = NCPPB 3147). Isolated from mushroom (*Agaricus bisporus*), UK. Colony type t1. Produces fluorescent pigments. (Medium 5, 25-30°C)

Pseudomonas gladioli Severini 1913[AL]
Reclassified as *Burkholderia gladioli*

Pseudomonas maltophilia Hugh 1981[AL]
Reclassified as *Stenotrophomonas maltophilia*

Pseudomonas marginalis (Brown 1918) Stevens 1925[AL]

* E-94557 ELI 95 (= ELI 114) (*Pseudomonas aureofaciens*). Isolated from forest soil, Otaniemi, Finland. Studies on siderophores (468, 501), microbicidic activity (574). (Medium 5, 25°C)

Pseudomonas putida (Trevisan 1889) Migula 1895[AL]

E-92005[T] DSM 291 (= ATCC 12633 = ATCC 23467 = DSM 50202 = LMG 2257 = CIP 52.191 = CCEB 848 = USCC 2032 = CNCTC Ps 161/78 = NCTC 10936 = NCIMB 9494 = NCIMB 9528 = CCUG 2091 = CCUG 12690 = KM 888 = ICPB 2693 = ICPB 2484 = PDDCC 2758 = CECT 324 = IFO 14164 = FIRDI 459 = JCM 3697 = Palleroni 90 = Stanier A.3.12 = Stanier 90 = Jacob PF15 = Kosako 85004). Isolated from soil by lactate enrichment, USA. Biotype A. Degrades aromatic compounds. Studies on siderophores (459), biobleaching (520). (Medium 5, 26°C)

E-94516 PMS 118. Isolated from casing, New Zealand. Produces fluorescent pigments. (Medium 5, 25-30°C)

* E-95568 BEL (A2). Isolated from mixed wastes (biofilms and white waters of paper machines, compost soil, sewage sludge), Finland. Degrades alginate. Studies on biodegradation of microbial polysaccharides (470). (Medium 5, 25-30°C)

"***Pseudomonas reactans***" Preece and Wong 1982, invalid name
See *Pseudomonas* sp. E-94519

Pseudomonas sp.

E-85244 BIO (GISA 18B) (*Pseudomonas fluorescens*). Isolated from a stream contaminated with Kraft pulping wastes, Finland. No growth on glucoisosaccharinic acid (GISA). Growth on glucose. (Medium 5 or 28, 30°C)

E-90397 BIO (III) (*Pseudomonas fluorescens*). Isolated from split barley kernel, Finland. Colony type “a” since Sep 1996 (type b -> E-97653). Studies on mash filtration problems (378, 379). (Medium 5, 30°C)

* E-91436 ELI 106 (*Pseudomonas chlororaphis*). Isolated from wood logs of alder (*Alnus incana*). Studies on siderophores (426, 459, 468) and microbicidic activity (440). (Medium 32, 25°C)

* E-93475 BIO (1). Isolated from sewage sludge by styrene enrichment, Finland. (Medium 72, 30°C)

* E-93478 BIO (4). Isolated from sewage sludge by styrene enrichment, Finland. (Medium 72, 30°C)

* E-93486 BIO (14). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 72, 30°C)

E-94519 PMS 627 (= LMG 6643 = Vantomme VT165) (*Pseudomonas reactans*). Isolated from mushroom (*Agaricus bisporus*), Belgium. Not virulent. Produces fluorescent pigments. (Medium 5, 25-30°C)

E-96653 BEL (*Pseudomonas fluorescens*). Colony type "b" from E-90397 isolated in Sep 1996. (Medium 5, 30°C)

* E-97980 BEL (B1/A). Isolated from compost, Finland. (Medium 5, 30°C)

* E-97981 BEL (B1/B). Isolated from compost, Finland. (Medium 5, 30°C)

E-981049 Isolated from dairy industry, UK. (Medium 5, 25°C)

Pseudomonas stutzeri (Lehmann and Neumann 1896) Sijderius 1946AL

E-97825 BEL (16/10). Isolated from paper machine slime, Finland. Studies on slime (537). (Medium 5 or 95, 30°C)

Pseudomonas testosteroni Marcus and Talalay 1956[AL]
Reclassified as *Comamonas testosteroni*

Pseudomonas tolaasii Paine 1919[AL]

E-94518 PMS 188 (= ICMP 2283 = NCPPB 2412 = LMG 2346 = PDDCC 2283 = Dye ND8 = Watson A196). Isolated from mushroom (*Agaricus bisporus*), New Zealand. Brown blotch on cap. Produces fluorescent pigments. (Medium 5, 25-30°C)

Pseudonocardia alni (Evtushenko et al. 1989) Warwick et al. 1994[VP]

E-981066 BEL (6aO <- CSC6a). Isolated from catacomb, Italy. (Medium 18, 20-25°C)

Ralstonia pickettii (Ralston et al. 1973) Yabuuchi et al. 1996[VP]
Basonym *Burkholderia pickettii*
Basonym *Pseudomonas pickettii*

E-981068[T] DSM 6297 (= ATCC 27511 = CIP 73.23 = JCM 5969 = NCTC 11149 = Pickettii K-288). Isolated from patient who had undergone tracheotomy. (Medium 5, 30°C)

Rhodococcus fascians (Tilford 1936) Goodfellow 1984[VP]
Basonym *Corynebacterium fascians*

E-95575 TKK (B01). Isolated from ground barley kernel, Finland. (Medium 5 or 66, 28°C)

E-95595 TKK (B04). Isolated from ground barley kernel, Finland. (Medium 5 or 66, 28°C)

Rhodococcus rhodochrous (Zopf 1891) Tsukamura 1974 emend. Rainey et al. 1995[AL]
Basonym *Rhodococcus roseus*

E-981123 ATCC 12674 (= Squibb & Sons SC 2318) (*Nocardia aurantia*). Produces 9-α-hydroxy sterols (US Pat. 3065146). Conversion of oleic acid to 10-hydroxystearic acid. Two type of colonies. (Medium 51, 26°C)

Rhodococcus terrae (Tsukamura 1971) Tsukamura 1974[AL]
Reclassified as *Gordonia terrae*

Saccharopolyspora rectivirgula (Krassilnikov and Agre 1964) Korn-Wendisch et al. 1989[VP]
Basonym *Faenia rectivirgula*
Basonym *Micropolyspora faeni*
Basonym *Micropolyspora rectivirgula*

E-81130 DSM 43113 (= ATCC 15347 = CMI 104402 = IFO 12991 = CCM 3261 = CUB 134 = KCC A-0099 = CBS 100.63 = ETH 31520 = NCIMB 9984 = Gregory A94 = Rothamsted A94 = Lacey A94 = strain Corbaz). Isolated from mouldy hay, UK. Formerly type strain of *Micropolyspora faeni*. Source of farmer's lung disease antigens. (Medium 102, 55°C)

Salmonella enterica subsp. ***enterica*** (Smith 1894) Weldin 1927[AL]

serotype Blockley

E-991194 NCTC 9926 (=ISC 670) 6, 8:k:1,5. F. Kauffmann, Copenhagen in 1956. (Medium 81, 37°C)

serotype Choleraesuis

E-86246 ELI 1. ATCC 10708 (= CIP 104220 = NCTC 10789 = AMC strain ETS 34). Serotype 6,7:c:1,5. Disinfectant test strain. **Test strain**. (Medium 81, 37°C)

E-97963 BEL (2689-2). Industrial isolate, Finland. (Medium 81, 37°C)

serotype Enteritidis

E-97834[T] ATCC 13076 (= DSM 9898 = CDC K-1891). Antigenic formula: 1,9,12:g,m:-. Type strain of *Salmonella enteritidis.* Member of pooled antigens for immunizing cattle in the production of a treatment for rheumatoid arthritis (US Pat 4732757). Studies on outer membrane (547). (Medium 81, 37°C)

E-97964 BEL (2695-7). Industrial isolate, Finland. (Medium 81, 37°C)

serotype Indiana

E-97873 BEL (2786-2). Industrial isolate, Finland. (Medium 81, 37°C)

E-991195 NCTC 11304 (= S33288/78 = BR 2050), 1, 4, 12:z:1, 7. Isolated from turkey. Lactose positive. (Medium 81, 37°C)

serotype Infantis

E-96733 ELI 5. Control strain for method VTT-4272-91.(Medium 81, 37°C)

E-97759 ATCC 51741 (= DUP-103). Isolated from pasta. Quality control for DuPont/Qualicon RiboPrinter™ Microbial Characterization System. (Medium 81, 37°C)

E-991196 NCTC 6703 (= Conn 2076) 6, 7:r:1, 5. Isolated from blood, Kentucky. (Medium 81, 37°C)

serotype Java

E-991197 NCTC 5706 (= K5 = CN 1137) 4, 5, 12:b:-. Isolated in Copenhagen. (Medium 81, 37°C)

serotype Livingstone

E-991198 NCTC 9125 (= Col Sal 545/51 = JT 300) 6, 7:d:l, w. Isolated from faeces, UK. (Medium 81, 37°C)

serotype Mbandaka

E-97792 BEL (1). Industrial isolate, Finland. (Medium 81, 37°C)

E-991199 NCTC 7892 (= JT 240) 6, 7:z10:e, n, z15. Isolated in UK. (Medium 81, 37°C)

serotype Montevideo

E-991200 NCTC 5747 (= 623 = K 46) 6, 7:g, m, s:-. Isolated in Copenhagen. (Medium 81, 37°C)

serotype Tennessee

E-991201 NCTC 6388 (= K1) 6, 7:z29:-. Isolated in UK. (Medium 81, 37°C)

serotype Typhimurium

E-95582^{T} ELI 2 (= ATCC 13311 = DSM 5569 = NCTC 74 = strain Mutton). Quality control strain according to DIN 58959-7. Formerly type strain of *Salmonella typhimurium*. Studies on effect of siderophores (501), outer membrane (547, 554), essential oils (562). (Medium 81, 37°C)

E-97833 ATCC 14028 (= CDC 6516-60 = CIP 104115 = NCTC 12023). Antigenic formula: 4,5,12:i:1,2. (Medium 81, 37°C)

E-981151 HY, National Public Health Institute (SL696). Virulent strain. Studies on lipopolysaccharide (565). (Medium 5, 37°C)

serotype Worthington

E-97794 BEL (5 = X582). Industrial isolate, Finland. (Medium 81, 37°C)

E-97799 BEL (339). Industrial isolate, Finland. (Medium 81, 37°C)

E-991202 NCTC 5793 (= K 92). 1, 13, 23:z:l, w. Isolated in Copenhagen. (Medium 81, 37°C)

Salmonella typhimurium (Loeffler 1892) Castellani and Chalmers 1919[AL]

See *Salmonella enterica* subsp. *enterica* serotype Typhimurium

Selenomonas lacticifex Schleifer et al. 1990 [VP]

E-86269 BIO (O22). Isolated from brewer's yeast culture, Finland. Studies on characterization, hybridization (311), maintenance (322) and taxonomic rearrangement (437). (Medium 41 or 99, 28°C, strictly anaerobic)

E-86273 BIO (O light brown). Isolated from brewer's yeast culture, Finland. Studies on characterization, hybridization (311), maintenance (322) and taxonomic rearrangement (437). (Medium 41 or 99, 28°C, strictly anaerobic)

E-90407[T] DSM 20757 (= ATCC 49690 = Seidel VB4b). Isolated from brewery pitching yeast, Germany. (Medium 41 or 99, 28°C, strictly anaerobic)

Serratia marcescens Bizio 1823[AL]

E-91449 HY, Department of General Microbiology (E120). Isolated from process water of a paper mill, Finland. (Medium 5 or 67, 30°C)

E-97865[T] DSM 30121 (= ATCC 13880 = CCM 303 = DSM 47 = NCIMB 9155 = NCTC 10211 = Kocur BS 303 = NCDC 813-60). Isolated from pond water. Produces L-asparaginase (US Pat. 3627639), follicle stimulating hormone (FSH) binding inhibitor (US Pat. 4652450), glutaminase, pyrazine, vitamin K. Degrades chitin. Quality control strain according to DIN 58959-7. (Medium 5, 30°C)

* E-97889 BEL (CYC/H). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

Shewanella putrefaciens (Lee et al. 1981) MacDonell and Colwell 1986[VP]

Basonym *Alteromonas putrefaciens*

E-95586[T] ATCC 8071 (= DSM 6067 = ICPB 352 = NCIMB 10471 = Hammer 95) (*Pseudomonas putrefaciens*). (Medium 95, 26°C)

Sphaerotilus natans Kützing 1833[AL]

E-84218 BIO. Isolated from a paper mill, Finland. Studies on biofilms (533). (Medium 22, 26°C)

E-97866[T] DSM 6575 (= ATCC 13338 = Stokes 6). (Medium 22, 26°C)

Sphingobacterium sp.

* E-97886 BEL (CYC/F1). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

* E-97985 BEL (CRA/15). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

Sphingomonas capsulata (Leifson 1962) Yabuuchi et al. 1990[VP]
Basonym *Flavobacterium capsulatum*

E-91059[T] DSM 30196 (= ATCC 14666 = GIFU 11526 = IAM 14271 = JCM 7508 = LMG 2830 = IFO 12533 = CIP 82.103 = AJ 2514 = NCIMB 9890 = Leifson 28). Isolated from distilled water, USA. (Medium 5 or 66, 26°C)

* E-93479 BIO (5). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 5 or 66, 26°C)

Sphingomonas paucimobilis (Holmes et al. 1977) Yabuuchi et al. 1990[VP]
Basonym *Pseudomonas paucimobilis*

E-981071[T] DSM 1098 (= ATCC 29837 = NCPPB 3838 = NCTC 11030 = Holmes CL 1/70). Isolated from hospital respirator. Carotenoid pigments. (Medium 5, 30°C)

Sphingomonas sp.

* E-93480 BIO (6). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 72, 26°C)

* E-93484 BIO (12). Isolated from sewage sludge by styrene enrichment, Finland. (Medium 72, 26°C)

Sporolactobacillus sp.

E-981035 BEL (U68/2). Isolated from aromatic mineral water, Sweden. (Medium 6, 30°C)

Staphylococcus aureus Rosenbach 1884[AL]

E-70045 Sanitized Testing Laboratory, Burgdorf, Switzerland. ATCC 6538 (= DSM 799 = LMG 8064 = IFO 13276 = NCIMB 9518 = NCTC 10788= FDA 209 = CIP 4.83). Isolated from human lesion. Disinfectant and preservation testing. Assay of antibiotics. Studies on effect of siderophores (501). **Test strain**. (Medium 5, 37°C)

E-81093 NCTC 4163 (= NCIMB 11832 = CCM 1484 = CCM 2301). Disinfectant test strain (Kelsey test). **Test strain**. (Medium 5, 37°C)

E-94530 ATCC 25923 (=DSM 1104 = LMG 8224 = NCIMB 12702 = CIP 76.25 = CCTM 2816 = JCM 2413 = CNCTC Mau 80/73 = CECT 435 = CCUG 7738 = CCUG 17621 = FDA strain Seattle 1945). Clinical isolate. Quality control strain according to DIN 58959-7. Reference strain for susceptibility testing of bacteria to antibiotics. CAMP test organism for *Listeria*. **Test strain**. (Medium 5, 37°C)

E-94531^{T} ATCC 12600 (= DSM 20231 = NCFB 949 = NCTC 8532 = IAM 12544 = CIP 65.8 = CCM 885 = Hugh 2605 = Cowan 533 R4). Isolated from human pleural fluid. Serotype 3. (Medium 5, 37°C)

E-96698 NCTC 7447 (= ATCC 6538 P = DSM 346 = CIP 53.156 = FDA 209 P). Quality control strain according to DIN 58959-7. Assay of antibiotics. Sterility testing. **Test strain**. (Medium 5, 37°C)

E-97758 ATCC 51740 (DUP-102 = CCFRA S2208). Isolated from margarine. Quality control for DuPont/Qualicon RiboPrinter® Microbial Characterization System. (Medium 5, 37°C)

E-97789 BEL (C-1). Isolated from process water of a mill, Finland. (Medium 5, 37°C)

Staphylococcus carnosus subsp. ***carnosus*** Schleifer and Fischer 1982^{VP}

* E-94524 ELI I (= ELI 202). Isolated from meat, Finland. Studies on siderophores (468, 498, 510) and microbicidic activity (514, 533). (Medium 5, 37°C)

* E-94525 ELI II (= ELI 203). Isolated from meat, Finland. Studies on siderophores (468, 498, 510) and microbicidic activity (514, 533). (Medium 5, 37°C)

* E-94550 BEL (E). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

* E-94551 BEL (P1). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

* E-94552 BEL (P2). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

* E-94553 BEL (Atk). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

* E-94554 BEL (HK). Isolated from metwurst sausage, Finland. Studies on siderophores (510), microbicidic activity (574). (Medium 5, 37°C)

* E-94555 BEL (KL). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

* E-94556 BEL (KSM). Isolated from metwurst sausage, Finland. Studies on siderophores (510). (Medium 5, 37°C)

E-97786^{T} DSM 20501 (= ATCC 51365 = Schleifer 361). Isolated from dry sausage. (Medium 20, 37°C)

Staphylococcus epidermidis (Winslow and Winslow 1908) Evans 1916^{AL}

E-95599 BEL. Isolated from a virgin fibre sample, Finland. (Medium 5 or 20, 37°C)

E-95620 BEL. Isolated from a virgin fibre sample, Finland. (Medium 5 or 20, 37°C)

E-97768^{T} DSM 20044 (= ATCC 14990 = CCM 2124 = NCTC 11047 = Hugh 2466 = AMIF strain Fussel). Isolated from nose. Quality control strain for API products. (Medium 5 or 20, 37°C)

Staphylococcus haemolyticus Schleifer and Kloos 1975^{AL}

E-97770^{T} DSM 20263 (= ATCC 29970 = CCM 2737 = Kloos SM 131). Isolated from human skin. Quality control for API products. (Medium 5 or 20, 37°C)

Staphylococcus hominis subsp. ***hominis*** Kloos and Schleifer 1975 emend. Kloos et al. 1998^{AL}

E-95621 BEL (6). Isolated from salad, Finland. (Medium 5 or 20, 37°C)

E-97769^{T} DSM 20328 (= ATCC 27844 = Kloos DM 122). Isolated from human skin. (Medium 5 or 20, 37°C)

Staphylococcus simulans Kloos and Schleifer 1975^{AL}

* E-94146 ELI 204 (= KC 47) (*Staphylococcus saprophyticus*). Derived from the culture VTT E-82146, isolated from wort, UK. Studies on siderophores (468, 498), microbicidic activity (514, 533). (Medium 5, 37°C)

E-97784^{T} DSM 20322 (= ATCC 27848 = CCM 2705 = Kloos MK 148). Isolated from human skin. (Medium 5 or 20, 37°C)

Staphylococcus warneri Kloos and Schleifer 1975^{AL}

E-82149 KC 228 (*Staphylococcus epidermidis*). Isolated from beer, UK. (Medium 5 or 20, 37°C)

E-97785^{T} DSM 20316 (= ATCC 27836 = CCM 2730 = Kloos AW 25). Isolated from human skin. (Medium 5 or 20, 37°C)

Staphylococcus xylosus Schleifer and Kloos 1975[AL]

E-97787[T] DSM 20266 (= ATCC 29971 = CCM 2738 = Kloos KL 162). Isolated from human skin. (Medium 5 or 20, 37°C)

Stenotrophomonas maltophilia (Hugh 1981) Palleroni and Bradbury 1993[VP]
Basonym *Pseudomonas maltophiala*
Basonym *Xanthomonas maltophiala*

E-96657[T] DSM 50170 (= ATCC 13637 = LMG 958 = ICPB 2648-67 = NCIMB 9203 = NCTC 10257 = Stanier 67 = Hugh 810-2). Isolated from oropharyngeal region of patient with mouth cancer. Quality control strain according to DIN 58959-7 and MIDI/TSBA database. **Test strain**. (Medium 5, 30°C)

Stenotrophomonas sp.

E-981140 BEL (1:3). Isolated from a paper mill, Finland. (Medium 5, 30°C)

Streptococcus agalactiae Lehmann and Neumann 1896[AL]

E-96731 ELI 701. (Medium 81 or 85, 30-37°C)

E-97858[T] DSM 2134 (= ATCC 13813 = NCTC 8181 = Stableforth G19). Quality control strain according to DIN 58959-7. Nonhemolytic. (Medium 85, 37°C)

E-97843 BEL (PiaK308). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 81 or 85, 37°C, anaerobic)

Streptococcus casseliflavus Vaughan et al. 1979
Reclassified as *Enterococcus casseliflavus*

Streptococcus cremoris Orla-Jensen 1919[AL]
Reclassified as *Lactococcus lactis* subsp. *cremoris*

Streptococcus dysgalactiae subsp. ***equisimilis*** Vandamme et al. 1996 emend. Vieira et al. 1998[VP]

E-97845 BEL (PiaK367). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C, anaerobic)

Streptococcus faecalis Andrewes and Horder 1906[AL]
Reclassified as *Enterococcus faecalis*

Streptococcus faecium Orla-Jensen 1919[AL]
Reclassified as *Enterococcus faecium*

Streptococcus gallinarum Bridge and Sneath 1982
Reclassified as *Enterococcus gallinarum*

Streptococcus gallolyticus Osawa et al. 1996[VP]
Syn. *Streptococcus caprinus*

E-97844 BEL (PiaK324). Isolated from a human biopsy sample, Finland. Studies on prebiotic carbohydrates (575). (Medium 6, 37°C, anaerobic)

Streptococcus lactis (Lister 1873) Löhnis 1909[AL]
Reclassified as *Lactococcus lactis* subsp. *lactis*

Streptococcus lactis subsp. ***cremoris*** (Orla-Jensen 1919) Garvie and Farrow 1982[VP]
Reclassified as *Lactococcus lactis* subsp. *cremoris*

Streptococcus lactis subsp. ***diacetilactis*** (Matuszewski et al. 1936) Garvie and Farrow 1982[VP]
Reclassified as *Lactococcus lactis* subsp. *lactis*

Streptococcus plantarum Collins et al. 1984[VP]
Reclassified as *Lactococcus plantarum*

Streptococcus raffinolactis Orla-Jensen and Hansen 1932[AL]
Reclassified as *Lactococcus raffinolactis*

Streptococcus salivarius subsp. ***thermophilus*** (Orla-Jensen 1919) Farrow and Collins 1984[VP]
Reclassified as *Streptococcus thermophilus*

Streptococcus sp.

E-981002 BEL (PiaK115). Isolated from a human biopsy sample, Finland. (Medium 6, 37°C, anaerobic)

Streptococcus thermophilus (ex Orla-Jensen 1919) Schleifer et al. 1995[VP]
Basonym *Streptococcus salivarius* subsp. *thermophilus*

E-71048 TY (KQ). Isolated from skim milk. Used for production of Swiss cheese. (Medium 6 or 20 or 80, 37°C

E-96665[T] DSM 20617 (= ATCC 19258 = LMG 6896 = USCC 2083 = CCTM 3104 = NCFB 573 = NCIMB 8510). Isolated from pasteurized milk. Produces aminopeptidase N. (Medium 20 or 80, 37°C)

Streptomyces albidoflavus (Rossi Doria 1891) Waksman and Henrici 1948[AL]

E-95632 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-95635 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97915 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97916 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97917 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97918 BEL. Isolated from a recycled fibre pulp sample, Spain (Medium 7 or 18, 28°C)

E-97919 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97920 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97921 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 28°C)

E-97942 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 28°C)

Streptomyces albogriseolus Benedict et al. 1954[AL]

E-86260[T] DSM 40003 (ATCC 23875 = ETH 16834 = PSA 139 = CBS 614.68 = NRRL B-1305 = IFO 3413 = IFO 3709 = IFO 12834 = RIA 1101 = IMRU 3698 = NCIMB 9604 = NCIMB 9812 = JCM 4004 = JCM 4616 = KCCS-0004 = KCCS-0616 = Pridham 7-A = Shirling ISP 5003). Isolated from soil. Produces neomycin. Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Streptomyces albus (Rossi Doria 1891) Waksman and Henrici 1943[AL]

E-95630 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

Streptomyces anulatus (Beijerinck 1912) Waksman 1953[AL]

E-95631 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97922 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97923 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97924 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 28°C)

E-97927 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

Streptomyces badius (Kudrina 1957) Pridham et al. 1958[AL]

E-85227 ATCC 39117 (= Univ. Idaho 252). Isolated from soil, Idaho, USA. Degrades lignin (US Pat. 4478747). Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Streptomyces bikiniensis Johnstone and Waksman 1947[AL]

E-82155[T] ATCC 11062 (= DSM 40581 = ISP 5581 = ISP 5235 = IFO 13350 = IFO 13198 = ETH 14303 = ETH 21195 = IMRU 3514 = NRRL B-1049 = CBS 412.54 = CBS 651.72 = RIA 74 = RIA 1175 = RIA 1311 = Waksman 3514 = PSA 41) (*Streptomyces antibioticus*). Isolated from soil, Pacific Island. Produces streptomycin II. (Medium 7 or 18, 28°C)

Streptomyces cavourensis Skarbek and Brady 1978[AL]

E-981105 BEL (15/TN). Isolated from brick, Finland. (Medium 7 or 18, 28°C)

Streptomyces celluloflavus Nishimura et al. 1953[AL]

E-86258[T] DSM 40839 (= ATCC 29806 = IFO 13780 = NRRL B-2493 = Mayama SRL 39a = SRL 5026 = ETH 24125 = NIHJ 198). Isolated from soil, Japan. Produces aureothricin (thiolutin). Degrades cellulose. Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Streptomyces coelicolor (Müller 1908) Waksman and Henrici 1948[AL]

E-72049 Research Institute for Pharmaceutical Industry, Budapest (9). Leu^-, his C_9^-, ura^-. (Medium 7 or 18, 28°C)

E-72050 Research Institute for Pharmaceutical Industry, Budapest (13). Leu^-, arg^-, ura^-, NH_4^-. (Medium 7 or 18, 28°C)

E-72051 Research Institute for Pharmaceutical Industry, Budapest (24). Arg^-, NH_4^-. (Medium 7 or 18, 28°C)

Streptomyces diastaticus subsp. ***ardesiacus*** (Baldacci et al. 1955) Pridham et al. 1958[AL]

E-981103 BEL (13/TN). Isolated from concrete, Finland. (Medium 7 or 18, 28°C)

Streptomyces exfoliatus (Waksman and Curtis 1916) Waksman and Henrici 1948[AL]

E-86262[T] DSM 40060 (= ATCC 12627 = ATCC 19750 = CBS 489.68 = IFO 13191 = Waksman IMRU 3316 = RIA 757 = RIA 1031 = ISP 5060 = NRRL B-1237 = PSA 222 = ETH 24304 = ETH 24436 = CCM 3169 = KCC S-0366). Isolated from soil. Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Streptomyces flavogriseus (Duche 1934) Waksman and Lechevalier 1953[AL]

E-82158[T] ATCC 25452 (= DSM 40323 = CBS 101.34 = CBS 685.69 = ISP 5323 = IMRU 3322 = IFO 13040 = ETH 28743 = RIA 1232 = Duche strain Heim). Isolated from soil, Martinique. (Medium 7 or 18, 28°C)

E-86259 DSM 40990 (= ATCC 33331 = Kluepfel IAF 45 CD). Isolated from soil. Degrades cellulose. Studies on hemicellulases (329, 430). (Medium 7 or 18, 28°C)

Streptomyces flavovirens (Waksman 1923) Waksman and Henrici 1948[AL]

E-82159[T] ATCC 3320 (= ATCC 19758 = DSM 40062 = IMRU 3320 = CCM 3243 = BUCSAV 6 = BUCSAV 24 = ISP 5062 = PSA 217 = CBS 129.20 = CBS 496.68 = CBS 279.30 = IFO 3716 = IFO 3412 = IFO 12771 = ETH 10248 = ETH 24134 = ETH 31593 = IAM W5-7 = IAM 0069= RIA 635 = RIA 1038) (*Actinomyces flavovirens*). Isolated from soil. Produces actinomycin complex. (Medium 7 or 18, 28°C)

Streptomyces griseus (Krainsky 1914) Waksman and Henrici 1948[AL]

E-981101 BEL (3/TN). Isolated from a Siporex wall, Finland. (Medium 7 or 18, 28°C)

E-981102 BEL (3/TN). Isolated from office air, Finland. (Medium 7 or 18, 28°C)

Streptomyces halstedii (Waksman and Curtis 1916) Waksman and Henrici 1948[AL]

E-95634 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97929 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97930 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 28°C)

E-97943 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 28°C)

Streptomyces lydicus De Boer et al. 1956[AL]

* E-92202 HY (5C1a31). Isolated from strawberry flower. Antifungal activity. Biocontrol against grey mould (*Botrytis cinerea*). (Medium 7 or 18, 28°C)

Streptomyces olivochromogenes (Waksman 1923) Waksman and Henrici 1948[AL]

E-82156 ATCC 21114 (= CBS 687.73 = IFO 13873). Produces glucose isomerase (US Pat. 3622463 and 3770589). (Medium 7 or 18, 28°C)

E-82157 ATCC 21713 (= IFO 13874 = CPC 3). Derived from ATCC 21114. Produces xylose (glucose) isomerase (US Pat. 3813318). Studies on hemicellulases (230, 246, 247, 259, 277, 281, 290, 329, 430, 441, 484), enzymatic hydrolysis (293) and biobleaching (367). (Medium 7 or 18, 28°C)

Streptomyces parvulus Waksman and Gregory 1954[AL]

E-981106 BEL (18/TN). Isolated from crushed concrete/brick, Finland. (Medium 7 or 18, 28°C)

Streptomyces phaeochromogenes (Conn 1917) Waksman 1957[AL]

E-82160[T] ATCC 3338 (= ATCC 23945 = DSM 40073 = BUCSAV 17 = BUCSAV 4 = CBS 929.68 = CBS 288.60 = CBS 282.30 = ETH 14851 = ETH 16838 = ETH 20197 = IFO 3180 = IFO 12898 = ISP 5073 = NCIMB 8505 = RIA 61 = RIA 1119 = IMRU 3338 = NRRL B-1266 = JCM 4070 = JCM 4659 = KCCS-0070 = KCCS-0659). Produces tyrosinase. (Medium 7 or 18, 28°C)

Streptomyces rochei Berger et al. 1953[AL]

E-97925 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97926 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 28°C)

E-97944 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 28°C)

E-97945 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 28°C)

Streptomyces sp.

E-82154 ATCC 21132 (= CBS 683.73 = Takasaki YT5) (*Streptomyces albus*). Isolated from soil. Produces glucose isomerase (US Pat. 3715276). Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

E-82161 ATCC 21175 (= Maquire A-50). Produces glucose isomerase (US Pat. 3666628). (Medium 7 or 18, 28°C)

* E-92201 HY (5D3b23b). Isolated from strawberry flower. Antifungal activity. Biocontrol against *Botrytis cinerea* (grey mould). (Medium 7 or 18, 28°C)

E-87306 DSM 40529 (= ATCC 23443 = ISP 5529 = CBS 733.72 = IFO 13432 = NRRL 3150 = RIA 1393 = Dietz UC 2995) (*Streptomyces moderatus*). Isolated from soil. Produces protease (US Pat. 3317400). (Medium 7 or 18, 28°C)

* E-981019 BEL (DAS57). Isolated from compost, Finland. (Medium 95, 37°C)

E-981107 BEL (5/TN). Isolated from plastic carpet of a kitchen, Finland. (Medium 7 or 18, 28°C)

Streptomyces thermocarboxydus Kim et al. 1998[VP]

* E-981017 BEL (DAS14). Isolated from compost, Finland. (Medium 95, 37°C)

Streptomyces thermodiastaticus (Bergey et al. 1923) Waksman 1953[AL]

E-92040 BIO (2F). Isolated from stable compost, Finland. (Medium 7 or 18, 50°C)

Streptomyces thermonitrificans Desai and Dhala 1967[AL]
See *Streptomyces thermovulgaris*

Streptomyces thermoviolaceus Henssen 1957[AL]

E-97932 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 45°C)

E-97933 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 45°C)

E-97934 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 45°C)

E-97935 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 45°C)

E-97936 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 45°C)

E-97937 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 45°C)

E-97938 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 45°C)

E-97939 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 7 or 18, 45°C)

E-97940 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 45°C)

E-97941 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 7 or 18, 45°C)

E-97946 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 45°C)

E-97947 BEL. Isolated from process water of a paper mill, Spain. (Medium 7 or 18, 45°C)

* E-981018 BEL (DAS46). Isolated from compost, Finland. (Medium 95, 37°C)

Streptomyces thermovulgaris Henssen 1957[AL]
Syn. *Streptomyces thermonitrificans*

* E-981014 BEL (CRA1) (*Streptomyces thermonitrificans*). Isolated from compost, Finland. (Medium 95, 37°C)

* E-981016 BEL (DAS6) (*Streptomyces thermonitrificans*). Isolated from compost, Finland. (Medium 95, 37°C)

Streptomyces violaceoruber (Waksman and Curtis 1916) Pridham 1970[AL]

E-981104 BEL (9/TN). Isolated from an office floor, Finland. (Medium 7 or 18, 28°C)

Streptomyces viridochromogenes (Krainsky 1914) Waksman and Henrici 1948[AL]

E-86261 DSM 40721 (= NRRL 2860 = ETH 23575 = Zähner Tü 57). Isolated from soil, Venezuela. Produces avilamycine. Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Streptomyces viridosporus Pridham et al. 1958[AL]

E-85228 ATCC 39115 (= Univ. Idaho T7A). Isolated from compost soil, Idaho, USA. Produces extracellular lignin peroxidase. Degrades lignin (US Pat. 4478747). Studies on hemicellulases (329). (Medium 7 or 18, 28°C)

Tetragenococcus halophilus (Mees 1934) Collins et al. 1993[VP]
Basonym *Pediococcus halophilus*

E-88314[T] DSM 20339 (= ATCC 33315 = LMG 11490 = NCDO 1635 = NCIMB 12011 = Coster TC 1). (Medium 42, 30°C)

Thermoactinomyces thalpophilus Lacey and Cross 1989[AL]

E-95650 BEL. Isolated from a recycled fibre pulp sample, Finland. (Medium 18, 45°C)

E-95651 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 18, 45°C)

E-95654 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 18, 45°C)

E-95655 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 18, 45°C)

E-97890 BEL. Isolated from a recycled fibre board sample, Spain. (Medium 18, 45°C)

E-97891 BEL. Isolated from a recycled fibre board sample, Spain. (Medium 18, 45°C)

E-97892 BEL. Isolated from a recycled fibre board sample, France. (Medium 18, 45°C)

E-97893 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 18, 45°C)

E-97894 BEL. Isolated from a recycled fibre board sample, Germany. (Medium 18, 45°C)

E-97895 BEL. Isolated from process water of a paper mill, Spain. (Medium 18, 45°C)

E-97896 BEL. Isolated from a recycled fibre pulp sample, Spain. (Medium 18, 45°C)

E-97908 BEL. Isolated from a recycled fibre board sample, Finland. (Medium 18, 45°C)

Thermoactinomyces vulgaris Tsilinsky 1899[AL]

E-81131[T] DSM 43016 (= ATCC 43649 = IFO 13606 = KCC A-0162 = NCIMB 11364 = CUB 250 = CBS 505.77 = JCM 3162 = Küster MVD = Webley strain D). Isolated from compost. Source of farmer's lung disease antigens. (Medium 7, 50°C)

* E-981013 BEL (ACT1). Isolated from compost, Finland. (Medium 105, 50°C)

Thermomonospora mesophila Nonomura and Ohara 1971[AL]
Reclassified as *Microbispora mesophila*

Thermus sp.

E-88337 BIO (J70-2). Isolated from a hot spring mud sample, Iceland. Studies on fatty acid composition (403). (Medium 50, 65°C)

E-88339 BIO (J60). Isolated from a hot spring mud sample, Iceland. (Medium 50, 65°C)

E-88340 BIO (B4-7). Isolated from a hot spring mud sample, Iceland. (Medium 50, 65°C)

E-88341 BIO (J65-1). Isolated from a hot spring mud sample, Iceland. (Medium 50, 65°C)

E-88342 BIO (B3). Isolated from a hot spring mud sample, Iceland. (Medium 50, 65°C)

Thiobacillus ferrooxidans Temple and Colmer 1951[AL]

E-95626[T] DSM 583 (= ATCC 23270 = NCIMB 8455) (*Ferrobacillus ferrooxidans*). Isolated from acid, bituminous coal mine effluent. Adapted to ferrous sulfate. **Teaching strain**. (Medium 90, 26-30°C)

Tsukamurella sp.,

* E-93476 BIO (2). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 72, 30°C)

* E-93483 BIO (11). Isolated from sewage by styrene enrichment, Finland. (Medium 72, 30°C)

Unidentified bacteria

* E-79106 BIO (265-8) (*Pseudomonas* sp.). Degrades uric acid. (Medium 59, 30°C)

* E-79107 BIO (366-28) (*Pseudomonas* sp.). Degrades uric acid. (Medium 59, 30°C)

* E-79108 BIO (578-29). Degrades urea. (Medium 57, 30°C)

* E-79109 BIO (656-10) (*Rhizobium* sp.). Degrades creatinine. (Medium 58, 30°C)

* E-79112 BIO (281-34). Degrades uric acid. (Medium 59, 30°C)

* E-79113 BIO (591-37). Degrades creatinine. (Medium 58, 30°C)

* E-79114 BIO (273-8). Degrades uric acid. (Medium 59, 30°C)

* E-79115 BIO (415-5). Degrades uric acid. (Medium 59, 30°C)

* E-79116 BIO (47-31) (*Pseudomonas* sp.). (Medium 57, 30°C)

E-84220 BIO (*Clostridium* sp.). Isolated from a paper mill, Finland. (Medium 11, 30°C, strictly anaerobic)

E-85242 BIO (GISA 21). Isolated from the surface of waterlogged wood in a lake receiving Kraft pulping wastes, Finland. Growth on glucoisosaccharinic acid (GISA) as sole carbon source below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-85243 BIO (GISA 23) (*Pseudomonas* sp.). Isolated from a mildly contaminated pond in the grounds of a Kraft pulping mill, Finland. Growth on glucoisosaccharinic acid (GISA) as sole carbon source below pH 7. Growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-86248 BIO (B8). Isolated from a brewery, Finland. (Medium 9 or 29, 30°C)

E-87281 TII (A-0101). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-87282 TII (A-0104). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-87283 TII (A-0201). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-87284 TII (A-0301). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-87285 TII (A-0501). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-87286 TII (A-0601). Isolated from a hot spring, Iceland. (Medium 31, 65°C)

E-88319 BIO (1/4D). Isolated from a hot spring mud sample, Iceland. Chemolitothrophic. (Medium 45, 65°C)

E-88320 BIO (1/6A). Isolated from a hot spring mud sample, Iceland. Chemolitothrophic. (Medium 45, 65°C)

E-88321 BIO (A3-02/A). Enrichment culture from a hot spring mud sample, Iceland. Mixed culture. (Medium 45, 65°C)

E-88322 BIO (A5-01/A). Enrichment culture from a hot spring mud sample, Iceland. Mixed culture. (Medium 45, 65°C)

E-88323 BIO (A3-02/B). Subculture from VTT E-88321. (Medium 45, 65°C)

E-88327 BIO (T21v). Isolated from beer, Finland. (Medium 6, 30°C)

E-90379 BIO (P18). Isolated from beer, Finland.. (Medium 12, 30°C)

E-90400 BIO (HI 8/2). Isolated from a hot spring mud sample, Iceland. Produces thermostable xylanases. (Medium 5 or 50, 65°C)

E-90401 BIO (HI 8/3). Isolated from a hot spring mud sample, Iceland. Produces thermostable xylanases. (Medium 5 or 50, 65°C)

E-90402 BIO (HVL 14/1). Isolated from a hot spring mud sample, Iceland. Produces thermostable xylanases. (Medium 5 or 50, 65°C)

E-90403 ITI-4. Isolated from a hot spring mud sample, Iceland. Produces thermostable xylanases. (Medium 5 or 50, 65°C)

E-90404 ITI-5. Isolated from a hot spring mud sample, Iceland. Produces thermostable xylanases. (Medium 5 or 50, 65°C)

E-91420 BIO (KP7A). Isolated from a bleaching process, Finland. Studies on xylanases. Alkalophilic. (Medium 38, 30°C)

E-91421 BIO (KP3C). Isolated from a paper machine, Finland. Produces xylanases. Alkalophilic. (Medium 38, 30°C)

E-91431 TTKK (7V87). Isolated from activated sludge, Finland. Flocculent. (Medium 67, 30°C)

E-91432 TTKK (3V122). Isolated from activated sludge, Finland. Flocculent. (Medium 67, 30°C)

E-91433 TTKK (7V66). Isolated from activated sludge, Finland. Flocculent. (Medium 67, 30°C)

* E-94539 TTKK (2E-4, white). Isolated from process water of a paper mill, Finland. (Medium 86, 30°C)

* E-94540 TTKK (2E-4, yellow). Isolated from process water of a paper mill, Finland. (Medium 86, 30°C)

* E-94541 TTKK (3, opalescent, yellow). Isolated from process water of a paper mill, Finland. (Medium 86, 30°C)

* E-94542 TTKK (3, orange). Isolated from process water of a paper mill, Finland. (Medium 86, 30°C)

E-94545 NRRL B-14401. Mixed culture. Degrades xanthan. Studies on biodegradation of microbial polysaccharides (470). (Medium 5, 30°C)

* E-94549 BEL (B3). Isolated from aged spilled pulp, Finland. Growth on hexene glucuronic acid-substituted xylo-oligosaccharides. (Medium 5, 30°C)

* E-94559 BEL (B13). Isolated from aged spilled pulp, Finland. Growth on hexene glucuronic acid-substituted xylo-oligosaccharides. (Medium 5, 30°C)

E-94560 BEL (O23) (*Leuconostoc lactis*). Isolated from beer, Finland. Produces high amount of diacetyl. (Medium 6, 30°C)

* E-97982 BEL (CRA/9). Isolated from compost, Finland. (Medium 5 or 19, 30°C)

Vibrio fischeri (Beijerinck 1889) Lehmann and Neumann 1896[AL]

E-95625[T] DSM 507 (= ATCC 7744 = NCIMB 1281) (*Achromobacter fischeri*). Produces luciferase. (Medium 91, 20-25°C)

Weissella confusa (Holzapfel and Kandler 1969) Collins et al. 1994[VP]
Basonym *Lactobacillus confusus*

E-90392 DSM 20194 (= NCDO 1975). Isolated from soured carrot mash. Causes slimy consistency in vegetable juice. (Medium 6, 30°C)

E-90393[T] DSM 20196 (= ATCC 10881 = LMG 9497 = LMG 6898 = NCDO 1586 = NCIMB 9311 = NRRL B-1064 = JCM 1093 = CIP 54.169 = NCFB 540 = NCFB 586 = McCleskey 548-D) (*Leuconostoc mesenteroides*). Isolated from sugar cane. (Medium 6, 30°C)

* E-95616 Primalco (TSB 325). Isolated from sour dough seed, Finland. Studies on preferments (504). (Medium 6, 30°C)

Weissella halotolerans (Kandler et al. 1983) Collins et al. 1994[VP]
Basonym *Lactobacillus halotolerans*

E-98965[T] ATCC 35410 (= DSM 20190 = Reuter G1 = E-97965) (*Lactobacillus viridescens* subsp. *halotolerans*). Isolated from sausage. Studies on ribotyping (561). (Medium 6, 30°C)

Weissella paramesenteroides (Garvie 1967) Collins et al. 1994[VP]
Basonym *Leuconostoc paramesenteroides*

E-98967[T] DSM 20288 (= ATCC 33313 = NCFB 803 = Pederson R80 = E-97965). Studies on ribotyping (561). (Medium 6, 30°C)

Weissella viridescens (Niven and Evans 1957) Collins et al. 1994[VP]
Basonym *Lactobacillus viridescens*

E-98966[T] ATCC 12706 (= CCM 56 = DSM 20410 = NCFB 1655 = NCIMB 8965 = Evans S38A = E-97965). Isolated from cured meat products. Thiamine assay. Slime formation. Studies on ribotyping (561). (Medium 6, 30°C)

Xanthobacter autotrophicus (Baumgarten et al. 1974) Wiegel et al. 1978[AL]

E-85235 BIO (GISA 10) (*Pseudomonas testosteroni*). Isolated from bottom mud in a lake receiving Kraft pulping effluents, Finland. Growth on glucoisosaccharinic acid (GISA) as sole carbon source below pH 7. No growth on glucose. Studies on GISA (237, 251). (Medium 5 or 28, 30°C)

Xanthobacter sp.

E-85234 BIO (GISA 9). Isolated from bottom mud in a lake receiving Kraft pulping effluents, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (237, 251). (Medium 5 or 28, 30°C)

E-85237 BIO (GISA 14). Isolated from a pond heavily contaminated with black liquor in the grounds of a Kraft pulping mill, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-85238 BIO (GISA 16). Isolated from a pond heavily contaminated with black liquor in the grounds of a Kraft pulping mill, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-85239 BIO (GISA 18A). Isolated from a stream contaminated with Kraft pulping wastes, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-85240 BIO (GISA 19). Isolated from a stream contaminated with Kraft pulping wastes, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

E-85241 BIO (GISA 20). Isolated from a pond mildly contaminated with pulping wastes, Finland. Growth on glucoisosaccharinic acid (GISA) below pH 7. No growth on glucose. Studies on GISA (251). (Medium 5 or 28, 30°C)

Xanthomonas campestris (Pammel 1895) Dowson 1939 emend. Vauterin et al. 1995[AL]

E-81025 TKK 382 (= 386/2). Isolated from cabbage. Produces xanthan gum. (Medium 5 or 103, 26°C)

E-80120 ATCC 13951 (= DSM 1706 = IFO 13303 = NCIMB 11803 = NRRL B-1459 = CCM 1069 = ICPB XC 153). Produces xanthan gum polysaccharides (US Pat. 3000790, 3054689 and 3119812). (Medium 5 or 103, 26°C)

Xanthomonas maltophilia (Hugh 1981) Swings et al. 1983[VP]
Reclassified as *Stenotrophomonas maltophilia*

Xanthomonas sp.

* E-93482 BIO (10) (*Pseudomonas vesicularis*). Isolated from sewage sludge by styrene enrichment, Finland. Studies on degradion of styrene (549). (Medium 66 or 72, 30°C)

* E-97888 BEL (CYC/G). Isolated from compost, Finland. (Medium 5 or 66, 30°C)

Yersinia enterocolitica (Schleifstein and Coleman 1939) Frederiksen 1964[AL]

E-94534 ATCC 23715 (= NCTC 10598 = Mollaret Ye 636 = IP 636 = Sonnenwirth strain Billups-1803-68 = strain FB). Isolated from blood. Biotype 1, serotype 8. Sal/Esc-Pyz-CRMOX-. (Medium 84, 37°C)

E-97837 ATCC 27729 (= NCTC 10938 = CIP Ye 2705). Isolated from human blood. Biotype 1. Serotype 8. Sal/Esc-Pyz-CRMOX+. (Medium 81, 26°C)

E-97838[T] ATCC 9610 (= DSM 4780 = CIP 80-27 = Coffey 33114) (*Bacterium enterocoliticum*). Isolated from glanders-like infection of face. Biovar 1b, serogroup O:8, phagovar X_z. Sal/Esc-Pyz-CRMOX+, no plasmid found. Autoagglutination test negative. Rough colonies. Quality control strain according to DIN 58959-7. (Medium 81, 30°C)

Zymomonas mobilis *sub*sp. ***mobilis*** (Lindner 1928) De Ley and Swings 1976[AL]

E-78081 AB (B 69 = Burton 163) (*Zymomonas anaerobia*). Isolated from beer, UK. Studies on biochemical characterization (128), immunology (145, 177), ethanol (126, 155), levan and sorbitol (223, 224). (Medium 9, 30°C, anaerobic)

E-78082 AB (B 73 = Burton) (*Zymomonas* sp.). Isolated from beer, UK. Studies on ethanol (126, 138, 155, 176), immunology (145, 177), levan and sorbitol (179, 189, 223, 224, 226), fructose (236), carbohydrate metabolism (283), fructooligosaccharides (308). (Medium 9, 30°C, anaerobic)

E-78083 AB (B 76 = B'ham 30/10) (*Zymomonas* sp.). Isolated from beer, UK. Studies on ethanol (126, 155), levan and sorbitol (223, 224). (Medium 9, 30°C, anaerobic)

E-78084 AB (B 78 = B'ham FV 51) (*Zymomonas* sp.). Isolated from beer, UK. Studies on biochemical characterization (128), ethanol (126, 155), levan and sorbitol (223, 224). (Medium 9, 30°C, anaerobic)

E-78085 AB (B 82 = Warrington) (*Zymomonas* sp.). Isolated from beer, UK. Studies on ethanol (126, 155), levan and sorbitol (223, 224). (Medium 9, 30°C, anaerobic)

E-78086 AB (B 83 = Romford) (*Zymomonas* sp.). Isolated from beer, UK. Studies on ethanol (126, 138, 155). (Medium 9, 30°C, anaerobic)

E-78087 AB (B 84 = Romford 14) (*Zymomonas* sp.). Isolated from beer, UK. Studies on ethanol (126, 155). (Medium 9, 30°C, anaerobic)

E-78088 AB (B 85 = B'ham FV 107) (*Zymomonas* sp.) Isolated from beer, UK. Produces ethanol. (Medium 9, 30°C, anaerobic)

E-78089 AB (*Zymomonas* sp.). Isolated from beer, Sweden. Produces ethanol. (Medium 9, 30°C, anaerobic)

E-82099[T] ATCC 10988 (= DSM 424 = NCIMB 8938 = LMG 404 = NRRL B-806 = ICPB 2463) (*Pseudomonas lindneri*). Isolated from *Agave* juice. Studies on ethanol (126, 138, 155), levan and sorbitol (223, 224). **Teaching strain**. (Medium 9, 25°C, anaerobic)

E-82162 Lehigh University (*Zymomonas mobilis* var. *recifensis*) (= ATCC 31821= LMG 460 = NRRL B-14023 = De Lima CP4 = Rogers ZM 4). Isolated from fermenting cane juice, Brazil. Produces ethanol (US Pat. 4403034 and 4443544) and alkaline phosphatase. Studies on levan and sorbitol (179, 223, 224). (Medium 9, 30°C, anaerobic)

E-89369 KFA (= ATCC 29191 = DSM 3580 = LMG 445 = IFO 13756 = NCIMB 11199 = De Ley Z6 = van Pee). Isolated from fermenting *Elaeis* palm sap, Zaire. Produces ethanol and levan. (Medium 9, 30°C, anaerobic)

Zymomonas mobilis subsp. ***pomaceae*** (Millis 1956) De Ley and Swings 1976[AL]

E-82163[T] ATCC 29192 (= LMG 448 = IFO 13757 = NCIMB 11200 = CCM 2771 = NRRL B-4491 = Barker strain I = De Ley strain Delft). Isolated from cider, Bristol, UK. Studies on ethanol, levan and sorbitol (223, 224) and immobilization (249). (Medium 9, 30°C, anaerobic)

Zymophilus paucivorans Schleifer et al. 1990 [VP]

E-90405[T] DSM 20756 (= ATCC 49689 = Seidel AA1). Isolated from brewery pitching yeast, Germany. (Medium 41 or 99, 28°C, strictly anaerobic)

Zymophilus raffinosivorans Schleifer et al. 1990 [VP]

E-90406[T] DSM 20765 (= ATCC 49691 = Seidel SH2). Isolated from brewery pitching yeast, Germany. (Medium 41 or 99, 28°C, strictly anaerobic)

NUMERICAL INDEX

	VTT-	Name		VTT-	Name
Brewer's yeasts					
	A-59001	*Saccharomyces pastorianus* (bottom)		A-93115	*Saccharomyces cerevisiae* (top)
	A-59002	*Saccharomyces pastorianus* (bottom)		A-93116	*Saccharomyces cerevisiae* (top)
	A-59003	*Saccharomyces pastorianus* (bottom)		A-93117	*Saccharomyces cerevisiae* (top)
	A-62004	*Saccharomyces pastorianus* (bottom)		A-93118	*Saccharomyces cerevisiae* (top)
	A-62005	*Saccharomyces pastorianus* (bottom)		A-93119	*Saccharomyces cerevisiae* (top)
	A-62006	*Saccharomyces pastorianus* (bottom)		A-93120	*Saccharomyces cerevisiae* (top)
	A-62008	*Saccharomyces pastorianus* (bottom)		A-93121	*Saccharomyces cerevisiae* (top)
	A-59009	*Saccharomyces pastorianus* (bottom)		A-93122	*Saccharomyces cerevisiae* (top)
	A-60010	*Saccharomyces pastorianus* (bottom)		A-94124	*Saccharomyces cerevisiae* (top)
	A-61011	*Saccharomyces pastorianus* (bottom)		A-94125	*Saccharomyces pastorianus* (bottom)
	A-60012	*Saccharomyces pastorianus* (bottom)		A-94126	*Saccharomyces pastorianus* (bottom)
	A-62013	*Saccharomyces pastorianus* (bottom)		A-94127	*Saccharomyces pastorianus* (bottom)
	A-60014	*Saccharomyces pastorianus* (bottom)		A-94128	*Saccharomyces pastorianus* (bottom)
	A-62016	*Saccharomyces pastorianus* (bottom)		A-94129	*Saccharomyces pastorianus* (bottom)
	A-66017	*Saccharomyces pastorianus* (bottom)		A-94130	*Saccharomyces cerevisiae* (top)
	A-66018	*Saccharomyces pastorianus* (bottom)		A-94131	*Saccharomyces cerevisiae* (top)
	A-62019	*Saccharomyces pastorianus* (bottom)		A-94132	*Saccharomyces cerevisiae* (top)
	A-62020	*Saccharomyces pastorianus* (bottom)		A-94133	*Saccharomyces cerevisiae* (top)
	A-59021	*Saccharomyces pastorianus* (bottom)	*	A-94134	*Saccharomyces pastorianus* (GMO)
	A-66023	*Saccharomyces pastorianus* (bottom)		A-94135	*Saccharomyces cerevisiae* (top)
	A-69025	*Saccharomyces pastorianus* (bottom)		A-94136	*Saccharomyces cerevisiae* (top)
	A-59026	*Saccharomyces pastorianus* (bottom)		A-94137	*Saccharomyces cerevisiae* (top)
	A-66027	*Saccharomyces pastorianus* (bottom)		A-94138	*Saccharomyces cerevisiae* (top)
	A-66028	*Saccharomyces pastorianus* (bottom)		A-94139	*Saccharomyces cerevisiae* (top)
	A-71037	*Saccharomyces pastorianus* (bottom)		A-94140	*Saccharomyces cerevisiae* (top)
	A-72039	*Saccharomyces pastorianus* (bottom)		A-95144	*Saccharomyces cerevisiae* (top)
	A-73040	*Saccharomyces pastorianus* (bottom)		A-95145	*Saccharomyces pastorianus* (bottom)
	A-70041	*Saccharomyces pastorianus* (bottom)	*	A-97157	*Saccharomyces pastorianus* (GMO)
	A-70042	*Saccharomyces pastorianus* (bottom)	*	A-97158	*Saccharomyces pastorianus* (GMO)
	A-59044	*Saccharomyces pastorianus* (bottom)	*	A-97159	*Saccharomyces pastorianus* (GMO)
	A-75050	*Saccharomyces pastorianus* (bottom)		A-98162	*Saccharomyces cerevisiae* (top)
	A-60055	*Saccharomyces cerevisiae* (top)		A-98166	*Saccharomyces cerevisiae* (top)
	A-60056	*Saccharomyces cerevisiae* (top)		A-98167	*Saccharomyces cerevisiae* (top)
	A-74058	*Saccharomyces pastorianus* (bottom)			
	A-74059	*Saccharomyces pastorianus* (bottom)	**Baker´s yeasts**		
	A-80061	*Saccharomyces cerevisiae* (top)			
	A-81062	*Saccharomyces cerevisiae* (top)		B-62001	*Saccharomyces cerevisiae*
	A-82063	*Saccharomyces pastorianus* (bottom)		B-67002	*Saccharomyces cerevisiae*
	A-66065	*Saccharomyces pastorianus* (bottom)		B-62003	*Saccharomyces cerevisiae*
	A-59066	*Saccharomyces pastorianus* (bottom)		B-63004	*Saccharomyces cerevisiae*
	A-83067	*Saccharomyces cerevisiae* (top)		B-65005	*Saccharomyces cerevisiae*
	A-85068	*Saccharomyces pastorianus* (bottom)		B-65006	*Saccharomyces cerevisiae*
	A-85069	*Saccharomyces pastorianus* (bottom)		B-67007	*Saccharomyces cerevisiae*
	A-85070	*Saccharomyces pastorianus* (bottom)			
	A-85071	*Saccharomycespastorianus*(bottom)			
*	A-87076	*Saccharomyces pastorianus* (GMO)			
*	A-88086	*Saccharomyces pastorianus* (GMO)			
*	A-88088	*Saccharomyces pastorianus* (GMO)			
*	A-88090	*Saccharomyces pastorianus* (GMO)			
*	A-88091	*Saccharomyces pastorianus* (GMO)			
	A-91103	*Saccharomyces cerevisiae* (top)			
	A-93113	*Saccharomyces cerevisiae* (top)			
	A-93114	*Saccharomyces cerevisiae* (top)			

	VTT-	Name	VTT-	Name
	B-67008	*Saccharomyces cerevisiae*	B-96105	*Saccharomyces cerevisiae*
	B-67009	*Saccharomyces cerevisiae*	B-96106	*Saccharomyces cerevisiae*
	B-67010	*Saccharomyces cerevisiae*	B-96107	*Saccharomyces cerevisiae*
	B-67011	*Saccharomyces cerevisiae*	B-96108	*Saccharomyces cerevisiae*
	B-67012	*Saccharomyces cerevisiae*	B-96109	*Saccharomyces cerevisiae*
	B-67013	*Saccharomyces cerevisiae*	B-96110	*Saccharomyces cerevisiae*
	B-68015	*Saccharomyces cerevisiae*	B-96111	*Saccharomyces cerevisiae*
	B-69016	*Saccharomyces cerevisiae*	B-96112	*Saccharomyces cerevisiae*
	B-69017	*Saccharomyces cerevisiae*	B-96113	*Saccharomyces cerevisiae*
	B-70019	*Saccharomyces cerevisiae*	B-96114	*Saccharomyces cerevisiae*
	B-72020	*Saccharomyces cerevisiae*	B-96115	*Saccharomyces cerevisiae*
	B-72021	*Saccharomyces cerevisiae*	B-96116	*Saccharomyces cerevisiae*
	B-72022	*Saccharomyces cerevisiae*	B-96117	*Saccharomyces cerevisiae*
	B-73023	*Saccharomyces cerevisiae*	B-96118	*Saccharomyces cerevisiae*
	B-74026	*Saccharomyces cerevisiae*	B-96119	*Saccharomyces cerevisiae*
	B-74027	*Saccharomyces cerevisiae*	B-96120	*Saccharomyces cerevisiae*
	B-75028	*Saccharomyces cerevisiae*	B-96121	*Saccharomyces cerevisiae*
	B-75029	*Saccharomyces cerevisiae*	B-96122	*Saccharomyces cerevisiae*
	B-72030	*Saccharomyces cerevisiae*	B-96123	*Saccharomyces cerevisiae*
	B-72031	*Saccharomyces cerevisiae*	B-96124	*Saccharomyces cerevisiae*
	B-74032	*Saccharomyces cerevisiae*	B-96125	*Saccharomyces cerevisiae*
	B-74033	*Saccharomyces cerevisiae*	B-96126	*Saccharomyces cerevisiae*
	B-75034	*Saccharomyces cerevisiae*	B-96127	*Saccharomyces cerevisiae*
	B-76035	*Saccharomyces cerevisiae*	B-96128	*Saccharomyces cerevisiae*
	B-76036	*Saccharomyces cerevisiae*	B-96129	*Saccharomyces cerevisiae*
	B-78045	*Saccharomyces cerevisiae*	B-96130	*Saccharomyces cerevisiae*
	B-79046	*Saccharomyces cerevisiae*	B-96131	*Saccharomyces cerevisiae*
	B-81047	*Saccharomyces cerevisiae*	B-96132	*Saccharomyces cerevisiae*
	B-82048	*Saccharomyces cerevisiae*	B-96133	*Saccharomyces cerevisiae*
*	B-97078	*Saccharomyces cerevisiae*	B-96134	*Saccharomyces cerevisiae*
*	B-97079	*Saccharomyces cerevisiae*	B-96135	*Saccharomyces cerevisiae*
*	B-97080	*Saccharomyces cerevisiae*	B-96136	*Saccharomyces cerevisiae*
*	B-97081	*Saccharomyces cerevisiae*	B-96137	*Saccharomyces cerevisiae*
*	B-97082	*Saccharomyces cerevisiae*	B-96138	*Saccharomyces cerevisiae*
*	B-97083	*Saccharomyces cerevisiae*	B-96139	*Saccharomyces cerevisiae*
*	B-97084	*Saccharomyces cerevisiae*	B-96140	*Saccharomyces cerevisiae*
*	B-97085	*Saccharomyces cerevisiae*	B-96141	*Saccharomyces cerevisiae*
*	B-97086	*Saccharomyces cerevisiae*	B-96142	*Saccharomyces cerevisiae*
*	B-97087	*Saccharomyces cerevisiae*	B-96143	*Saccharomyces cerevisiae*
*	B-97088	*Saccharomyces cerevisiae*	B-96144	*Saccharomyces cerevisiae*
*	B-97089	*Saccharomyces cerevisiae*	B-96145	*Saccharomyces cerevisiae*
*	B-97090	*Saccharomyces cerevisiae*	B-96146	*Saccharomyces cerevisiae*
*	B-97091	*Saccharomyces cerevisiae*	B-96147	*Saccharomyces cerevisiae*
*	B-97092	*Saccharomyces cerevisiae*	B-96148	*Saccharomyces cerevisiae*
*	B-97093	*Saccharomyces cerevisiae*	B-96149	*Saccharomyces cerevisiae*
*	B-97094	*Saccharomyces cerevisiae*	B-96150	*Saccharomyces cerevisiae*
*	B-97095	*Saccharomyces cerevisiae*	B-96151	*Saccharomyces cerevisiae*
*	B-97096	*Saccharomyces cerevisiae*	B-96152	*Saccharomyces cerevisiae*
*	B-97097	*Saccharomyces cerevisiae*	B-96153	*Saccharomyces cerevisiae*
*	B-97098	*Saccharomyces cerevisiae*	B-96154	*Saccharomyces cerevisiae*
*	B-97099	*Saccharomyces cerevisiae*	B-96155	*Saccharomyces cerevisiae*
*	B-97100	*Saccharomyces cerevisiae*	B-96156	*Saccharomyces cerevisiae*
*	B-97101	*Saccharomyces cerevisiae*	B-96157	*Saccharomyces cerevisiae*
*	B-97102	*Saccharomyces cerevisiae*	B-96158	*Saccharomyces cerevisiae*
*	B-97103	*Saccharomyces cerevisiae*	B-96159	*Saccharomyces cerevisiae*

VTT-	Name	VTT-	Name

Other yeasts

C-75001	*Dekkera anomala*	C-82065	*Candida versatilis*
C-75003	*Candida albicans*	C-72066	*Saccharomyces cerevisiae*
C-59004	*Pichia guilliermondii*	C-59067	*Saccharomyces bayanus*
C-71005	*Pichia guilliermondii*	C-82068	*Candida parapsilosis*
C-75007	*Kluyveromyces marxianus*	C-82069	*Candida parapsilosis*
C-71008	*Issatchenkia orientalis*	C-71070	*Schizosaccharomyces japonicus*
C-73009	*Issatchenkia orientalis*		var. *japonicus*
C-75010	*Issatchenkia orientalis*	C-74071	*Candida saitoana*
C-92011	*Rhodotorula glutinis*	C-74074	*Candida glabrata*
C-92012	*Cryptococcus albidus*	C-75075	*Saccharomyces exiguus*
C-71013	*Kluyveromyces marxianus*	C-77077	*Candida maltosa*
C-71014	*Candida tropicalis*	C-78078	*Pichia fermentans*
C-71015	*Pichia jadinii*	C-78079	*Pichia fabianii*
C-71016	*Pichia jadinii*	C-78080	*Candida viswanathii*
C-74021	*Pichia anomala*	C-78081	*Candida tropicalis*
C-74022	*Pichia anomala*	C-78082	*Candida catenulata*
C-72023	*Kluyveromyces marxianus*	C-78083	*Pichia jadinii*
C-75024	*Kluyveromyces marxianus*	C-78084	*Saccharomyces cerevisiae*
C-75025	*Kluyveromyces marxianus*	C-78085	*Pichia jadinii*
C-75026	*Kluyveromyces lactis*	C-78086	*Candida tropicalis*
C-72027	*Kluyveromyces marxianus*	C-78087	*Candida tropicalis*
C-72028	*Kluyveromyces thermotolerans*	C-78088	*Yarrowia lipolytica*
C-71030	*Metschnikowia pulcherrima*	C-79089	*Saccharomycodes ludwigii*
C-74031	*Pichia fermentans*	C-79090	*Issatchenkia orientalis*
C-94032	*Zygosaccharomyces rouxii*	C-79091	*Pichia jadinii*
C-74033	*Trichosporon beigelii*	C-79092	*Saccharomyces cerevisiae*
C-71034	*Rhodosporidium toruloides*	C-79093	*Saccharomyces cerevisiae*
C-72035	*Zygosaccharomyces bailii*		(Distiller´s)
C-70036	*Saccharomyces cerevisiae* (Wine)	C-79094	*Saccharomyces cerevisiae*
C-72037	*Saccharomyces bayanus*	C-79095	*Saccharomyces cerevisiae*
C-95038	*Saccharomyces pastorianus*	C-79096	*Saccharomyces cerevisiae*
C-74039	*Saccharomyces bayanus*	C-79097	*Saccharomyces cerevisiae*
C-70040	*Saccharomyces cerevisiae* (Wine)		(Wine)
C-70041	*Saccharomyces cerevisiae* (Wine)	C-79098	*Saccharomyces cerevisiae*
C-70042	*Saccharomyces cerevisiae* (Wine)		(Wine)
C-71043	*Saccharomyces cerevisiae*	C-79099	*Saccharomyces cerevisiae*
C-71044	*Saccharomyces pastorianus*		(Wine)
C-74045	*Saccharomyces cerevisiae*	C-79100	*Candida tropicalis*
C-70047	*Saccharomyces cerevisiae* (Wine)	C-82101	*Saccharomyces cerevisiae*
C-82050	*Pichia subpelliculosa*	C-80102	*Saccharomyces cerevisiae*
C-71052	*Saccharomyces cerevisiae*	C-80103	*Schizosaccharomyces pombe*
C-71053	*Saccharomyces cerevisiae*		var. *pombe*
C-82054	*Candida diddensiae*	C-81104	*Kluyveromyces lactis*
C-82055	*Trigonopsis variabilis*	C-81105	*Kluyveromyces marxianus*
C-82056	*Candida parapsilosis*	C-81106	*Kluyveromyces marxianus*
C-72057	*Saccharomyces cerevisiae*	C-81107	*Kluyveromyces marxianus*
C-72058	*Torulaspora delbrueckii*	C-81108	*Kluyveromyces marxianus*
C-68059	*Saccharomyces cerevisiae*	C-81109	*Kluyveromyces marxianus*
C-70060	*Saccharomyces cerevisiae*	C-81110	*Kluyveromyces marxianus*
C-74061	*Saccharomyces exiguus*	C-81111	*Kluyveromyces marxianus*
C-72062	*Torulaspora delbrueckii*	C-81112	*Kluyveromyces marxianus*
C-72063	*Saccharomyces cerevisiae*	C-81113	*Kluyveromyces marxianus*
C-72064	*Pichia guilliermondii*	C-81114	*Kluyveromyces lactis*

VTT-	Name	VTT-	Name
C-81115	*Saccharomyces exiguus*	C-91184	*Zygosaccharomyces bailii*
C-81116	*Saccharomyces exiguus*	C-93186	*Zygosaccharomyces bailii*
C-81117	*Saccharomyces cerevisiae*	C-93187	*Rhodotorula glutinis*
C-81118	*Saccharomyces cerevisiae*	C-93188	*Sporobolomyces roseus*
C-81119	*Saccharomyces unisporus*	C-93189	*Pichia anomala*
C-81120	*Saccharomyces unisporus*	C-93190	*Candida zeylanoides*
C-81121	*Pachysolen tannophilus*	C-94191	*Pichia anomala*
C-81122	*Pachysolen tannophilus*	C-94192	*Pichia membranifaciens*
C-81123	*Pachysolen tannophilus*	C-94194	*Zygosaccharomyces bailii*
C-81124	*Pachysolen tannophilus*	C-94195	*Zygosaccharomyces bisporus*
C-82125	*Pichia farinosa*	C-94196	*Zygosaccharomyces fermentati*
C-81126	*Pichia fermentans*	C-94197	*Zygosaccharomyces rouxii*
C-82127	*Pichia farinosa*	C-94198	*Zygosaccharomyces microellipsoides*
C-82128	*Debaryomyces hansenii*		
C-82129	*Debaryomyces hansenii*	C-94199	*Zygosaccharomyces florentinus*
C-82130	*Pichia guilliermondii*	C-94200	*Zygosaccharomyces mellis*
C-82131	*Pichia triangularis*	C-94201	*Zygosaccharomyces cidri*
C-82132	*Rhodosporidium toruloides*	C-94202	*Zygosaccharomyces mrakii*
C-82133	*Schizosaccharomyces pombe* var. *pombe*	C-96203	*Saccharomyces cerevisiae* (Distiller´s)
C-82134	*Candida diddensiae*		
C-82137	*Saccharomyces cerevisiae*	C-94204	*Candida milleri*
C-82138	*Kluyveromyces marxianus*	C-94205	*Candida milleri*
C-83140	*Kluyveromyces marxianus*	C-94206	*Candida milleri*
C-83141	*Candida* sp.	C-94207	*Saccharomyces cerevisiae*
C-85142	*Sporidiobolus johnsonii*	C-94208	*Candida sake*
C-83143	*Saccharomyces cerevisiae* (Wine)	C-95209	*Pichia anomala*
C-84144	*Saccharomyces cerevisiae* (Wine)	C-95210	*Zygosaccharomyces rouxii*
C-84146	*Pichia jadinii*	C-95211	*Zygosaccharomyces rouxii*
C-84147	*Pichia jadinii*	C-95212	*Zygosaccharomyces rouxii*
C-84148	*Pichia jadinii*	C-95213	*Zygosaccharomyces rouxii*
C-84149	*Pichia jadinii*	C-95214	*Zygosaccharomyces rouxii*
C-84150	*Pichia jadinii*	C-95215	*Zygosaccharomyces rouxii*
C-84151	*Pichia jadinii*	C-95216	*Zygosaccharomyces rouxii*
C-84152	*Pichia jadinii*	C-95217	*Zygosaccharomyces rouxii*
C-84153	*Pichia jadinii*	C-95218	*Zygosaccharomyces rouxii*
C-84154	*Pichia jadinii*	C-95219	*Candida saitoana*
C-84155	*Pichia jadinii*	C-95220	*Candida sake*
C-84156	*Pichia jadinii*	C-95221	*Candida* sp.
C-84157	*Pichia jadinii*	C-95222	*Sporopachydermia lactativora*
C-84158	*Pichia quercuum*	C-95223	*Sporopachydermia lactativora*
C-84159	*Candida tropicalis*	C-95224	*Clavispora lusitaniae*
C-84160	*Candida tropicalis*	C-95225	*Issatchenkia orientalis*
C-85161	*Candida albicans*	C-95226	*Cryptococcus albidus*
C-86162	*Pichia jadinii*	C-95227	*Cryptococcus laurentii*
C-86163	*Debaryomyces coudertii*	C-95228	*Rhodotorula mucilaginosa*
C-86164	*Saccharomyces cerevisiae*	C-95229	*Saccharomyces cerevisiae*
C-86170	*Pichia membranifaciens*	C-95230	*Clavispora lusitaniae*
C-87174	*Candida apicola*	C-95231	*Clavispora lusitaniae*
C-87175	*Candida milleri*	* C-95232	*Candida milleri*
C-88176	*Saccharomyces cerevisiae*	C-95233	*Clavispora lusitaniae*
C-88177	*Saccharomyces cerevisiae*	C-95234	*Kluyveromyces marxianus*
C-89178	*Issatchenkia orientalis*	C-95235	*Saccharomyces dairensis*
C-89179	*Rhodotorula mucilaginosa*	* C-95236	*Saccharomyces cerevisiae*
* C-91180	*Saccharomyces cerevisiae* (Distiller´s)	C-95237	*Rhodotorula mugilaginosa*
C-91183	*Dekkera anomala*		

VTT-	Name
C-95243	*Saccharomyces cerevisiae* (Distiller´s)
C-96244	*Candida milleri*
C-96245	*Saccharomyces cerevisiae* (Distiller´s)
C-96246	*Saccharomyces cerevisiae* (Distiller´s)
C-96247	*Saccharomyces cerevisiae* (Distiller´s)
C-96250	*Candida milleri*
C-96251	*Candida membranaefaciens*
C-96252	*Pichia anomala*
C-96253	*Candida tenuis*
C-96257	*Candida mambranaefaciens*
C-96258	*Saccharomyces cerevisiae*
C-96259	*Rhodotorula mucilaginosa*
C-96260	*Rhodotorula mucilaginosa*
C-96261	*Rhodotorula minuta*
C-96262	*Debaryomyces hansenii* var. *fabryii*
C-96263	*Candida albicans*
* C-96264	*Saccharomyces cerevisiae*
C-97282	*Torulaspora delbrueckii*
C-97283	*Torulaspora delbrueckii*
C-97284	*Pichia guillermondii*
C-97285	*Clavispora lusitaniae*
C-97286	*Debaryomyces hansenii* var. *fabryii*
C-97287	*Issatchenkia orientalis*
C-97288	*Cryptococcus infirmo-miniatus*
C-97289	*Pichia membranifaciens*
C-97290	*Pichia guillermondii*
C-97291	*Zygosaccharomyces bailii*
C-97292	*Saccharomyces cerevisiae* (Wine)
C-97293	*Saccharomyces cerevisiae* (Wine)
C-97294	*Saccharomyces cerevisiae* (Wine)
C-97295	*Saccharomyces cerevisiae*
C-97297	*Yarrowia lipolytica*
C-97305	*Rhodotorula minuta*
C-98306	*Candida boidinii*
C-98307	*Zygosaccharomyces rouxii*
C-98308	*Rhodosporidium toruloides*
C-98309	*Candida intermedia*
C-98310	*Pichia farinosa*
C-98311	*Candida albicans*
C-98312	*Zygosaccharomyces mellis*
C-98313	*Zygosaccharomyces rouxii*
C-98314	*Zygosaccharomyces rouxi*

Filamentous fungi

D-71001	*Aspergillus foetidus*
D-71002	*Aspergillus foetidus*
D-76003	*Thielavia heterothallica*
D-76004	*Phanerochaete chrysosporium*
D-70005	*Aspergillus niger*
D-71006	*Aspergillus niger*
D-68007	*Aspergillus oryzae* var. *oryzae*
D-72008	*Aspergillus oryzae* var. *oryzae*
D-70009	*Byssochlamys fulva*
D-70010	*Cryptonectria parasitica*
D-70011	*Cryptonectria parasitica*
D-72012	*Fusarium culmorum*
D-76013	*Gibberella zeae*
D-72014	*Fusarium sporotrichioides*
D-73015	*Aureobasidium pullulans* var. *pullulans*
D-70016	*Rhizomucor pusillus*
D-75017	*Neurospora crassa*
D-76019	*Aspergillus phoenicis*
D-77020	*Aspergillus niger*
D-74021	*Penicillium chrysogenum*
D-70022	*Rhizopus microsporus* var. *oligosporus*
D-70023	*Trichophyton mentagrophytes*
D-76024	*Alternaria alternata*
D-71025	*Aspergillus awamori*
D-74026	*Aspergillus awamori*
D-75027	*Aspergillus awamori*
D-75028	*Aspergillus awamori*
D-75029	*Aspergillus awamori*
D-75030	*Aspergillus awamori*
D-92031	*Penicillium echinulatum*
D-92032	*Penicillium brevicompactum*
D-76035	*Eurotium amstelodami*
D-76036	*Aspergillus clavatus*
D-76037	*Fusarium culmorum*
D-76038	*Fusarium poae*
D-76039	*Cochliobolus sativus*
D-76040	*Cochliobolus sativus*
D-92041	*Thermoascus aurantiacus*
D-76042	*Trichothecium roseum*
D-76043	*Acremonium strictum*
D-76044	*Botryotinia fuckeliana*
D-76045	*Mycosphaerella tassiana*
D-76046	*Epicoccum nigrum*
D-76047	*Pleospora herbarum* var. *herbarum*
D-77049	*Aspergillus niger*
D-77050	*Aspergillus niger*
D-77051	*Aspergillus niger*
D-77052	*Aspergillus niger*
D-77053	*Aspergillus niger*
D-77054	*Gibberella avenacea*
D-77055	*Fusarium chlamydosporium*
D-77056	*Gibberella pulicaris*
D-77057	*Nectria haematococca* var. *brevicona*
D-77058	*Fusarium sporotrichioides*
D-77059	*Aspergillus flavus*
D-77060	*Aspergillus janus*
D-77061	*Aspergillus ochraceus*
D-77062	*Eurotium herbariorum*
D-77063	*Aspergillus versicolor*
D-77064	*Eurotium rubrum*

VTT-	Name	VTT-	Name
D-77065	*Aspergillus restrictus*	D-79127	*Fusarium* sp.
D-78066	*Trichoderma reesei*	D-79128	*Fusarium* sp.
D-78067	*Trichoderma reesei*	D-79129	*Gibberella zeae*
D-74068	*Trichoderma reesei*	D-80134	*Fusarium oxysporum*
D-78069	*Trichoderma reesei*	D-80135	*Fusarium oxysporum*
D-74070	*Trichoderma reesei*	D-80136	*Gibberella zeae*
D-81071	*Fusarium arthrosporioides*	D-80137	*Gibberella zeae*
D-81072	*Gibberella acuminata*	D-80138	*Fusarium sporotrichioides*
D-81073	*Fusarium pallidoroseum*	D-80139	*Gibberella tricincta*
D-81074	*Gibberella baccata*	D-80140	*Fusarium oxysporum* fsp. *lini*
D-74075	*Trichoderma reesei*	D-80141	*Gibberella avenacea*
D-78076	*Trichoderma reesei*	D-80142	*Penicillium aurantiogriseum*
D-78077	*Trichoderma reesei*	D-80143	*Gibberella zeae*
D-81078	*Aspergillus niger*	D-80145	*Trichoderma pseudokoningii*
D-81079	*Chaetomium globosum*	D-80146	*Gibberella avenacea*
D-81080	*Penicillium funiculosum*	D-80147	*Gibberella avenacea*
D-82081	*Gibberella zeae*	D-80148	*Fusarium culmorum*
D-82082	*Gibberella zeae*	D-80149	*Fusarium culmorum*
D-74083	*Trichoderma reesei*	D-80150	*Trichoderma harzianum*
D-82084	*Fusarium sporotrichioides*	D-81152	*Trichoderma reesei*
D-82086	*Gibberella zeae*	D-81153	*Trichoderma reesei*
D-82087	*Gibberella intricans*	D-81154	*Trichoderma reesei*
D-82088	*Fusarium culmorum*	D-81155	*Trichoderma reesei*
D-78089	*Trichoderma reesei*	D-81161	*Trichoderma reesei*
D-78091	*Aspergillus awamori*	D-81162	*Trichoderma reesei*
D-78092	*Trichoderma reesei*	D-81166	*Trichoderma reesei*
D-78093	*Trichoderma reesei*	D-81167	*Trichoderma reesei*
D-78094	*Aspergillus awamori*	D-81168	*Trichoderma reesei*
D-78095	*Aspergillus awamori*	D-82169	*Gibberella zeae*
D-78096	*Aspergillus awamori*	D-82170	*Gibberella zeae*
D-78097	*Aspergillus awamori*	D-82171	*Fusarium culmorum*
D-78098	*Aspergillus awamori*	D-82172	*Gibberella pulicaris*
D-79100	*Aspergillus awamori*	D-82173	*Gibberella avenacea*
D-79101	*Aspergillus awamori*	D-82174	*Fusarium culmorum*
D-79102	*Aspergillus awamori*	D-82175	*Fusarium sporotrichioides*
D-79104	*Aspergillus awamori*	D-82176	*Fusarium culmorum*
D-79105	*Aspergillus awamori*	D-82177	*Gibberella zeae*
D-79106	*Aspergillus niger*	D-82178	*Fusarium oxysporum*
D-79107	*Thielavia terrestris*	D-82179	*Fusarium culmorum*
D-79108	*Irpex lacteus*	D-82180	*Fusarium culmorum*
D-79109	*Nectria haematococca* var. *brevicona*	D-82181	*Gibberella tricincta*
D-79110	*Alternaria alternata*	D-82182	*Fusarium poae*
D-79111	*Alternaria alternata*	D-82183	*Fusarium oxysporum*
D-79112	*Curvularia inaequalis*	D-82184	*Fusarium pallidoroseum*
D-79113	*Curvularia inaequalis*	D-82185	*Nectria haematococca* var. *brevicona*
D-79114	*Thanatephorus cucumeris*	D-82186	*Gibberella moniliformis*
D-79115	*Acremonium strictum*	D-82187	*Gibberella baccata*
D-79116	*Curvularia inaequalis*	D-92188	*Cladosporium cladosporioides*
D-79117	*Curvularia inaequalis*	D-82189	*Trichoderma reesei*
D-79118	*Curvularia inaequalis*	D-82190	*Cryptonectria parasitica*
D-79119	*Curvularia protuberata*	D-82191	*Mucor* sp.
D-79120	*Curvularia inaequalis*	D-82192	*Rhizopus microsporus* var. *oligosporus*
D-79121	*Curvularia inaequalis*	D-82193	*Rhizomucor miehei*
D-79122	*Nigrospora* sp.		
D-79123	*Stemphylium* sp.		

	VTT-	Name	VTT-	Name
	D-82194	*Absidia corymbifera*	D-86268	*Aspergillus awamori*
	D-82195	*Aspergillus fumigatus* var. *fumigatus*	D-86269	*Aspergillus awamori*
			D-86270	*Phanerochaete chrysosporium*
	D-93196	*Thermoascus aurantiacus*	D-86271	*Trichoderma reesei*
	D-93197	*Thermoascus aurantiacus*	D-86273	*Lentinula edodes*
	D-93198	Unidentified fungus	D-86274	*Lentinula edodes*
	D-93199	*Aspergillus kawachii*	D-86277	*Lentinula edodes*
	D-82200	*Mucor hiemalis*	D-86278	*Lentinula edodes*
*	D-93201	*Trichoderma reesei*	D-86280	*Lentinula edodes*
	D-82202	*Mucor circinelloides* f. *griseocyanus*	D-86281	*Lentinula edodes*
	D-82203	*Mucor hiemalis*	D-86282	*Lentinula edodes*
	D-82204	*Mucor hiemalis*	D-86283	*Lentinula edodes*
	D-82207	*Trichoderma viride*	D-86284	*Lentinula edodes*
	D-82208	*Penicillium verruculosum*	D-86285	*Lentinula edodes*
	D-82209	*Aspergillus terreus*	D-86286	*Lentinula edodes*
	D-83210	*Stachybotrys chartarum*	D-86288	*Lentinula edodes*
	D-83211	*Trametes versicolor*	D-86289	*Lentinula edodes*
	D-93212	*Aspergillus awamorii*	D-86290	*Lentinula edodes*
	D-83213	*Heterobasidion annosum*	D-86292	*Lentinula edodes*
	D-83214	*Paecilomyces variotii*	D-86293	*Lentinula edodes*
	D-83215	*Gliocladium virens*	D-86294	*Lentinula edodes*
	D-83216	*Aspergillus clavatus*	D-86296	*Lentinula edodes*
	D-83217	*Chaetomium virescens*	D-86297	*Lentinula edodes*
	D-83218	*Stachybotrys chartarum*	D-86298	*Lentinula edodes*
	D-83219	*Stachybotrys chartarum*	D-86299	*Lentinula edodes*
	D-83220	*Stachybotrys chartarum*	D-86300	*Lentinula edodes*
	D-83221	*Stachybotrys chartarum*	D-86301	*Lentinula edodes*
	D-83222	*Stachybotrys chartarum*	D-86302	*Lentinula edodes*
	D-84223	*Phellinus pini*	D-86303	*Lentinula edodes*
	D-84224	*Trametes versicolor*	D-87322	*Lentinula edodes*
	D-84225	*Heterobasidion annosum*	D-87323	*Lentinula edodes*
	D-84226	*Trametes versicolor*	D-87325	*Lentinula edodes*
*	D-84227	*Aspergillus terreus*	D-87326	*Lentinula edodes*
	D-84228	*Galactomyces geotrichum*	D-87328	*Penicillium digitatum*
	D-84229	*Inonotus weirii*	D-88329	*Penicillium* sp.
	D-84230	*Inonotus weirii*	D-88330	*Cladosporium sphaerospermum*
	D-84231	*Inonotus weirii*	D-88331	*Cantharellus cibarius*
	D-84232	*Myrothecium gramineum*	D-88332	*Cantharellus cibarius*
	D-84233	*Myrothecium gramineum*	D-88333	*Cantharellus cibarius*
	D-84234	*Myrothecium verrucaria*	D-88334	*Cantharellus cibarius*
	D-84235	*Stereum rugosum*	D-88335	*Cantharellus cibarius*
	D-84236	*Phlebia radiata*	D-88336	*Cantharellus cibarius*
	D-84237	*Phanerochaete chrysosporium*	D-88337	*Cantharellus cibarius*
	D-84238	*Galactomyces geotrichum*	D-88338	*Cantharellus cibarius*
	D-84239	*Amorphotheca resinae*	D-88339	*Cantharellus cibarius*
	D-85240	*Aspergillus niger*	D-88340	*Cantharellus cibarius*
	D-85241	*Phanerochaete chrysosporium*	D-88341	*Cantharellus cibarius*
	D-85242	*Phanerochaete chrysosporium*	D-88343	*Coniophora puteana*
	D-85243	*Amorphotheca resinae*	D-88344	*Lentinula edodes*
	D-85244	*Inonotus weirii*	D-88345	*Lentinula edodes*
	D-85245	*Aspergillus niger*	D-88346	*Lentinula edodes*
	D-85246	*Aspergillus niger*	D-88347	*Lentinula edodes*
	D-85248	*Aspergillus oryzae* var. *oryzae*	D-88348	*Aspergillus oryzae* var. *oryzae*
	D-85264	*Agaricus bisporus*	D-88349	*Aspergillus oryzae* var. *oryzae*
	D-85265	*Pleurotus ostreatus*	D-88350	*Aspergillus oryzae* var. *oryzae*

	VTT-	Name
	D-88351	*Aspergillus oryzae* var. *oryzae*
	D-88352	*Aspergillus oryzae* var. *oryzae*
	D-88353	*Aspergillus oryzae* var. *oryzae*
	D-88354	*Aspergillus oryzae* var. *oryzae*
	D-88355	*Aspergillus oryzae* var. *oryzae*
	D-88356	*Monascus ruber*
	D-88357	*Ulocladium oudemansii*
	D-88362	*Schizophyllum commune*
	D-88364	*Cantharellus cibarius*
	D-88365	*Cantharellus cibarius*
	D-88366	*Cantharellus cibarius*
	D-88367	*Cantharellus cibarius*
	D-88368	*Cantharellus cibarius*
	D-88369	*Cantharellus cibarius*
	D-88370	*Cantharellus cibarius*
	D-88371	*Cantharellus cibarius*
	D-88372	*Cantharellus cibarius*
	D-88373	*Cantharellus cibarius*
	D-88374	*Cantharellus cibarius*
	D-88375	*Cantharellus cibarius*
	D-88376	*Cantharellus cibarius*
	D-88377	*Lentinula edodes*
	D-88378	*Lentinula edodes*
	D-88379	*Lentinula edodes*
	D-88380	*Lentinula edodes*
	D-88381	*Penicillium chrysogenum*
	D-88382	*Emericella nidulans*
	D-88383	*Emericella nidulans*
	D-88384	*Emericella nidulans*
	D-88385	*Emericella nidulans*
	D-88386	*Emericella nidulans*
	D-88387	*Emericella nidulans*
	D-88388	*Emericella nidulans*
	D-88389	*Cantharellus cibarius*
	D-92392	*Eurotium amstelodami*
	D-89393	*Penicillium roquefortii*
	D-89394	*Eurotium amstelodami*
	D-89395	*Pyrenophora teres*
	D-89396	*Phoma macrostoma*
	D-89397	*Aureobasidium pullulans* var. *pullulans*
	D-90398	*Lentinula edodes*
	D-90399	*Lentinula edodes*
	D-90400	*Lentinula edodes*
	D-90402	*Lentinula edodes*
	D-90403	*Lentinula edodes*
	D-90404	*Lentinula edodes*
	D-90405	*Lentinula edodes*
	D-90408	*Septoria avenae* fsp. *triticea*
	D-90409	*Septoria avenae* fsp. *triticea*
	D-90410	*Serpula lacrimans*
	D-90412	*Gloeophyllum trabeum*
	D-90413	*Poria placenta*
*	D-90414	*Lentinus tigrinus*
*	D-90415	*Pleurotus ostreatus*
*	D-90416	*Trametes hirsuta*
*	D-90417	*Thielavia terrestris*
	D-93421	*Hypocrea jecorina*
	D-94422	*Aspergillus clavatus*
	D-94423	*Cladosporium sphaerospermum*
	D-94424	*Penicillium brevicompactum*
	D-94425	*Galactomyces geotrichum*
	D-94426	*Aspergillus fumigatus* var. *fumigatus*
	D-94428	*Gilmaniella humicola*
	D-94429	*Gilmaniella humicola*
	D-94430	*Exophiala jeanselmei*
	D-94431	*Mucor plumbeus*
	D-94432	*Neurospora crassa*
	D-94433	*Monographella nivalis* var. *neglecta*
*	D-95436	*Aspergillus niger*
	D-95437	*Aspergillus fumigatus*
	D-95438	*Absidia corymbifera*
	D-95439	*Emericella nidulans*
	D-95440	*Aspergillus terreus*
	D-95441	*Penicillium corylophilum*
	D-95442	*Aspergillus niger*
	D-95443	*Trametes hirsuta*
	D-95445	*Pseudallescheria boydii*
	D-95446	*Microascus cirrosus*
	D-95447	*Penicillium crustosum*
	D-95448	*Talaromyces trachyspermus*
	D-95449	*Paecilomyces variotii*
	D-95450	*Penicillium janczewskii*
	D-95451	*Trichoderma citrinoviride*
	D-95452	*Gilmaniella humicola*
	D-95453	*Gilmaniella humicola*
	D-95454	*Lecythophora mutabilis*
	D-95455	*Phoma putaminum*
	D-95456	*Monocillium curvisetosum*
	D-95457	*Monocillium curvisetosum*
	D-95458	*Dipodascus capitatus*
	D-95459	*Aureobasidium* sp.
	D-95460	*Monocillium curvisetosum*
	D-95461	*Gilmaniella humicola*
	D-95462	*Gilmaniella humicola*
	D-95463	*Gilmaniella humicola*
	D-95464	*Eurotium herbariorum*
	D-95465	*Talaromyces helicus*
	D-95469	*Fusarium merismoides* var. *merismoides*
	D-95470	*Gibberella zeae*
	D-95471	*Gibberella zeae*
	D-95472	*Gibberella zeae*
	D-95473	*Galactomyces geotrichum*
	D-95474	*Trametes versicolor*
	D-95475	*Penicillium aurantiogriseum*
	D-95476	*Scopulariopsis brevicaulis*
	D-96477	*Phialophora americana*

VTT-	Name	VTT-	Name
D-96478	*Wallemia sebi*	D-95537	*Penicillium corylophilum*
D-96483	*Exophiala jeanselmei*	D-95538	*Mucor circinelloides*
D-96484	*Lecythophora lignicola*	D-95539	*Penicillium expansum*
D-96485	*Monocillium curvisetosum*	D-96540	*Aspergillus niger*
D-96486	*Lecythophora mutabilis*	D-95541	*Penicillium commune*
D-96487	Unidentified	D-95542	*Trichoderma viride*
D-96488	*Thermomyces lanucinosus*	D-95543	*Trichoderma harzianum*
D-96489	*Theilavia terrestris*	D-95544	*Trichoderma atroviride*
D-96490	*Melanocarpus albomyces*	D-95545	*Fusarium oxysporum*
D-96491	*Thermoascus thermophilus*	D-95546	*Mucor racemosus*
D-96493	*Humicola grisea* var. *thermoidea*	D-95547	*Penicillium* sp.
D-98494	*Penicillium verrucosum*	D-95548	*Gliocladium nigrovirens*
D-98495	*Penicillium verrucosum*	D-95549	*Mucor hiemalis*
D-95496	*Penicillium chrysogenum*	D-95550	*Geotrichum candidum*
D-95497	*Penicillium commune*	D-95551	*Gilmaniella* sp.
D-95498	*Penicillium rugulosum*	D-96552	*Penicillium crustosum*
D-95499	*Mucor plumbeus*	D-96553	*Penicillium spinulosum*
D-95500	*Mucor circinelloides*	D-96554	*Hamigera avellanea*
D-95501	*Trichoderma koningii*	D-96555	*Syncephalastrum racemosum*
D-95502	*Trichoderma harzianum*	D-96556	*Aspergillus flavus*
D-95503	*Phialemonium curvatum*	D-96557	*Penicillium glabrum*
D-95504	*Phoma macrostoma*	D-96558	*Penicillium chrysogenum*
D-95505	*Scolecobasidium variabile*	D-96559	*Paecilomyces variotii*
D-95506	*Penicillium aurantiogriseum*	D-96560	*Acremonium furcatum*
D-95507	*Mucor plumbeus*	D-96561	*Neurospora crassa*
D-95508	*Trichoderma pseudokoningii*	D-96562	*Rhizopus stolonifer*
D-95509	*Absidia cylindrospora*	D-96563	*Mucor circinelloides*
D-95510	*Aspergillus fumigatus*	D-96564	*Trichoderma atroviride*
D-95511	*Penicillium rugulosum*	D-96565	*Gliocladium virens*
D-95512	*Penicillium brevicompactum*	D-96566	*Aspergillus versicolor*
D-95513	*Paecilomyces variotii*	D-96567	*Acremonium strictum*
D-95514	*Gilmaniella* sp.	D-96568	*Mucor plumbeus*
D-95515	*Penicillium solitum*	D-96569	*Mucor hiemalis*
D-95516	*Trichoderma pseudokoningii*	D-96570	*Trichoderma longibrachiatum*
D-95517	*Mucor racemosus*	D-96571	*Penicillium steckii*
D-95518	*Syncephalastrum racemosum*	D-96572	*Trichoderma harzianum*
D-95519	*Geotrichum candidum*	D-96573	*Paecilomyces variotii*
D-95520	*Mucor plumbeus*	D-96574	*Aspergillus ochraceus*
D-95521	*Mucor hiemalis*	D-96576	*Monocillium curvisetosum*
D-95522	*Penicillium crustosum*	D-96577	*Rhizopus oryzae*
D-95523	*Myceliophthora fergusii*	D-96578	*Mucor hiemalis*
D-95524	*Aureobasidium pullulans*	D-96579	*Trichoderma atroviride*
D-95525	*Mucor plumbeus*	D-96580	*Trichoderma inhamatum*
D-95526	*Penicillium* sp.	D-96581	*Penicillium steckii*
D-95527	*Geotrichum candidum*	D-96582	*Stachybotrys chartarum*
D-95528	*Aspergillus niger*	D-96583	*Trichoderma citrinoviride*
D-95529	*Trichoderma atroviride*	D-96584	*Rhizopus stolonifer*
D-95530	*Penicillium commune*	D-96585	*Mucor hiemalis*
D-95531	*Penicillium chrysogenum*	D-96586	*Trichoderma pseudokoningii*
D-95532	*Dipodascus capitatus*	D-96587	*Penicillium chrysogenum*
D-96533	*Ochroconis gallopava*	D-96588	*Gliocladium virens*
D-95534	*Eurotium herbariorum*	D-96589	*Trichoderma harzianum*
D-95535	*Exophiala jeanselmei* var. *lecanii-corni*	D-97590	*Aspergillus niger*
		D-96591	*Penicillium chrysogenum*
D-95536	*Lecythophora* sp.	D-96592	*Trichoderma atroviride*

VTT-	Name
D-96593	*Gliocladium roseum*
D-96594	*Penicillium citrinum*
D-96595	*Gilmaniella humicola*
D-96596	*Paecilomyces variotii*
D-96597	*Gilmaniella humicola*
D-96598	*Talaromyces macrosporus*
D-96599	*Gilmaniella humicola*
D-96600	*Gibberella tricincta*
D-96601	*Fusarium cerealis*
D-96602	*Gibberella avenacea*
D-96603	*Gibberella tricincta*
D-96604	*Gibberella avenacea*
D-96605	*Gibberella avenacea*
D-96606	*Fusarium culmorum*
D-96607	*Gibberella tricincta*
D-96608	*Gibberella avenacea*
D-96609	*Fusarium culmorum*
D-96610	*Tritirachum oryzae*
D-96611	*Monocillium bulbillosum*
D-96612	*Acremonium murorum*
D-96613	Unidentified
D-96614	*Acremonium persicium*
D-96615	*Ulocladium chartarum*
D-96616	*Alternaria alternata*
D-96617	*Doratomyces stemonitis*
D-96618	*Pithomyces cynodontis*
D-96619	*Engyodontium album*
D-96620	*Ulocladium chartarum*
D-96621	*Nectria inventa*
D-96622	*Stachybotrys chartarum*
D-96623	*Aureobasidium pullulans*
D-96624	*Lecythophora hoffmannii*
D-96625	*Nectria haematococca* var. *brevicona*
D-96626	*Phoma exigua*
D-96627	*Acremonium polychromum*
D-96628	*Paecilomyces variotii*
D-96629	*Gliocladium virens*
D-96630	*Aspergillus flavus*
D-96631	*Trichoderma atroviride*
D-96632	*Aspergillus niger*
D-96633	*Penicillium glabrum*
D-96634	*Trichoderma longibrachiatum*
D-96635	*Aspergillus niger*
D-96636	*Penicillium crustosum*
D-96637	*Penicillium glabrum*
D-96638	*Penicillium chrysogenum*
D-96639	*Paecilomyces variotii*
D-96640	*Acremonium strictum*
D-96641	Unidentified
D-97642	*Aspergillus ficuum*
D-96643	*Aspergillus ochraceus*
D-96644	*Chaetomium globosum*
D-96645	*Mucor plumbeus*
D-96646	*Cladosporium cladosporioides*
D-96647	*Scopulariopsis brevicaulis*
D-97648	*Galactomyces geotrichum*
D-96649	*Aureobasidium pullulans*
D-96650	*Aspergillus ochraceus*
D-96651	*Wallemia sebi*
D-96652	*Chaetomium globosum*
D-96653	*Acremonium* sp.
D-96654	*Paeciolomyces variotii*
D-96655	*Aspergillus niger*
D-96656	*Aspergillus niger*
D-96657	*Microsphaeropsis* sp.
D-96658	*Penicillium steckii*
D-96659	*Aspergillus ustus*
D-96660	*Aspergillus versicolor*
D-96661	*Penicillium chrysogenum*
D-96662	*Penicillium roqueforti*
D-96663	*Apiospora montagnei*
D-96664	*Alternaria alternata*
D-96665	*Penicillium brevicompactum*
D-96666	*Monocillium tenue*
D-96667	*Aspergillus versicolor*
D-96668	*Rhizopus microsporus* var. *rhizopodiformis*
D-96669	*Penicillium solitum*
D-96670	*Penicillium roqueforti*
D-98671	*Phialophora cinerescens*
D-96672	*Aspergillus niger*
* D-98677	*Pseudallescheria boydii*
* D-98678	*Aspergillus fumigatus*
* D-98679	*Aspergillus fumigatus*
D-98680	*Cladosporium sphaerospermum*
D-99683	*Galactomyces geotrichum*
D-98684	*Lentinula edodes*
D-98685	*Lentinula edodes*
D-98686	*Lentinula edodes*
D-98687	*Pythium* sp.
D-98688	*Botryotinia fuckeliana*
D-98689	*Penicillium hirsutum*
D-98695	*Acremonium implicatum*
D-98696	*Verticillium lamellicola*

Bacteria and archaea

E-74001	*Acetobacter* sp.
E-74002	*Acetobacter pasteurianus*
E-97003	*Gluconobacter oxydans* subsp. *suboxydans*
E-92004	*Gluconacetobacter xylinus* subsp. *xylinus*
E-92005	*Pseudomonas putida*
E-92006	*Lactobacillus lindneri*
E-92007	*Lactobacillus lindneri*
E-97008	*Paenibacillus polymyxa*
E-97009	*Bacillus subtilis*
E-68010	*Bacillus subtilis*

	VTT-	Name
	E-68011	*Bacillus subtilis*
	E-68012	*Bacillus subtilis*
	E-68013	*Bacillus subtilis*
	E-71014	*Bacillus amyloliquefaciens*
	E-71015	*Bacillus amyloliquefaciens*
	E-73016	*Bacillus amyloliquefaciens*
	E-73017	*Bacillus amyloliquefaciens*
*	E-73018	*Bacillus amyloliquefaciens*
	E-73019	*Bacillus amyloliquefaciens*
	E-93020	*Cellulomonas fimi*
	E-75021	*Cellulomonas uda*
	E-77022	*Clostridium acetobutylicum*
	E-74023	*Klebsiella terrigena*
	E-74024	*Enterobacter cloacea*
	E-81025	*Xanthomonas campestris*
	E-70026	*Escherichia coli*
	E-74027	*Obesumbacterium proteus*
	E-64028	*Lactobacillus brevis*
	E-62029	*Lactobacillus brevis*
	E-64030	*Lactobacillus brevis*
	E-96031	*Lactobacillus rhamnosus*
	E-64032	*Lactobacillus brevis*
	E-71033	*Lactobacillus fermentum*
	E-71034	*Lactobacillus plantarum*
	E-75036	*Lactobacillus buchneri*
	E-75038	*Lactobacillus brevis*
	E-76039	*Escherichia coli*
	E-92040	*Streptomyces thermodiastaticus*
	E-97041	*Pseudomonas aeruginosa*
	E-97042	*Microbacterium luteolum*
	E-92043	*Bacillus cereus*
	E-82044	*Corynebacterium* sp.
	E-70045	*Staphylococcus aureus*
	E-97046	*Enterococcus hirae*
	E-75047	*Enterococcus hirae*
	E-71048	*Streptococcus thermophilus*
	E-72049	*Streptomyces coelicolor*
	E-72050	*Streptomyces coelicolor*
	E-72051	*Streptomyces coelicolor*
	E-73052	*Bacillus amyloliquefaciens*
	E-73053	*Bacillus amyloliquefaciens*
	E-76054	*Lactobacillus parabuchneri*
	E-93055	*Bacillus megaterium*
	E-97056	*Alcaligenes faecalis* subsp. *faecalis*
	E-77057	*Clostridium beijerinckii*
	E-97058	*Clavibacter michiganense* subsp. *michiganense*
	E-91059	*Sphingomonas capsulata*
	E-95060	*Lactobacillus collinoides*
	E-97061	*Bacillus firmus*
	E-76062	*Pediococcus acidilacitci*
	E-97063	*Bacillus flexus*
	E-76064	*Pediococcus dextrinicus*
*	E-76065	*Pediococcus damnosus*
	E-76066	*Pediococcus acidilactici*
*	E-76067	*Pediococcus damnosus*
*	E-76068	*Pediococcus acidilactici*
	E-76070	*Lactobacillus* sp.
	E-76071	*Lactobacillus* sp.
	E-77072	*Clostridium* sp.
	E-78073	*Obesumbacterium proteus*
	E-78074	*Lactobacillus brevis*
	E-78075	*Lactobacillus brevis*
*	E-78076	*Lactobacillus plantarum*
	E-78077	*Lactobacillus fermentum*
	E-78078	*Lactobacillus paracasei* subsp. *paracasei*
	E-78079	*Lactobacillus plantarum*
	E-78080	*Lactobacillus rhamnosus*
	E-78081	*Zymomonas mobilis* subsp. *mobilis*
	E-78082	*Zymomonas mobilis* subsp. *mobilis*
	E-78083	*Zymomonas mobilis* subsp. *mobilis*
	E-78084	*Zymomonas mobilis* subsp. *mobilis*
	E-78085	*Zymomonas mobilis* subsp. *mobilis*
	E-78086	*Zymomonas mobilis* subsp. *mobilis*
	E-78087	*Zymomonas mobilis* subsp. *mobilis*
	E-78088	*Zymomonas mobilis* subsp. *mobilis*
	E-78089	*Zymomonas mobilis* subsp. *mobilis*
	E-81090	*Pseudomonas aeruginosa* subsp. *erythrogenes*
	E-78091	*Acetobacter pasteurianus*
	E-81092	*Proteus vulgaris*
	E-81093	*Staphylococcus aureus*
	E-81094	*Escherichia coli*
	E-79095	*Propionibacterium thoenii*
	E-79096	*Propionibacterium acidipropionici*
	E-98097	*Lactobacillus delbrueckii* subsp. *delbruekii*
	E-79098	*Lactobacillus plantarum*
	E-98098	*Lactobacillus plantarum*
	E-82099	*Zymomonas mobilis* subsp. *mobilis*
	E-79100	*Pectinatus frisingensis*
	E-92101	*Gluconacetobacter xylinus* subsp. *xylinus*
	E-92102	*Gluconacetobacter xylinus* subsp. *xylinus*
	E-79103	*Pectinatus cerevisiiphilus*
	E-79104	*Pectinatus frisingensis*
	E-79105	*Pectinatus cerevisiiphilus*

	VTT-	Name
*	E-79106	Unidentified
*	E-79107	Unidentified
*	E-79108	Unidentified
*	E-79109	Unidentified
	E-79110	*Megasphaera cerevisiae*
	E-79111	*Megasphaera cerevisiae*
*	E-79112	Unidentified
*	E-79113	Unidentified
*	E-79114	Unidentified
*	E-79115	Unidentified
*	E-79116	Unidentified
	E-80117	*Bacillus licheniformis*
	E-80118	*Bacillus licheniformis*
	E-80119	*Bacillus licheniformis*
	E-80120	*Xanthomonas campestris*
	E-80121	*Pectinatus frisingensis*
*	E-80122	*Corynebacterium glutamicum*
*	E-80123	*Bacillus* sp.
	E-80124	*Bacillus amyloliquefaciens*
	E-81127	*Bacillus* sp
	E-81128	*Bacillus stearothermophilus*
	E-81129	*Bacillus stearothermophilus*
	E-81130	*Saccharopolyspora rectivirgula*
	E-81131	*Thermoactinomyces vulgaris*
	E-81132	*Pectinatus cerevisiiphilus*
	E-81133	*Bacteroides fragilis*
	E-81134	*Bacteroides* sp.
	E-81135	*Megamonas hypermegale*
	E-81136	*Prevotella ruminicola* subsp. *ruminicola*
	E-81137	*Clostridium thermocellum*
	E-81138	*Paenibacillus macerans*
	E-81139	*Bacillus subtilis*
	E-81140	*Pectinatus frisingensis*
	E-81141	*Pectinatus frisingensis*
	E-92142	*Lactobacillus reuteri*
	E-93143	*Bacillus cereus*
	E-82144	*Pediococcus damnosus*
	E-82145	*Pediococcus acidilactici*
*	E-94146	*Staphylococcus simulans*
	E-82147	*Kocuria kristinae*
	E-82148	*Kocuria varians*
	E-82149	*Staphylococcus warneri*
	E-98150	*Bacillus coagulans*
	E-82151	*Actinoplanes missouriensis*
	E-82152	*Lactobacillus brevis*
	E-82153	*Lactobacillus brevis*
	E-82154	*Streptomyces* sp.
	E-82155	*Streptomyces bikiniensis*
	E-82156	*Streptomyces olivochromogenes*
	E-82157	*Streptomyces olivochromogenes*
	E-82158	*Streptomyces flavogriseus*
	E-82159	*Streptomyces flavovirens*
	E-82160	*Streptomyces phaeochromogenes*
	E-82161	*Streptomyces* sp.
	E-82162	*Zymomonas mobilis* subsp. *mobilis*
	E-82163	*Zymomonas mobilis* subsp. *pomaceae*
	E-82164	*Pectinatus frisingensis*
	E-82165	*Pectinatus frisingensis*
	E-82166	*Lactobacillus lindneri*
	E-98167	*Lactobacillus cellobiosus*
	E-98168	*Lactobacillus pentosus*
	E-82169	*Lactococcus lactis* subsp. *lactis*
	E-83170	*Pectinatus frisingensis*
	E-83171	*Brevibacillus parabrevis*
	E-83172	*Bacillus subtilis*
	E-83173	*Bacillus subtilis*
	E-83174	*Bacillus subtilis*
	E-83175	*Bacillus licheniformis*
	E-83176	*Bacillus subtilis*
	E-83177	*Bacillus subtilis*
	E-83178	*Bacillus subtilis*
	E-83179	*Bacillus licheniformis*
	E-83180	*Bacillus licheniformis*
	E-83181	*Pseudomonas aeruginosa*
	E-84182	*Agrobacterium tumefaciens*
	E-84183	*Clostridium beijerinckii*
	E-84184	*Clostridium beijerinckii*
	E-84185	*Clostridium aurantibutyricum*
	E-84186	*Pediococcus acidilactici*
	E-97187	*Aneurinibacillus migulanus*
	E-97188	*Brevibacillus brevis*
	E-84189	*Clostridium beijerinckii*
	E-84190	*Clostridium beijerinckii*
	E-84191	*Clostridium beijerinckii*
	E-84192	*Lactobacillus* sp.
	E-84193	*Lactobacillus* sp.
	E-84194	*Pectinatus frisingensis*
	E-84195	*Megasphaera cerevisiae*
	E-84196	*Pectinatus frisingensis*
	E-84197	*Enterococcus avium*
	E-84198	*Enterobacter cloacae*
	E-84199	*Enterobacter cloacae*
	E-98200	*Pseudomonas fragi*
*	E-92201	*Streptomyces* sp.
*	E-92202	*Streptomyces lydicus*
	E-93203	*Enterococcus faecalis*
	E-93204	*Enterococcus faecium*
	E-84205	*Kocuria* sp.
	E-97206	*Bacillus mycoides*
	E-84207	*Bacillus subtilis*
	E-84208	*Bacillus stearothermophilus*
	E-84209	*Enterobacter cloacae*
	E-84210	*Klebsiella pneumoniae* subsp. *pneumoniae*
	E-84211	*Klebsiella pneumoniae* subsp. *pneumoniae*
	E-84212	*Microbacterium luteolum*
	E-84213	*Enterobacteriaceae*

	VTT-	Name		VTT-	Name
	E-84214	*Comamonas testosteroni*	*	E-86274	*Pediococcus damnosus*
	E-84215	*Micrococcus luteus*		E-96275	*Lactococcus lactis* subsp. *cremoris*
	E-84216	*Micrococcus* sp.		E-96276	*Lactobacillus acidophilus*
	E-84217	*Acinetobacter lwoffii*		E-87277	*Lactobacillus delbrueckii* subsp. *lactis*
	E-84218	*Sphaerotilus natans*		E-87278	*Bacillus* sp.
	E-84219	*Pseudomonas aeruginosa*		E-87279	*Bacillus schlegelii*
	E-84220	Unidentified		E-87280	*Enterococcus faecalis*
	E-84221	*Megasphaera elsdenii*		E-87281	Unidentified
	E-85222	*Lactococcus lactis* subsp. *lactis*		E-87282	Unidentified
	E-85223	*Brevibacillus brevis*		E-87283	Unidentified
	E-85224	*Bacillus licheniformis*		E-87284	Unidentified
	E-85225	*Lactobacillus casei* subsp. *casei*		E-87285	Unidentified
	E-85227	*Streptomyces badius*		E-87286	Unidentified
	E-85228	*Streptomyces viridosporus*		E-87291	*Agrobacterium rhizogenes*
	E-85229	*Proteus mirabilis*		E-87292	*Enterobacter cloacae*
	E-85230	*Megasphaera cerevisiae*		E-87293	*Klebsiella pneumoniae* subsp. *pneumoniae*
	E-85231	*Bacillus subtilis*		E-87294	*Pectinatus frisingensis*
	E-85232	*Lactobacillus brevis*		E-87295	*Pectinatus frisingensis*
	E-85233	*Lactobacillus brevis*		E-87296	*Escherichia coli*
	E-85234	*Xanthobacter* sp.		E-87297	*Megasphaera cerevisiae*
	E-85235	*Xanthobacter autotrophicus*		E-87298	*Bacillus alcalophilus*
	E-85236	*Ancylobacter aquaticus*		E-87299	*Bacillus halodurans*
	E-85237	*Xanthobacter* sp.		E-88300	*Corynebacterium glutamicum*
	E-85238	*Xanthobacter* sp.		E-88301	*Brevibacterium* sp.
	E-85239	*Xanthobacter* sp.		E-88302	*Arthrobacter* sp.
	E-85240	*Xanthobacter* sp.		E-88303	*Arthrobacter* sp.
	E-85241	*Xanthobacter* sp.		E-87304	*Bacillus* sp.
	E-85242	Unidentified		E-87305	*Bacillus circulans*
	E-85243	Unidentified		E-87306	*Streptomyces* sp.
	E-85244	*Pseudomonas* sp.		E-87307	*Pectinatus frisingensis*
	E-86245	*Bacillus thuringiensis*		E-87308	*Megasphaera cerevisiae*
	E-86246	*Salmonella enterica* subsp. *enterica* ser. Choleraesuis		E-88309	*Pediococcus damnosus*
	E-86247	*Enterobacter cloacae*		E-88310	*Pectinatus frisingensis*
	E-86248	Unidentified		E-88311	*Corynebacterium* sp.
	E-86249	*Comamonas testosteroni*		E-88312	*Pediococcus pentosaceus*
	E-86250	*Comamonas acidovorans*		E-88313	*Pediococcus dextrinicus*
*	E-86251	*Pediococcus damnosus*		E-88314	*Tetragenococcus halophilus*
*	E-86252	*Clostridium* sp.		E-88315	*Pediococcus parvulus*
*	E-86253	*Clostridium* sp.		E-88316	*Pediococcus pentosaceus*
*	E-86254	*Clostridium* sp.		E-88317	*Pediococcus pentosaceus*
*	E-86255	*Clostridium* sp.		E-88318	*Bacillus stearothermophilus*
*	E-86256	*Clostridium* sp.		E-88319	Unidentified
*	E-86257	*Clostridium* sp.		E-88320	Unidentified
	E-86258	*Streptomyces celluloflavus*		E-88321	Unidentified
	E-86259	*Streptomyces flavogriseus*		E-88322	Unidentified
	E-86260	*Streptomyces albogriseolus*		E-88323	Unidentified
	E-86261	*Streptomyces viridochromogenes*		E-88324	*Lactobacillus* sp.
	E-86262	*Streptomyces exfoliatus*		E-88325	*Enterobacter aerogenes*
	E-86263	*Enterobacter* sp.		E-88326	*Lactobacillus brevis*
	E-86267	*Megasphaera cerevisiae*		E-88327	Unidentified
	E-86268	*Pectinatus frisingensis*		E-94328	*Listeria monocytogenes*
	E-86269	*Selenomonas lacticifex*		E-88329	*Pectinatus cerevisiiphilus*
	E-86272	*Megasphaera cerevisiae*			
	E-86273	*Selenomonas lacticifex*			

	VTT-	Name
	E-88330	*Pectinatus cerevisiiphilus*
	E-88331	*Bacillus* sp.
	E-88333	*Bacillus* sp.
	E-88336	*Megasphaera cerevisiae*
	E-88337	*Thermus* sp.
	E-88338	*Lactobacillus brevis*
	E-88339	*Thermus* sp.
	E-88340	*Thermus* sp.
	E-88341	*Thermus* sp.
	E-88342	*Thermus* sp.
	E-88343	*Lactobacillus brevis*
	E-89344	*Lactobacillus* sp.
	E-89345	*Lactobacillus* sp.
	E-89346	*Lactobacillus brevis*
	E-89347	*Lactobacillus brevis*
	E-89348	*Lactobacillus brevis*
	E-89349	*Lactobacillus brevis*
	E-91350	*Pectinatus frisingensis*
	E-89360	*Pectobacterium carotovorum* subsp. *carotovorum*
	E-89361	*Pectobacterium carotovorum* subsp. *carotovorum*
	E-89362	*Lactobacillus lindneri*
	E-89363	*Gluconobacter oxydans*
	E-89364	*Gluconobacter oxydans*
	E-89365	*Gluconobacter oxydans* subsp. *oxydans*
	E-89366	*Gluconobacter* sp.
	E-89367	*Clostridium beijerinckii*
	E-89368	*Clostridium* sp.
	E-89369	*Zymomonas mobilis* subsp. *mobilis*
	E-89370	*Gluconacetobacter xylinus* subsp. *xylinus*
	E-89371	*Pectinatus cerevisiiphilus*
	E-89372	*Acetobacter* sp.
	E-89373	*Pantoea agglomerans*
	E-89374	*Microbispora mesophila*
	E-89375	*Megasphaera cerevisiae*
	E-90376	*Lactobacillus* sp.
	E-90377	*Lactobacillus paracasei* subsp. *paracasei*
	E-90378	*Lactobacillus* sp.
	E-90379	Unidentified
	E-90380	*Lactobacillus lindneri*
	E-90381	*Enterococcus faecium*
	E-90382	*Bacillus* sp.
	E-90383	*Bacillus pseudofirmus*
	E-90384	*Bacillus* sp.
	E-90385	*Bacillus* sp.
	E-90386	*Bacillus* sp.
	E-90387	*Bacillus* sp.
	E-90388	*Carnobacterium divergens*
*	E-90389	*Leuconostoc citreum*
*	E-90390	*Pediococcus pentosaceus*
	E-90391	*Lactobacillus curvatus* subsp. *curvatus*
	E-90392	*Weissella confusa*
	E-90393	*Weissella confusa*
	E-90394	*Lactococcus lactis* subsp. *hordniae*
	E-90395	*Lactococcus lactis* subsp. *lactis*
	E-90396	*Enterobacter* sp.
	E-90397	*Pseudomonas* sp.
	E-90398	*Pantoae agglomerans*
	E-90399	*Chryseobacterium indologenes*
	E-90400	Unidentified
	E-90401	Unidentified
	E-90402	Unidentified
	E-90403	Unidentified
	E-90404	Unidentified
	E-90405	*Zymophilus paucivorans*
	E-90406	*Zymophilus raffinosivorans*
	E-90407	*Selenomonas lacticifex*
	E-90408	*Bacillus amyloliquefaciens*
	E-90409	*Bacillus alcalophilus*
	E-90411	*Lactococcus plantarum*
	E-90412	*Megasphaera cerevisiae*
	E-90413	*Pantoae agglomerans*
*	E-90414	*Lactococcus lactis* subsp. *lactis*
*	E-90415	*Leuconostoc citreum*
*	E-90416	*Enterococcus* sp.
	E-90417	*Enterobacter amnigenus*
	E-90418	*Escherichia coli*
	E-90419	*Pediococcus damnosus*
	E-91420	Unidentified
	E-91421	Unidentified
*	E-91422	*Lactococcus lactis* subsp. *lactis*
*	E-91423	*Lactobacillus curvatus* subsp. *curvatus*
	E-91424	*Pediococcus inopinatus*
	E-91425	*Clostridium beijerinckii*
	E-97426	*Clostridium butyricum*
	E-91431	Unidentified
	E-91432	Unidentified
	E-91433	Unidentified
	E-91434	*Bacillus simplex*
*	E-91435	*Ochrobactrum anthropi*
*	E-91436	*Pseudomonas* sp.
	E-91437	*Clavibacter michiganense* subsp. *michiganense*
	E-91438	*Bacillus* sp.
	E-91439	*Pseudomonas fluorescens*
	E-91440	*Hafnia alvei*
	E-93441	*Pediococcus damnosus*
	E-93442	*Micrococcus luteus*
	E-93443	*Pseudomonas fluorescens*
	E-93444	*Lactobacillus rhamnosus*
	E-93445	*Lactobacillus buchneri*
	E-91446	*Bacillus licheniformis*
	E-91447	*Chryseobacterium indologenes*
	E-91448	*Hafnia alvei*

	VTT-	Name		VTT-	Name
	E-91449	*Serratia marcescens*		E-94511	*Burkholderia gladioli*
	E-91450	*Bacillus licheniformis*		E-94512	*Burkholderia cepacia*
	E-91451	*Leuconostoc citreum*		E-94513	*Pseudomonas agarici*
	E-91452	*Leuconostoc citreum*		E-94514	*Pseudomonas agarici*
	E-91453	*Lactococcus raffinolactis*		E-94515	*Pseudomonas agarici*
	E-91454	*Lactobacillus lindneri*		E-94516	*Pseudomonas putida*
	E-91455	*Empedobacter breve*		E-94517	*Pseudomonas gingeri*
	E-91456	*Chryseobacterium balustinum*		E-94518	*Pseudomonas tolaasii*
	E-91457	*Lactobacillus brevisimilis*		E-94519	*Pseudomonas* sp.
	E-91458	*Lactobacillus brevis*		E-94520	*Lactobacillus kefiri*
	E-91459	*Pediococcus damnosus*	*	E-94524	*Staphylococcus carnosus* subsp. *carnosus*
	E-91460	*Lactobacillus lindneri*			
	E-91461	*Leuconostoc mesenteroides* subsp. *mesenteroides*	*	E-94525	*Staphylococcus carnosus* subsp. *carnosus*
	E-91466	*Lactobacillus paracasei* subsp. *paracasei*		E-94526	*Clostridium perfringens*
				E-94527	*Lactococcus lactis* subsp. *lactis*
	E-91467	*Lactobacillus paracasei* subsp. *paracasei*		E-94528	*Aeromonas veronii*
				E-94529	*Brevibacterium linens*
	E-91468	*Lactobacillus plantarum*		E-94530	*Staphylococcus aureus*
	E-91469	*Lactobacillus parabuchneri*		E-94531	*Staphylococcus aureus*
	E-91470	*Lactobacillus ruminis*		E-94532	*Clostridium perfringens*
	E-91471	*Pectinatus frisingensis*		E-94533	*Escherichia coli*
	E-91472	*Lactobacillus collinoides*		E-94534	*Yersinia enterocolitica*
	E-91473	*Lactobacillus fructivorans*		E-94535	*Campylobacter jejuni* subsp. *jejuni*
	E-91474	*Micrococcus luteus*			
*	E-93475	*Pseudomonas* sp.		E-94538	*Brochothrix thermosphacta*
*	E-93476	*Tsukamurella* sp.	*	E-94539	Unidentified
*	E-93477	*Pseudomonas azelaica*	*	E-94540	Unidentified
*	E-93478	*Pseudomonas* sp.	*	E-94541	Unidentified
*	E-93479	*Sphingomonas capsulata*	*	E-94542	Unidentified
*	E-93480	*Sphingomonas* sp.		E-95543	*Escherichia coli*
*	E-93481	*Pseudomonas azelaica*		E-94544	*Flavobacterium* sp.
*	E-93482	*Xanthomonas* sp.		E-94545	Unidentified
*	E-93483	*Tsukamurella* sp.		E-94546	*Lactobacillus lindneri*
*	E-93484	*Sphingomonas* sp.		E-94547	*Bacillus* sp.
*	E-93485	Proteobacteria		E-94548	*Bacillus* sp.
*	E-93486	*Pseudomonas* sp.	*	E-94549	Unidentified
	E-93487	*Lactobacillus coryniformis* subsp. *coryniformis*	*	E-94550	*Staphylococcus carnosus* subsp. *carnosus*
	E-93488	*Lactobacillus delbrueckii* subsp. *lactis*	*	E-94551	*Staphylococcus carnosus* subsp. *carnosus*
	E-93489	*Lactobacillus fermentum*			
	E-93490	*Lactobacillus paracasei* subsp. *paracasei*	*	E-94552	*Staphylococcus carnosus* subsp. *carnosus*
	E-93491	*Lactobacillus sanfranciscensis*	*	E-94553	*Staphylococcus carnosus* subsp. *carnosus*
	E-93492	*Leuconostoc mesenteroides* subsp. *dextranicum*	*	E-94554	*Staphylococcus carnosus* subsp. *carnosus*
	E-93493	*Pediococcus acidilactici*			
	E-93494	*Pediococcus dextrinicus*	*	E-94555	*Staphylococcus carnosus* subsp. *carnosus*
	E-93495	*Caulobacter crescentus*			
	E-93496	*Chryseobacterium indologenes*	*	E-94556	*Staphylococcus carnosus* subsp. *carnosus*
	E-93497	*Leuconostoc citreum*			
	E-93498	*Clostridium acetobutylicum*	*	E-94557	*Pseudomonas marginalis*
	E-93499	*Pectinatus frisingensis*	*	E-94558	*Pseudomonas fluorescens*
	E-93503	*Lactobacillus parabuchneri*	*	E-94559	Unidentified
	E-93504	*Leuconostoc citreum*		E-94560	Unidentified

	VTT-	Name		VTT-	Name
	E-94561	*Pantoea agglomerans*		E-95621	*Staphylococcus hominis* subsp. *hominis*
	E-94562	*Pseudomonas fluorescens*			
	E-94563	*Pantoea agglomerans*		E-95622	*Enterobacter* sp.
	E-94564	*Escherichia coli*		E-95623	*Bacillus subtilis*
	E-94565	*Bacillus subtilis*		E-95624	*Bacillus thuringiensis*
	E-94566	*Lactobacillus plantarum*		E-95625	*Vibrio fischeri*
*	E-95568	*Pseudomonas putida*		E-95626	*Thiobacillus ferrooxidans*
	E-95569	*Escherichia coli*		E-95627	*Bacillus cereus*-group
	E-95570	*Bacillus circulans*		E-95628	*Listeria monocytogenes*
	E-95571	*Bacillus licheniformis*		E-95629	*Bacillus circulans*
	E-95572	*Bacillus pumilus*		E-95630	*Streptomyces albus*
	E-95573	*Desulfovibrio desulfuricans* subsp. *desulfuricans*		E-95631	*Streptomyces anulatus*
				E-95632	*Streptomyces albidoflavus*
	E-95574	*Lactobacillus amylophilus*		E-95633	*Nocardiopsis* sp.
	E-95575	*Rhodococcus fascians*		E-95634	*Streptomyces halstedii*
	E-95576	*Lactobacillus amylovorus*		E-95635	*Streptomyces albidoflavus*
	E-95579	*Enterococcus* sp.		E-95636	*Microbacterium* sp.
	E-95580	*Bacillus sphaericus*		E-95637	*Bacillus circulans*
	E-95581	*Pseudomonas chlororaphis*		E-95638	*Bacillus circulans*
	E-95582	*Salmonella enterica* subsp. *enterica* ser. Typhimurium		E-99639	*Pseudomonas fluorescens*
				E-95640	*Bacillus circulans*
	E-95586	*Shewanella putrefaciens*		E-95641	*Bacillus circulans*
	E-95587	*Lactobacillus sanfranciscensis*		E-95642	*Klebsiella oxytoca*
	E-95588	*Lactobacillus lindneri*		E-95643	*Enterobacter* sp.
	E-95589	*Lactobacillus lindneri*		E-95644	*Escherichia coli*
	E-95590	*Bacillus cereus*-group		E-95645	*Enterobacter* sp.
	E-95591	*Acinetobacter* genospecies 9		E-95646	*Leclercia adecarboxylata*
	E-95592	*Paenibacillus* sp.		E-95647	*Klebsiella* sp.
	E-95593	*Paenibacillus* sp.		E-95648	*Bacillus sphaericus*
	E-95594	*Acinetobacter* genospecies 9		E-95649	*Enterobacter* sp.
	E-95595	*Rhodococcus fascians*		E-95650	*Thermoactinomyces thalpophilus*
	E-95596	*Pseudomonas fluorescens*		E-95651	*Thermoactinomyces thalpophilus*
	E-95597	*Bacillus mycoides*		E-96652	*Listeria monocytogenes*
	E-95598	*Pseudomonas fluorescens*		E-96653	*Pseudomonas* sp.
	E-95599	*Staphylococcus epidermidis*		E-96654	*Thermoactinomyces thalpophilus*
	E-95600	*Bacillus cereus*		E-96655	*Thermoactinomyces thalpophilus*
	E-95601	*Bacillus subtilis*		E-96656	*Pseudomonas aeruginosa*
	E-95602	*Bacillus licheniformis*		E-96657	*Stenotrophomonas maltophilia*
	E-95603	*Bacillus amyloliquefaciens*		E-96658	*Escherichia coli*
	E-95604	*Bacillus simplex*	*	E-96659	*Pediococcus pentosaceus*
	E-95605	*Bacillus licheniformis*		E-96661	*Pediococcus inopinatus*
	E-95606	*Bacillus medusa*		E-96662	*Lactobacillus delbrueckii* subsp. *bulgaricus*
	E-95607	*Bacillus sphaericus*			
	E-95609	*Pediococcus acidilactici*		E-96663	*Bifidobacterium animalis*
	E-95610	*Clostridium beijerinckii*		E-96664	*Bifidobacterium longum*
*	E-95611	*Lactobacillus farciminis*		E-96665	*Streptococcus thermophilus*
*	E-95612	*Lactobacillus brevis*		E-96666	*Lactobacillus rhamnosus*
*	E-95613	*Lactobacillus sanfranciscensis*		E-96667	*Klebsiella pneumoniae* subsp. *ozaenae*
*	E-95614	*Lactobacillus farciminis*			
*	E-95615	*Lactobacillus reuteri*		E-96668	*Enterobacteriaceae*
*	E-95616	*Weissella confusa*		E-96669	*Enterobacter cloacae*
*	E-95617	*Lactobacillus brevis*		E-96670	*Listeria innocua*
*	E-95618	*Lactobacillus plantarum*		E-96671	*Corynebacterium vitaeruminis*
	E-95619	*Ochrobactrum antropi*		E-96672	*Corynebacterium vitaeruminis*
	E-95620	*Staphylococcus epidermidis*		E-96673	*Bacillus circulans*

VTT-	Name	VTT-	Name
E-96674	*Bacillus circulans*	E-97750	*Clostridium sporogenes*
E-96675	*Bacillus circulans*	E-97751	*Clostridium sporogenes*
E-96676	*Bacillus circulans*	E-97752	*Clostridium sporogenes*
E-96677	*Bacillus cereus*-group	E-97753	*Clostridium sporogenes*
E-96678	*Bacillus simplex*	E-97754	*Clostridium sporogenes*
E-96679	*Bacillus simplex*	E-97755	*Clostridium sporogenes*
E-96680	*Bacillus cereus*	E-97756	*Clostridium sporogenes*
E-96681	*Bacillus cereus*	E-97757	*Escherichia coli*
E-96682	*Bacillus cereus*	E-97758	*Staphylococcus aureus*
E-96683	*Enterobacteriaceae*	E-97759	*Salmonella enterica* subsp. *enterica* ser. Infantis
E-96684	*Enterobacter cloacae*		
E-96685	*Enterobacter cloacae*	E-97760	*Listeria innocua*
E-96686	*Enterobacter cloacae*	E-97761	*Oenococcus oeni*
E-96687	*Klebsiella pneumoniae* subsp. *pneumoniae*	E-97762	*Oenococcus oeni*
		E-97766	*Klebsiella oxytoca*
E-96688	*Enterobacter* sp.	E-97767	*Klebsiella pneumoniae* subsp. *pneumoniae*
E-96689	*Bacillus circulans* -group		
E-96690	*Enterococcus flavescens*	E-97768	*Staphylococcus epidermidis*
E-96691	*Enterobacteriaceae*	E-97769	*Staphylococcus hominis* subsp. *hominis*
E-96692	*Citrobacter freundii*		
E-96693	*Clostridium beijerinckii*	E-97770	*Staphylococcus haemolyticus*
E-96694	*Enterobacteriaceae*	E-97771	*Listeria ivanovii* subsp. *ivanovii*
E-96695	*Klebsiella terrigena*	E-97772	*Listeria innocua*
E-96696	*Klebsiella terrigena*	E-97773	*Ochrobactrum anthropi*
E-96697	*Clostridium sporogenes*	E-97774	*Enterococcus flavescens*
E-96698	*Staphylococcus aureus*	E-97775	*Enterococcus casseliflavus*
E-96699	*Bacillus amyloliquefaciens*	E-97776	*Enterococcus gallinarum*
E-96709	*Lactobacillus zeae*	E-97777	*Corynebacterium vitaeruminis*
E-96710	*Lactobacillus casei* subsp. *casei*	E-97778	*Citrobacter freundii*
E-96711	*Bacillus* sp.	E-97779	*Paenibacillus lautus*
E-96712	*Bacillus* sp.	E-97780	*Bacillus medusa*
E-96713	*Bacillus* sp.	E-97781	*Bacillus simplex*
E-96714	*Bacillus* sp.	E-97782	*Bacillus sphaericus*
E-96715	*Bacillus subtilis*	E-97783	*Listeria monocytogenes*
E-96716	*Paenibacillus* sp.	E-97784	*Staphylococcus simulans*
E-96717	*Bacillus cereus*	E-97785	*Staphylococcus warneri*
E-96718	*Paenibacillus* sp.	E-97786	*Staphylococcus carnosus* subsp. *carnosus*
E-96719	*Bacillus halodurans*		
E-96720	*Bacillus flexus*	E-97787	*Staphylococcus xylosus*
E-96721	*Paenibacillus* sp.	E-97788	*Bacillus coagulans*
E-96722	*Paenibacillus* sp.	E-97789	*Staphylococcus aureus*
E-96724	*Listeria monocytogenes*	E-97790	*Klebsiella pneumoniae* subsp. *ozaenae*
E-96726	*Pseudomonas aeruginosa*		
E-96727	*Bacillus cereus*	E-97791	*Megasphaera cerevisiae*
E-96728	*Pseudomonas aeruginosa*	E-97792	*Salmonella enterica* subsp. *enterica* ser. Mbandaka
E-96731	*Streptococus agalactiae*		
E-96732	*Gordonia terrae*	E-97794	*Salmonella enterica* subsp. *enterica* ser. Worthington
E-96733	*Salmonella enterica* subsp. *enterica* ser. Infantis		
		E-97795	*Bifidobacterium bifidum*
E-97734	*Acetobacter aceti*	E-97796	*Bifidobacterium infantis*
E-97745	*Bacillus mycoides*	E-97799	*Salmonella enterica* subsp. *enterica* ser. Worthington
E-97746	*Bacillus cereus* -group		
E-97747	*Bacillus cereus*	* E-97800	*Lactobacillus rhamnosus*
E-97748	*Bacillus cereus*	E-97801	*Enterococcus faecalis*
E-97749	*Bacillus cereus*	E-97802	*Enterococcus faecalis*

	VTT-	Name		VTT-	Name
	E-97803	*Enterococcus faecium*		E-97858	*Streptococcus agalactiae*
	E-97804	*Enterococcus avium*		E-97859	*Klebsiella pneumoniae* subsp. *pneumoniae*
	E-97805	*Enterococcus durans*			
*	E-97809	*Microbacterium testaceum*	*	E-97860	*Klebsiella pneumoniae* subsp. *pneumoniae*
	E-97810	*Enterococcus dispar*			
	E-97811	*Enterococcus pseudoavium*		E-98861	*Clostridium perfringens*
	E-97812	*Enterococcus raffinosus*		E-97862	*Enterobacter intermedius*
	E-97813	*Bacillus amyloliquefaciens*		E-97863	*Enterobacter amnigenus*
	E-97814	*Bacillus licheniformis*		E-97864	*Gluconobacter oxydans*
	E-97815	*Bacillus subtilis*		E-97865	*Serratia marcescens*
*	E-97816	*Bacillus cereus* -group		E-97866	*Shaerotilus natans*
*	E-97817	*Bacillus cereus* -group		E-97867	*Escherichia coli*
*	E-97818	*Bacillus cereus* -group		E-97868	*Escherichia coli*
	E-97819	*Lactobacillus crispatus*		E-97869	*Escherichia coli*
	E-97820	*Gluconobacter oxydans*		E-97870	*Escherichia coli*
	E-98821	*Clostridium botulinum*		E-97873	*Salmonella enterica* subsp. *enterica* ser. Indiana
	E-98822	*Clostridium botulinum*			
	E-97823	*Micrococcus luteus*		E-97875	*Pectinatus* sp.
	E-97824	*Klebsiella pneumoniae* subsp. *pneumoniae*		E-97876	*Listeria monocytogenes*
				E-97877	*Listeria innocua*
	E-97825	*Pseudomonas stutzeri*		E-97878	*Listeria monocytogenes*
	E-97826	*Citrobacter* sp.	*	E-97879	*Bacillus licheniformis*
	E-97827	*Methylobacterium* sp.	*	E-97880	*Bacillus licheniformis*
	E-97828	*Acetobacter aceti*	*	E-97881	*Pseudomonas citronellolis*
	E-97829	*Gluconacetobacter hansenii*	*	E-97882	*Comamonas acidovorans*
	E-97830	*Acetobacter pasteurianus*	*	E-97883	Proteobacteria
	E-97831	*Acetobacter xylinus* subsp. *xylinus*	*	E-97884	*Bordetella* sp.
	E-97832	*Oenococcus oeni*	*	E-97885	*Klebsiella pneumoniae*
	E-97833	*Salmonella enterica* subsp. *enterica* ser. Typhimurium	*	E-97886	*Sphingobacterium* sp.
			*	E-97887	*Ochrobactrum anthropi*
	E-97834	*Salmonella enterica* subsp. *enterica* ser. Enteritidis	*	E-97888	*Xanthomonas* sp.
			*	E-97889	*Serratia marcescens*
	E-97835	*Escherichia coli*		E-97890	*Thermoactinomyces thalpophilus*
	E-97836	*Escherichia coli*			
	E-97837	*Yersinia enterocolitica*		E-97891	*Thermoactinomyces thalpophilus*
	E-97838	*Yersinia enterocolitica*			
	E-97840	*Listeria monocytogenes*		E-97892	*Thermoactinomyces thalpophilus*
	E-97841	*Listeria monocytogenes*			
	E-97842	*Listeria monocytogenes*		E-97893	*Thermoactinomyces thalpophilus*
	E-97843	*Streptococcus agalactiae*			
	E-97844	*Streptococcus gallolyticus*		E-97894	*Thermoactinomyces thalpophilus*
	E-97845	*Streptococcus dysgalactiae* subsp. *equisimilis*		E-97895	*Thermoactinomyces thalpophilus*
	E-97846	*Enterococcus faecalis*			
	E-97847	*Bifidobacterium lactis*		E-97896	*Thermoactinomyces thalpophilus*
	E-97848	*Pediococcus damnosus*			
	E-97850	*Carnobacterium divergens*		E-97897	*Nocardiopsis* sp.
	E-97851	*Lactobacillus johnsonii*		E-97898	*Nocardiopsis* sp.
	E-97852	*Lactobacillus ruminis*		E-97899	*Nocardiopsis* sp.
	E-97853	*Lactobacillus salivarius* subsp. *salivarius*		E-97900	*Nocardiopsis* sp.
				E-97901	*Nocardiopsis* sp.
	E-97854	*Klebsiella terrigena*		E-97902	*Nocardiopsis* sp.
	E-97855	*Acinetobacter lwoffii*		E-97903	*Nocardiopsis* sp.
	E-97856	*Kocuria kristinae*		E-97904	*Nocardiopsis* sp.
	E-97857	*Kocuria varians*		E-97905	*Nocardiopsis* sp.

	VTT-	Name
	E-97906	*Nocardiopsis* sp.
	E-97907	*Nocardiopsis* sp.
	E-97908	*Thermoactinomyces thalpophilus*
	E-97909	*Pectinatus frisingensis*
	E-97910	*Pectinatus frisingensis*
	E-98912	*Pectinatus cerevisiiphilus*
	E-97913	*Pectinatus cerevisiiphilus*
	E-97914	*Pectinatus* sp.
	E-97915	*Streptomyces albidoflavus*
	E-97916	*Streptomyces albidoflavus*
	E-97917	*Streptomyces albidoflavus*
	E-97918	*Streptomyces albidoflavus*
	E-97919	*Streptomyces albidoflavus*
	E-97920	*Streptomyces albidoflavus*
	E-97921	*Streptomyces albidoflavus*
	E-97922	*Streptomyces anulatus*
	E-97923	*Streptomyces anulatus*
	E-97924	*Streptomyces anulatus*
	E-97925	*Streptomyces rochei*
	E-97926	*Streptomyces rochei*
	E-97927	*Streptomyces anulatus*
	E-98928	*Clostridium botulinum*
	E-97929	*Streptomyces halstedii*
	E-97930	*Streptomyces halstedii*
	E-98931	*Listeria grayi*
	E-97932	*Streptomyces thermoviolaceus*
	E-97933	*Streptomyces thermoviolaceus*
	E-97934	*Streptomyces thermoviolaceus*
	E-97935	*Streptomyces thermoviolaceus*
	E-97936	*Streptomyces thermoviolaceus*
	E-97937	*Streptomyces thermoviolaceus*
	E-97938	*Streptomyces thermoviolaceus*
	E-97939	*Streptomyces thermoviolaceus*
	E-97940	*Streptomyces thermoviolaceus*
	E-97941	*Streptomyces thermoviolaceus*
	E-97942	*Streptomyces albidoflavus*
	E-97943	*Streptomyces halstedii*
	E-97944	*Streptomyces rochei*
	E-97945	*Streptomyces rochei*
	E-97946	*Streptomyces thermoviolaceus*
	E-97947	*Streptomyces thermoviolaceus*
*	E-97948	*Lactobacillus rhamnosus*
*	E-97949	*Lactobacillus paracasei* subsp. *paracasei*
*	E-97950	*Lactobacillus salivarius* subsp. *salivarius*
*	E-97951	*Lactobacillus rhamnosus*
	E-97953	*Listeria monocytogenes*
	E-97954	*Citrobacter freundii*
*	E-97955	*Lactobacillus salivarius* subsp. *salivarius*
	E-98956	*Listeria welshimeri*
*	E-97957	*Lactobacillus cellobiosus*
*	E-97958	*Lactobacillus cellobiosus*
*	E-97959	*Lactobacillus rhamnosus*
*	E-97960	*Lactobacillus rhamnosus*
*	E-97962	*Lactobacillus rhamnosus*
	E-97963	*Salmonella enterica* subsp. *enterica* ser. Choleraesuis
	E-97964	*Salmonella enterica* subsp. *enterica* ser. Entiridis
	E-98965	*Weissella halotolerans*
	E-98966	*Weissella viridescens*
	E-98967	*Weissella paramesenteroides*
	E-98968	*Bacillus cereus*
	E-98969	*Microbacterium* sp.
	E-98970	*Leuconostoc pseudomesenteroides*
	E-98971	*Leuconostoc carnosum*
	E-98972	*Leuconostoc gelidum*
	E-98973	*Leuconostoc fallax*
	E-98974	*Leuconostoc lactis*
	E-98975	*Leuconostoc mesenteroides* subsp. *cremoris*
*	E-97980	*Pseudomonas* sp.
*	E-97981	*Pseudomonas* sp.
*	E-97982	Unidentified
*	E-97983	*Brevibacillus parabrevis*
*	E-97984	*Cytophaga* sp.
*	E-97985	*Sphingobacterium* sp.
*	E-97986	*Bordetella* sp.
*	E-97987	Proteobacteria
*	E-97988	*Brevibacillus parabrevis*
*	E-97989	Proteobacteria
*	E-97990	*Methylobacterium* sp.
*	E-97991	*Methylobacterium* sp.
*	E-97992	*Brevibacillus parabrevis*
*	E-97993	*Ochrobactrum antropi*
*	E-97994	*Bacillus licheniformis*
*	E-97995	*Bacillus licheniformis*
	E-98996	*Listeria seeligeri*
*	E-98997	*Lactobacillus cellobiosus*
	E-98998	*Escherichia coli*
*	E-98999	*Lactobacillus salivarius*
*	E-981000	*Lactobacillus rhamnosus*
	E-981001	*Pediococcus urinaeequi*
	E-981002	*Streptococcus* sp.
*	E-981003	*Lactobacillus cellobiosus*
*	E-981004	*Lactobacillus paracasei* subsp. *paracasei*
*	E-981006	*Lactobacillus salivarius*
*	E-981007	*Lactobacillus salivarius*
	E-981008	*Campylobacter jejuni* subsp. *jejuni*
	E-981009	*Listeria innocua*
	E-981010	*Listeria innocua*
	E-981011	*Listeria innocua*
	E-981012	*Listeria monocytogenes*
*	E-981013	*Thermoactinomyces vulgaris*
*	E-981014	*Streptomyces thermovulgaris*
*	E-981015	*Nocardiopsis* sp.
*	E-981016	*Streptomyces thermovulgaris*

	VTT-	Name	VTT-	Name
*	E-981017	*Streptomyces thermocarboxydus*	E-981083	*Clostridium beijerinckii*
*	E-981018	*Streptomyces thermoviolaceus*	E-981084	*Clostridium* sp.
*	E-981019	*Streptomyces* sp.	E-981085	*Clostridium* sp.
*	E-981020	*Lactobacillus salivarius*	E-981086	*Campylobacter jejuni* subsp. *jejuni*
	E-981021	*Klebsiella pneumoniae* subsp. *pneumoniae*		
	E-981022	*Paenibacillus* sp.	E-981087	*Megasphaera cerevisiae*
	E-981023	*Bacillus subtilis*	E-981088	*Pectinatus frisingensis*
*	E-981024	*Brevundimonas vesicularis*	E-981089	*Listeria monocytogenes*
	E-981025	Proteobacteria	E-981090	*Listeria monocytogenes*
	E-981026	*Enterobacteriaceae*	E-981091	*Listeria innocua*
	E-991027	*Pediococcus pentosaceus*	E-981092	*Listeria welshimeri*
	E-981028	*Flavobacterium*-group	E-981093	*Listeria monocytogenes*
*	E-981029	*Paenibacillus* sp.	E-981094	*Listeria monocytogenes*
	E-991030	*Escherichia coli*	E-981095	*Listeria monocytogenes*
*	E-981031	*Enterobacteriaceae*	E-981096	*Enterococcus faecium*
	E-991032	*Lactobacillus sakei*	E-981097	*Enterococcus faecium*
	E-981033	*Listeria monocytogenes*	E-981098	*Pantoea agglomerans*
	E-981034	*Leuconostoc pseudomesenteroides*	E-981101	*Streptomyces griseus*
	E-981035	*Sporolactobacillus* sp.	E-981102	*Streptomyces griseus*
	E-981036	*Listeria monocytogenes*	E-981103	*Streptomyces diastaticus* subsp. *ardesiacus*
	E-981037	*Listeria monocytogenes*		
	E-981038	*Listeria monocytogenes*	E-981104	*Streptomyces violaceoruber*
	E-991039	*Lactobacillus amylolyticus*	E-981105	*Streptomyces cavourensis*
	E-981048	*Lactobacillus brevis*	E-981106	*Streptomyces parvulus*
	E-981049	*Pseudomonas* sp.	E-981107	*Streptomyces* sp.
	E-981050	*Pseudomonas fluorescens*	E-981108	*Nocardiopsis dassonvillei*
	E-981051	*Clostridium symbiosum*	E-981109	*Nocardiopsis dassonvillei*
	E-981052	*Peptostreptococcus asaccharolyticus*	E-981110	*Nocardiopsis dassonvillei*
	E-981053	*Listeria monocytogenes*	E-981111	*Nocardiopsis dassonvillei*
	E-981054	*Listeria monocytogenes*	E-981112	*Nocardiopsis* sp.
	E-981055	*Listeria monocytogenes*	E-981113	*Nocardiopsis* sp.
	E-981056	*Listeria monocytogenes*	E-981114	*Nocardiopsis* sp.
	E-981057	*Listeria monocytogenes*	E-981115	*Pectobacterium carotovorum* subsp. *carotovorum*
	E-981058	*Listeria monocytogenes*		
	E-981059	*Listeria monocytogenes*	E-981116	*Acinetobacter baumannii*
	E-981060	*Listeria innocua*	E-981117	*Acinetobacter calcoaceticus*
	E-981061	*Listeria monocytogenes*	E-981118	*Acinetobacter* genospecies 11
	E-981063	*Listeria monocytogenes*	E-981119	*Acinetobacter haemolyticus*
*	E-981064	*Bacillus* sp.	E-981120	*Acinetobacter johnsonii*
	E-981066	*Pseudonocardia alni*	E-981121	*Acinetobacter junii*
	E-981067	*Comamonas terrigena*	E-981122	*Acinetobacter radioresistens*
	E-981068	*Ralstonia pickettii*	E-981123	*Rhodococcus rhodochrous*
	E-981069	*Brevibacillus parabrevis*	E-981124	*Enterobacter cancerogenus*
	E-981070	*Brevundimonas vesicularis*	E-981125	*Enterobacter cancerogenus*
	E-981071	*Sphingomonas paucimobilis*	E-981126	*Klebsiella pneumoniae* subsp. *rhinoscleromatis*
	E-981072	*Photobacterium leiognathi*		
	E-981073	*Enterobacter amnigenus*	E-981127	*Listeria monocytogenes*
	E-981074	*Bifidobacterium adolescentis*	E-981128	*Listeria monocytogenes*
	E-981075	*Bifidobacterium breve*	E-981129	*Listeria innocua*
	E-981077	*Klebsiella planticola*	E-981130	*Lactobacillus animalis*
	E-981078	*Kluyvera ascorbata*	E-981131	*Listeria innocua*
	E-981079	*Kluyvera cryocrescens*	E-981132	*Listeria innocua*
	E-981080	*Methylobacterium mesophilicum*	E-981133	*Lactobacillus collinoides*
	E-981081	*Pediococcus pentosaceus*	E-981134	*Lactobacillus brevis*
	E-981082	*Leuconostoc citreum*	E-981135	*Lactobacillus hilgardii*

VTT-	Name
E-981136	*Lactobacillus brevis*
E-981137	*Lactobacillus lindneri*
E-981138	*Lactobacillus plantarum*
E-981139	*Listeria monocytogenes*
E-981140	*Stenotrophomonas* sp.
E-981141	*Microbacterium* sp.
E-981142	*Acinetobacter baumanii*
E-981145	*Lactobacillus amylovorus*
E-981146	*Listeria monocytogenes*
E-981147	*Listeria monocytogenes*
E-981148	*Listeria monocytogenes*
E-981149	*Lactobacillus brevis*
E-981150	*Lactobacillus brevis*
E-981151	*Salmonella enterica* subsp. *enterica* ser. Typhimurium
E-981152	*Listeria monocytogenes*
E-991153	*Lactobacillus paracasei* subsp. *paracasei*
E-991154	*Lactobacillus brevis*
E-991155	*Lactobacillus brevis*
E-991156	*Lactobacillus casei* subsp. *casei*
E-991157	*Lactobacillus casei* subsp. *casei*
E-991158	*Lactobacillus plantarum*
E-991159	*Lactobacillus plantarum*
E-991160	*Lactobacillus lindneri*
E-991161	*Lactobacillus lindneri*
E-991162	*Lactobacillus collinoides*
E-991163	*Lactobacillus coryniformis* subsp. *coryniformis*
E-991164	*Lactobacillus delbrueckii* subsp. *delbrueckii*
E-991165	*Lactobacillus fermentum*
E-991168	*Lactobacillus* sp.
E-991169	*Lactobacillus* sp.
E-991170	*Gluconobacter oxydans*
E-991171	*Acetobacter aceti*
E-991172	*Lactococcus lactis* subsp. *lactis*
E-991173	*Acetobacter aceti*
E-991174	*Lactococcus lactis* subsp. *lactis*
E-991175	*Gluconacetobacter* sp.
E-991190	*Lactobacillus brevis*
E-991191	*Escherichia coli*
E-991192	*Corynebacterium glutamicum*
E-991193	*Corynebacterium glutamicum*
E-991194	*Salmonella enterica* subsp. *enterica* ser. Blockley
E-991195	*Salmonella enterica* subsp. *enterica* ser. Indiana
E-991196	*Salmonella enterica* subsp. *enterica* ser. Infantis
E-991197	*Salmonella enterica* subsp. *enterica* ser. Java
E-991198	*Salmonella enterica* subsp. *enterica* ser. Livingstone
E-991199	*Salmonella enterica* subsp. *enterica* ser. Mbandaka
E-991200	*Salmonella enterica* subsp. *enterica* ser. Montevideo
E-991201	*Salmonella enterica* subsp. *enterica* ser. Tennessee
E-991202	*Salmonella enterica* subsp. *enterica* ser. Worthington
E-991205	*Listeria monocytogenes*
E-991206	*Listeria monocytogenes*
E-991207	*Listeria welshimeri*
E-991208	*Enterococcus faecalis*
E-991209	*Listeria monocytogenes*
E-991210	*Listeria monocytogenes*
E-991213	*Bacillus subtilis*
* E-991214	*Bacillus subtilis*
* E-991215	*Bacillus subtilis*
E-991216	*Bacillus subtilis*
* E-991217	*Bacillus subtilis*
* E-991218	*Bacillus subtilis*
* E-991220	*Bacillus amyloliquefaciens*
* E-991221	*Bacillus amyloliquefaciens*
* E-991222	*Bacillus amyloliquefaciens*
* E-991223	*Bacillus amyloliquefaciens*
E-991228	*Bacillus subtilis*
E-991229	*Bacillus subtilis*
E-991237	*Bacillus subtilis*
E-991238	*Bacillus subtilis*
E-991239	*Bacillus subtilis*
E-991240	*Bacillus* sp.
E-991241	*Bacillus* sp
E-991242	*Bacillus* sp
E-991243	*Bacillus* sp
E-991244	*Lactobacillus iners*
E-991245	*Lactobacillus gasseri*
E-991248	*Lactobacillus brevis*

MEDIA

Unless otherwise stated all media are sterilized at 121°C for 15 minutes. For strict anaerobes the media are prereduced in anaerobic jars or boiled immediately before inoculation.

1. WORT AGAR/BROTH

Pretreated wort (11 %)	1.0	l
Yeast extract	1.0	g
Agar, for solid medium	25.0	g

2. WORT SUCROSE AGAR/BROTH

Pretreated wort (11 %)	0.5	l
Sucrose solution (10 %, w/v)	0.5	l
Yeast extract	1.0	g
Agar, for solid medium	25.0	g

3. YM AGAR/BROTH (Difco 0712/0711)

4. POTATO DEXTROSE AGAR (Difco 0013)

5. NUTRIENT AGAR/BROTH (Difco 0001/0003)

Adjust pH to 7.0. For *Bacillus* strains the addition of $MnSO_4$ x H_2O 10 mg/l is recommended for sporulation.

6. MRS AGAR/BROTH (Oxoid CM 361/Oxoid CM 359 or Difco 0881)

7. GYM STREPTOMYCES MEDIUM

Glucose	4.0	g
Yeast extract	4.0	g
Malt extract	10.0	g
$CaCl_3$	2.0	g
Agar, for solid medium	12.0	g
Distilled water	1.0	l

Adjust pH to 7.2 with KOH before adding agar.

8. LURIA AGAR/BROTH

Tryptone	10.0	g
Yeast extract	5.0	g
NaCl	10.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l

9. ZYMOMONAS MEDIUM (= PYG AGAR/BROTH)

Bacto peptone	10.0	g
Yeast extract	10.0	g
Glucose	20.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l

10. BRUCELLA AGAR/BROTH (Difco 0964/Difco 0495 or BBL 11088)

11. REINFORCED CLOSTRIDIAL AGAR/BROTH (Difco 1813/1808)

12. MRS + FERMENTED WORT without hops (4:1)

13. TOMATO JUICE YEAST EXTRACT MEDIUM

Skim milk	100.0	g
Filtered tomato juice (pH 7)	100.0	ml
Yeast extract	5.0	g
Agar, for solid medium	15.0	g
Distilled water to	1.0	l

14. TOMATO JUICE MEDIUM

Casein peptone, tryptic digest	10.0	g
Yeast extract	10.0	g
Filtered tomato juice (pH 7)	200.0	ml
Tween 80	1.0	ml
Agar	11.0	g
Distilled water	800.0	mll
Adjust pH to 6.5		

15. SOUR DOUGH MEDIUM

Maltose	20.0	g
Yeast extract	3.0	g
Fresh yeast extract (see below)	15.0	ml
Tween 80	0.3	g
Casein peptone, tryptic digest	6.0	g
Distilled water	1.0	l

Adjust pH to 5.6 with 20% lactic acid or HCl. Fresh yeast extract is prepared by autoclaving a 20% suspension of commercial baker´s yeast in distilled water for 30 minutes at 121°C, allowing the suspension to settle overnight at 2 to 8°C, decanting and further clarifying the supernatant by centrifugation. The extract prepared in this manner contains 1.5% solids and if not to be used within a few days, should be frozen or freeze-dried immediately.

16. AZOTOBACTER AGAR

Glucose	5.0	g
Mannitol	5.0	g
$CaCl_2 \times 2\ H_2O$	0.1	g
$MgSO_4 \times 7\ H_2O$	0.1	g
$Na_2MoO_4 \times 2H_2O$	5.0	mg
K_2HPO_4	0.9	g
KH_2PO_4	0.1	g
$FeSO_4 \times 7\ H_2O$	10.0	mg
$CaCO_3$	5.0	g
Agar	15.0	g
Distilled water	950.0	ml
Adjust pH to 7.3		

Sterilize glucose and mannitol separately (in 50 ml H_2O) and add to the medium after autoclaving.

17. PROPIONIBACTERIUM MEDIUM

Casein peptone, tryptic digest	10.0	g
Yeast extract	5.0	g
Na-lactate	10.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l
Adjust pH to 7.0 - 7.2		

18. ACTINOMYCETE ISOLATION AGAR (Difco 0957)

19. TRYPTONE SOY AGAR (Oxoid CM 131, Difco 0369)

20. CORYNEBACTERIUM MEDIUM

Casein peptone, tryptic digest	10.0	g
Yeast extract	5.0	g
Glucose	5.0	g
NaCl	5.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l
Adjust pH to 7.2 - 7.4		

21. MALT AGAR (Difco 0024) + 1 % WOOD POWDER

22. SPHAEROTILUS MEDIUM

Beef extract (Lab Lemco, Oxoid)	5.0	g
Agar for solid medium	15.0	g
Distilled water	1.0	l
Adjust pH to 7.0		

23. MALT AGAR (Difco 0024)

24. OATMEAL AGAR (Difco 0552)

25. NEUROSPORA CULTURE AGAR (Difco 0321)

26. TRICHOPHYTON AGAR (Difco 0965)

27. CLOSTRIDIUM THERMOCELLUM MEDIUM

Yeast extract	4.5	g
Cellulose (Avicel or MN 300)	10.0	g
or		
Cellobiose	5.0	g
Glutathione	0.25	g
$(NH_4)_2SO_4$	1.3	g
$MgCl_2 \times 6\ H_2O$	2.6	g
KH_2PO_4	1.43	g
$K_2HPO_4 \times 3\ H_2O$	7.2	g
$CaCl_2 \times 2\ H_2O$	0.13	g
Na-ß-glycerophosphate	6.0	g
$FeSO_4 \times 7\ H_2O$	1.1	mg
Resazurin	1.0	mg
Distilled water	1.0	l
Adjust pH to 7.0 - 7.2		

Cellobiose is filter-sterilized separately as a 10 % (w/v) solution in water.

28. GISA MEDIUM

Yeast Nitrogen Base w/o amino acids (Difco 0919)	6.7	g
Calcium salt of glucoisosaccharinic acid (GISA)	2.0	g
Agar, for solid medium	18.0	g
Distilled water	1.0	l

29. UBA MEDIUM (Difco 0856)

30. TYX/TYG MEDIUM

Tryptone	1.0	g
Yeast extract	5.0	g
Na_2SO_4	0.2	g
K_2HPO_4	3.5	g
Trace element solution*	1.0	ml
Resazurin (25 mg/100 ml H_2O)	4.0	ml
Distilled water to	1.0	l

Cook 5-10 min (colour turns first red and then yellow). Cool on ice. Add:

Biotin	10.0	mg
p-aminobenzoic acid	10.0	mg
L-cysteinium chloride (monohydr.)	0.5	g

Adjust pH to 7.0. Heat slightly to dissolve (do not boil). Distribute into tubes à 5 ml. After autoclaving (121°C/15 min) add 5 ml sterile sugar solution [10 g/l xylose (TYX) or glucose (TYG)].

*Trace element solution:

$NaMoO_4 \times 2\ H_2O$	0.24	g
$CoCl_2 \times 6\ H_2O$	24.0	mg
$CaCl_2 \times 2\ H_2O$	0.15	g
$FeCl_3 \times 6\ H_2O$	2.7	g
H_2SO_4	2.8	ml
$CuSO_4 \times 5\ H_2O$	25.0	mg
$ZnSO_4 \times 7\ H_2O$	29.0	mg
$MnSO_4 \times 7\ H_2O$	0.17	g
$MgSO_4$	1.2	g
Distilled water to	100.0	ml

31. THERMUS MEDIUM

Yeast extract	2.5	g
Tryptone	2.5	g
Nitrilotriacetic acid (Titriplex I Merck 8416)	0.1	g
Micronutrient solution*	1.0	ml
Fe-citrate solution (0.01 M)	0.5	ml
$CaSO_4 \times 2\ H_2O$	40.0	mg
$MgCl_2 \times 6\ H_2O$	0.2	g
KH_2PO_4	54.0	mg
$Na_2HPO_4 \times 12\ H_2O$	0.43	g
Agar, for solid medium	28.0	g
Distilled water	1.0	l
Adjust pH to pH 7.2		

*Micronutrient solution:

Concentrated H_2SO_4	0.5	ml
$MnSO_4 \times H_2O$	2.28	g
$ZnSO_4 \times 7\ H_2O$	0.5	g
H_3BO_3	0.5	g
$CuSO_4 \times 5\ H_2O$	25.0	mg
$Na_2MoO_4 \times 2\ H_2O$	25.0	mg
$CoCl_2 \times 6\ H_2O$	45.0	mg
Distilled water to	1.0	l

32. SHIITAKE AGAR

Malt extract	20.0	g
Yeast extract	1.0	g
Agar	15.0	g
Distilled water	1.0	l
Adjust pH to pH 7.0		

33. MINIMAL MEDIUM I

Yeast Nitrogen Base w/o amino acids (Difco 0919)	6.7	g
Glucose	20.0	g
L-tryptophan	20.0	mg
Uracil	20.0	mg
L-histidine-HCl	20.0	mg
Agar, for solid medium	20.0	g
Distilled water	1.0	l

Amino acid solutions are filter sterilized.

34. MINIMAL MEDIUM II

Yeast Nitrogen Base w/o amino acids (Difco 0919)	6.7	g
Glucose	20.0	g
L-histidine-HCl	20.0	mg
L-arginine-HCl	20.0	mg
Adenine sulfate	20.0	mg
Agar, for solid medium	20.0	g
Distilled water	1.0	l

Amino acid solutions are filter sterilized.

35. MINIMAL MEDIUM III

Yeast Nitrogen Base w/o amino acids (Difco 0919)	6.7	g
Glucose	20.0	g
Uracil	20.0	mg
L-tryptophan	20.0	mg
L-leucine	30.0	mg
Agar, for solid medium	20.0	g
Distilled water	1.0	l

Amino acid solutions are filter sterilized.

36. BACILLUS SCHLEGELII MEDIUM

$Na_2HPO_4 \times 2\ H_2O$	4.5	g
KH_2PO_4	1.5	g
NH_4Cl	1.0	g
$MnSO_4 \times H_2O$	10.0	mg
$MgSO_4 \times 7\ H_2O$	0.2	g
$CaCl_2 \times 2\ H_2O$	10.0	mg
Ferric ammonium citrate	5.0	mg
Trace element solution*	3.0	ml
Na-pyruvate	1.5	g
Distilled water	1.0	l
Adjust pH to 7.1		

*Trace element solution:

$ZnSO_4 \times 7\ H_2O$	0.1	g
$MnCl_2 \times 4\ H_2O$	30.0	mg
H_3BO3	0.3	g
$CoCl_2 \times 6\ H_2O$	0.2	g
$CuCl_2 \times 2\ H_2O$	10.0	g
$NiCl_2 \times 6\ H_2O$	20.0	mg
$Na_2MoO_4 \times 2\ H_2O$	30.0	mg
Distilled water	1.0	l

37. AGROBACTERIUM MEDIUM

Yeast extract	5.0	g
Casamino acids	0.5	g
Mannitol	8.0	g
$(NH_4)_2SO_4$	2.0	g
NaCl	5.0	g
Agar	15.0	g
Distilled water	1.0	l
pH 6.6		

If the growth is slow add 0.1 ml filter sterilized biotin solution (20 mg/ml).

38. ALKALINE NUTRIENT AGAR

Same as medium 5. After sterilization add sterile 1 M Na-sesquicarbonate solution (1 ml in 10 ml) to achieve a pH of 9.7 (or 9% Na_2CO_3 solution 0.2 ml to 12 ml agar -> pH 9.5 -10.0)

Na- sesquicarbonate solution:

$NaHCO_3$	4.2	g
Na_2CO_3 anhydrous	5.3	g
Distilled water	100.0	ml

39. CANTHARELLUS MEDIUM

Glucose	4.0	g
Na-succinate	1.35	g
NH_4Cl	0.58	g
KH_2PO_4	0.2	g
$MgSO_4 \times H_2O$	0.1	g
$CaCl_2 \times H_2O$	26.5	mg
NaCl	20.0	mg
EDTA	9.3	mg
$FeSO_4 \times 7\ H_2O$	6.95	mg
$MnSO_4 \times H_2O$	0.845	mg
H_3BO_4	0.31	mg
$ZnSO_4 \times 7\ H_2O$	1.44	mg
KI	0.415	mg
Na_2MoO4	1.21	g
$CuSO_4 \times 5\ H_2O$	0.125	g
$CoCl_2 \times 6\ H_2O$	0.12	g
m-Inositol	10.0	mg
Nicotinic acid	0.1	mg
p-Aminobenzoic acid	0.1	mg
Pyridoxine hydrochloride	0.1	mg
Calsium pantothenate	0.1	mg
Thiamine hydrochloride	0.1	mg
Riboflavin	0.1	mg
Biotin	0.025	mg
Agar	12.0	g
Distilled water to	1.0	l

Add onto the agar a piece of fresh tomato root near the inoculum.

40. PY 1% MEDIUM

Peptone	10.0	g
Yeast extract	10.0	g
NaCl	5.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l

41. PYF MEDIUM

Peptone	5.0	g
Tryptone	5.0	g
Yeast extract	10.0	g
Fructose	5.0	g
Na_2HPO_4	2.0	g
Tween 80	1.0	ml
Cysteine-HCl	0.5	g
Distilled water	1.0	l
Adjust pH to 7.0		

42. PEDIOCOCCUS HALOPHILUS MEDIUM

To medium 6 add 6.5 % NaCl.

43. WORT AGAR WITH $CuSO_4$

To medium 1 add 0.6 mM $CuSO_4$.

44. ORANGE SERUM AGAR (Difco 0521)

45. N4 MINERAL MEDIUM

$(NH_4)_2SO_4$	0.5	g
KH_2PO_4	0.2	g
$MgSO_4 \times 7$ H2O	0.04	g
$CaCl_2 \times 2$ H_2O	0.02	g
NaCl	0.5	g
HEPES buffer (Sigma H-3375)	11.92	g
$FeSO_4$/EDTA solution*	10.0	ml
Phenol Red (0.04 %)	1.0	ml
Distilled water	1.0	l

*$FeSO_4$/EDTA solution:

$FeSO_4 \times 7$ H_2O	0.018	g
EDTA	0.019	g
Distilled water	100.0	ml

46. ACETIC ACID MEDIUM

To medium 2 add 0.4 or 0.5 % (w/v) anhydrous sodium acetate.

47. ACETATE MEDIUM

Maltose	2.5	g
Yeast nitrogen base w/o amino acids (Difco 0919)	6.7	g
Sodium acetate anhydrous	40.0	g
Agar	25.0	g
Distilled water	1.0	l

48. ACETOBACTER MEDIUM

$(NH_4)_2SO_4$	3.3	g
KH_2PO_4	1.0	g
MgSO4 x 7 H_2O	0.25	g
Yeast extract	5.0	g
Trace element solution*	1.0	ml
Vitamin solution**	1.0	ml

Glucose solution[#]	200.0	ml
Agar	15.0	g
Distilled water	800.0	ml

[*]Trace element solution:

$CaCl_2$ x 2 H_2O	1.457	g
$FeSO_4$ x 7 H_2O	0.366	g
Na_2MoO_4 x 2 H_2O	23.4	mg
$ZnSO_4$ x 7 H_2O	0.178	g
$MnSO_4$ x H_2O	0.101	g
$CuSO_4$ x 5 H_2O	7.8	mg
Distilled water	100.0	ml

[**]Vitamin solution:

m-Inositol	200.0	mg
Nicotinic acid	40.0	mg
Pyridoxine hydrochloride	40.0	mg
Thiamine hydrochloride	40.0	mg
Calsium pantothenate	40.0	mg
Riboflavin	20.0	mg
p-Aminobenzoic acid	20.0	mg
Folic acid	0.2	mg
Biotin	0.2	mg
Distilled water	100.0	ml
Filter-sterilize		

[#]Glucose solution:

Dissolve 40 g glucose in 200 ml distilled water. Filter sterilize.

49. PYG MEDIUM

Peptone	5.0	g
Yeast extract	5.0	g
Glucose	20.0	g
K_2HPO_4	2.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l
Adjust pH to pH 7.4		

Glucose is filter sterilized separately as a 20 % (w/v) solution in water.

50. R2A AGAR (Difco 1826)

51. YEAST MALT EXTRACT MEDIUM

Yeast extract	4.0	g
Malt extract	10.0	g
Glucose	4.0	g

Agar	20.0	g
Distilled water	1.0	l
Adjust pH to pH 7.3		

52. TYG MEDIUM 1

Tryptone	10.0	g
Yeast extract	5.0	g
Glucose	2.0	g
K_2HPO_4	4.4	g
NaCl	2.0	g
Agar	20.0	g
Distilled water	1.0	l
pH 7.2		

53. LURIA WITH THYMINE

To medium 8 add thymine 20 mg/ml.

54. TYG MEDIUM 2

Tryptone	1.0	g
Yeast extract	0.33	g
Glucose	3.3	g
Tap water	200.0	ml
Distilled water	800.0	ml
Adjust pH to 7.2		

55. LURIA WITH KANAMYCIN

To medium 8 add kanamycin 50 mg/ml.

56. NBB BOUILLON/AGAR (Döhler 4710/4709)

57. UREA MEDIUM

Yeast extract	1.0	g
Meat extract	1.0	g
Glucose	5.0	g
NaCl	5.0	g
$Na_2HPO_4 \times 12\ H_2O$	9.0	g
KH_2PO_4	1.5	g
$MgSO_4 \times 7\ H_2O$	0.2	g
$CaCl_2$	1.2	mg
$MnCl_2 \times 4\ H_2O$	20.0	mg
Urea	10.0	g
Agar, for solid medium	15.0	g
Distilled water	1.0	l

Autoclave glucose separately and sterilize urea by filtration.

58. CREATININE MEDIUM

Same as medium 57; instead of urea use 1.0 g creatinine.

59. URIC ACID MEDIUM

Same as medium 57; instead of urea use 0.4 g uric acid or 1.0 g allantoin.

60. ASPERGILLUS TEST MEDIUM

Malt extract	20.0	g
Peptone	1.0	g
Glucose	20.0	g
Agar	20.0	g
Distilled water	1.0	l
Adjust pH to 6.5		

Supplements to be added as indicated by genotype:

Arginine	200.0	mg
Methionine	50.0	mg
Uridine	2.44	g
p-aminibenzoic acid	1.0	mg
Biotin	0.02	mg
Riboflavin	2.5	mg
Nicotinic acid	2.0	mg
Pyridoxine hydrochloride	0.05	mg

Glucose and supplement solutions are filter sterilized.

61. GLUCONOBACTER OXYDANS MEDIUM

Glucose	100.0	g
Yeast extract	10.0	g
$CaCO_3$	20.0	g
Agar	15.0	g
Distilled water	1.0	l
Adjust pH to 6.8		

62. LIMA BEAN AGAR (Difco 0117)

63. TRYPTICASE SOY YEAST EXTRACT MEDIUM

Trypticase soy broth	30.0	g
Yeast extract	3.0	g
Agar	15.0	g
Distilled water	1.0	l
Adjust pH to 7.0 - 7.2		

64. TRYPTONE YEAST EXTRACT MEDIUM

Tryptone	2.5	g
Yeast extract	2.5	g
NaCl	10.0	g
Base medium*	100.0	ml
Distilled water	800.0	ml
Phosphate buffer**	100.0	ml
Agar	28.0	g

*Base medium:

Titriplex I	1.0	g
NaOH-pellets	0.2	g
$CaSO_4 \times 2\ H_2O$	0.4	g
$MgCl_2 \times 6\ H_2O$	2.0	g
Fe-citrate (0.01 M)	5.0	ml
Trace element solution#	5.0	ml
Distilled water	1.0	l

#Trace element solution:

Titriplex I	12.8	mg
$FeCl_2 \times 4\ H_2O$	1.0	mg
$MnCl_2 \times 4\ H_2O$	0.5	mg
$CoCl_2 \times 6\ H_2O$	0.3	mg
$ZnCl_2$	0.2	mg
$CuCl_2 \times 2\ H_2O$	50.0	mg
$Na_2MoO_4 \times 2\ H_2O$	50.0	ng
H_3BO_3	20.0	ng
$NiCl_2 \times 6\ H_2O$	50.0	ng
Distilled water	5.0	ml

**Phosphate buffer:

KH_2PO_4	5.44	g
$Na_2HPO_4 \times 12\ H_2O$	43.0	g
Distilled water	1.0	l

pH 7.2
Autoclave phosphate buffer separately.

65. LURIA WITH AMPICILLIN

To medium 8 add ampicillin 100 mg/l.

66. PLATE COUNT AGAR/BROTH (Difco 0479/0751)

67. YEAST EXTRACT GLUCOSE MEDIUM

Yeast extract	0.5	g
Glucose	15.0	g
KH_2PO_4	3.18	g

K_2HPO_4	5.2	g
$MgSO_4$	0.12	g
NH_4Cl	0.54	g
Trace element solution*	5.0	ml
Agar, for solid medium	15.0	g
Distilled water	1.0	l
Adjust pH to 7.0		

*Trace element solution:

$CuSO_4$ x 5 H_2O	0.249	g
$MnSO_4$ x 4 H_2O	0.223	g
$ZnSO_4$ x 7 H_2O	0.287	g
$CaCl_2$ x 6 H_2O	0.118	g
H_3BO_3	0.03	g
Na_2MoO_4 x 2 H_2O	0.124	g
KJ	0.083	g
Distilled water	1.0	l

68. YEAST SYNTHETIC COMPLETE (= SC) MEDIUM

Yeast Nitrogen Base		
w/o amino acids (Difco 0919)	6.7	g
Milli-Q water	920.0	ml
40% (w/v) glucose solution	50.0	ml
Synthetic stock solution*	30.0	ml
Agar	20.0	g

Glucose and synthetic stock solutions are filter sterilized and added after autoclaving.

*Synthetic stock solution:

Adenine	0.135	g
Arginine	3.48	g
Aspartic acid	2.66	g
Histidine	0.58	g
Myo-inositol	0.36	g
Isoleucine	5.25	g
Leucine	2.62	g
Lysine	0.91	g
Methionine	1.49	g
Phenylalanine	0.83	g
Serine	1.05	g
Threonine	1.19	g
Tryptophan	0.82	g
Tyrosine	0.18	g
Uracil	0.22	g
Valine	1.17	g
Distilled water	300.0	ml

Storage in darkness at room temperature.

69. $SC^{leu-,trp-}$ MEDIUM

Medium 68 without leucine and tryptophan.

70. SC^{ura-} MEDIUM

Medium 68 without uracil.

71. SC^{his-} MEDIUM

Medium 68 without histidine.

72. STYRENE MINERAL SALTS MEDIUM

$K2HPO_4$	1.55	g
NaH_2PO_4 x 2 H_2O	0.85	g
$(NH_4)_2SO_4$	2.0	g
$MgCl_2$ x 6 H_2O	0.1	g
EDTA	10.0	mg
$ZnSO_4$ x 7 H_2O	2.0	mg
$CaCl_2$ x 2 H_2O	1.0	mg
$FeSO_4$ x 7 H_2O	5.0	mg
Na_2MoO_4 x 2 H_2O	0.2	mg
$CuSO_4$ x 5 H_2O	0.2	mg
$CoCl_2$ x 6 H_2O	0.4	mg
$MnCl_2$ x 2 H_2O	1.0	mg
Milli-Q water	1.0	l
Agar, for solid medium	20.0	g

Shake flask cultures: Before inoculation add in a fume cupboard 5 ml styrene into 50 ml sterile mineral salts solution and close tightly.

Agar plates: incubation takes place in a dessicator. Add to the dessicator an open bottle containing 10 ml dibutyl phthalate and 200 ml styrene.

73. SUPPLEMENTED ASPERGILLUS MINIMAL MEDIUM

Yeast Nitrogen Base	6.7	g
Glucose	20.0	g
Casamino acids	2.0	g
$NaNO_3$	6.0	g
KCl	0.52	g
$MgSO_4$ x 7 H_2O	0.52	g
$K2HPO_4$	1.52	g
Biotin	100.0	mg
Iron and zinc	traces	
Milli-Q water	1.0	l
Agar, for solid medium	20.0	g
Adjust pH to 6.5		

74. ACETAMIDE MEDIUM

Glucose	20.0	g
$KH2PO_4$	15.0	g
Trace element solution*	1.0	ml
Agar (Noble)	20.0	g
Distilled water	1.0	l

Add after autoclaving (121°C/15 min):

1 M $MgSO_4$ x 7 H_2O	2.4	ml
1 M $CaCl_2$ x 2 H_2O	4.1	ml
1 M Acetamide	10.0	ml
1 M $CSCl_2$	12.5	ml

*Trace element solution:

$FeSO_4$ x 7 H_2O	5.0	g
$MnSO_4$ x H_2O	1.6	g
$ZnSO_4$ x 7 H_2O	1.4	g
$CoCl_2$ x 6 H_2O	3.7	g
Distilled water to	1.0	l

75. STARCH MEDIUM

Agar	25.0	g
Soluble starch	2.0	g
Distilled water	800.0	ml

Heat to boiling to dissolve completely.

Add mineral solution:

$KH2PO_4$	2.0	g
$(NH_4)_2SO_4$	1.4	g
$MgSO_4$ x 7 H_2O	0.3	g
Distilled water	190.0	ml
Trace element solution*	10.0	ml
3 % (w/v) $CaCl_2$ x 2 H_2O solution	10.0	ml

*Trace element solution:

$FeSO_4$ x 7 H_2O	0.5	g
$MnSO_4$ x H_2O	0.16	g
$ZnSO_4$ x 7 H_2O	0.14	g
$CoCl_2$	0.2	g
Distilled water	1.0	l

76. CAULOBACTER MEDIUM

Bacto peptone	2.0	g
Yeast extract	1.0	g
$MgSO_4$ x 7 H_2O	0.2	g
Agar, for solid medium	15.0	g
Tap water	1.0	l

Dissolve all expect agar in the water and adjust pH to 7.0. Add agar and dissolve by steaming.

77. WHEY MEDIUM

Whey permeate	50.0	g
Casein hydrolysate	20.0	g
Yeast extract	10.0	g
Agar, if needed	15.0	g
Tween 80	1.0	ml
Distilled water	1.0	l

Adjust pH to 5.6 for *Lactobacillus* and to 6.5 for *Lactococcus*.

78. YMF MEDIUM

Peptone	5.0	g
Yeast extract	3.0	g
Malt extract	3.0	g
Brown sugar	200.0	g
Agar, for solid medium	20.0	g
Distilled water	1.0	l
Adjust pH to 6.2		

79. OSMOPHILIC MEDIUM

Glucose	400.0	g
Malt extract	20.0	g
Yeast extract	5.0	g
Agar	20.0	g
Distilled water to	1.0	l
Adjust pH to 5.0 - 5.2		

Sterilize 30 min at 110°C (0.5 atm).

80. M17 AGAR (Oxoid CM 785)

81. BRAIN HEART INFUSION AGAR (Difco 0418)

82. FLUID THIOGLYCOLLATE MEDIUM (Difco 0256)

83. CYE-ACES AGAR

Solution A:

Yeast extract (Difco 0127)	10.0	g
ACES (N-2-acetamido-2-aminoethane-sulfonic acid)	10.0	g
Activated charcoal (Sigma C 5510)	2.0	g
Distilled water	490.0	ml

Dissolve all components by boiling and autoclave at 121°C for 15 minutes. Cool to 50 - 55°C in a waterbath.

Solution B:

Agar	15.0	g
Distilled water	490.0	ml

Autoclave at 121°C for 15 minutes and cool to 50 - 55°C in a waterbath.

Solution C:

Cysteine-HCl x H_2O	0.4	g
Distilled water	10.0	ml

Prepare a fresh solution and filter-sterilize it.

Solution D:

$Fe_4(PO_4)_2$	0.25	g
Distilled water	10.0	ml

Prepare a fresh solution by heating to 50 - 55°C in a waterbath. Filter-sterilize solution separately.

Note: Soluble ferric pyrophosphate must be kept dry and in the dark. Do not use if chemical looses its green colour and becomes brown or yellow.

Add solution C, then solution D to solution A. Adjust the complete medium to pH 6.9 ± 0.05 at 50°C by adding 4.0 to 4.5 ml of sterile 1.0 N KOH. The pH of the medium is critical. Finally add solution B. Swirl medium in flask during dispensing to Petri dishes or tubes to keep charcoal suspended.

84. TRYPTOSE AGAR (Difco 0064)

85. BLOOD AGAR (Orion Diagnostica)

86. 10% TGE MEDIUM (Merck 10128)

TGE diluted 1:10

87. DESULFOVIBRIO MEDIUM

Solution A:

K_2HPO_4	0.5	g
NH_4Cl	1.0	g
Na_2SO_4	1.0	g
$CaCl_2$ x 2 H_2O	0.1	g
$MgSO_4$ x 7 H_2O	2.0	g
DL-Na-lactate	2.0	g
Yeast extract	1.0	g
Resazurin	1.0	mg
Distilled water	980.0	ml

Solution B:

$FeSO_4$ x 7 H_2O	0.5	g
Distilled water	10.0	ml

Solution C:

Na-thioglycolate	0.1	g
Ascorbic acid	0.1	g
Distilled water	10.0	ml

Dissolve the ingredients of each solution in the appropriate quantities of water. Bring solution A to the boil for a few minutes, then cool to room temperature while gassing with oxygen-free N_2 gas. Add solution B and C, adjust pH to 7.8 with NaOH, and distribute under N_2 in anaerobic tubes. During distribution continuously swirl the medium to keep the grey precipitate suspended. Autoclave 15 minutes at 121°C.

88. YNB - XANTHAN MEDIUM

Xanthan (Sigma G-1253)	5.0	g
KH_2PO_4 (Riedel-de Haën 30407)	5.0	g
Yeast Nitrogen Base (Difco 0392)*	100.0	ml
Agar, if needed	18.0	g
Distilled water	900.0	ml
Adjust pH to 7.5		

*filter sterilized and added after autoclaving

89. YNB - WELAN MEDIUM

Medium 88, instead of xanthan use welan (Kelco K1A96) 3.0 g/l.

90. THIOBACILLUS MEDIUM F2

Kcl	52.3	mg
KH_2PO_4	54.4	mg
$MgSO_4$ x 7 H_2O	493.0	mg
$CaCl_2$	6.7	mg
Na_2MoO_4	10.3	µg
$FeSO_4$ x 7 H_2O	50.0	mg
Distilled water	1.0	l

Adjust pH to 2.2 with sulfuric acid and filter sterilize.

91. PHOTOBACTERIUM MEDIUM (Difco 0417)

For solid medium add agar 20.0 g/l.

92. EMERSON YpSs AGAR (Difco 0739)

93. BIFIDOBACTERIUM MEDIUM

Casein peptone, tryptic digest	10.0	g
Meat extract	5.0	g
Yeast extract	5.0	g
Glucose	10.0	g
K_2HPO_4	3.0	g
Tween 80	1.0	ml
Tap water	1.0	l

Adjust pH to 6.8.

After sterilization aseptically add solutions of sodium ascorbate and cysteine-HCl to a final concentration of 1.0% and 0.05%, respectively. Medium not freshly prepared should be heated in a steamer for 10 min before addition of reducing substances.

94. SABOURAUD AGAR (Merck 7662)

95. TRYPTICASE SOY AGAR (BBL 4311043)

96. LOW SALT LURIA WITH ZEOCIN

To low salt medium 8 (NaCl 5 g/l) add zeocin 50 µg/ml.

97. OENOCOCCUS MEDIUM

Casein peptone, tryptic digest	10.0	g
Yeast extract	5.0	g
Glucose	10.0	g
Fructose	5.0	g
$MgSO_4$ x 7 H_2O	0.2	g
$MnSO_4$ x H_2O	0.05	g
Diammonium citrate	3.5	g
Tween 80	1.0	ml
Tomato juice, filtered	100.0	ml
Cysteine-HCl x H_2O	0.5	g
Distilled water	900.0	ml

Adjust pH to 4.8

98. YPM MEDIUM

Yeast extract	5.0	g
Peptone	3.0	g
Mannitol	25.0	g
Agar	12.0	g
Distilled water	1.0	l

pH not adjusted

99. MRS WITH CYSTEINE

To medium 6 add 0.5% cysteine-hydrochloride.

100. PEDIOCOCCUS DAMNOSUS MEDIUM

Adjust medium 6 to pH 5.2.

101. CORYNEBACTERIUM MEDIUM CII

Yeast extract	4.0	g
Sucrose	10.0	g
$CaCO_3$	20.0	g
Agar	15.0	g
Distilled water	1.0	l

102. BHI-GLUCOSE MEDIUM

Brain heart infusion	18.5	g
Glucose	5.0	g
Agar	12.0	g
Distilled water	1.0	l

103. GLUCOSE YEAST EXTRACT AGAR

Glucose	20.0	g
Yeast extract	10.0	g
$CaCO_3$ (light precipitate)	20.0	g
Agar	17.0	g
Distilled water	1.0	l

104. 731 LUMINOUS MEDIUM

Tryptone	5.0	g
Yeast extract	5.0	g
NaCl	30.0	g
KH_2HPO_4	2.1	g
NH_4Cl	5.0	g
$MgSO_4$ x 7 H_2O	1.0	g
KCl	0.75	g
$CaCO_3$	1.0	g
1 M Tris-buffer pH 7.5	50.0	ml
Glyserol	3.0	ml
Distilled water	1.0	l
Adjust pH to 7.2 with HCl		

Autoclave 25 ml in 100 ml erlenmeyers at 121 C for 20 min.

105. CYC-MEDIUM

Czapek Dox Agar (Merck)	48.0	g
Yeast extract (Oxoid)	2.0	g
Casamino acids (Difco)	6.1	g
Tryptophan	0.02	g
Distilled water	1.0	l
pH 7.2		

106. EDINBURGH MINIMAL MEDIUM (EMM 2)

Potassium hydrogen phthallate (14.7mM)	3.0	g
Na_2HPO_4	2.2	g
NH_4Cl	5.0	g
Glucose	20.0	g
Salts (50X stock)*	20.0	ml
Vitamins (1000X stock)**	1.0	ml
Minerals (10000X stock)***	0.1	ml
Distilled water to	1.0	l

*50X Salts :

$MgCl_2$ x 6 H_20	52.5	g
$CaCl_2$ x 2 H_20	0.735	g
KCl	50.0	g
Na_2SO_4	2.0	g
Distilled wate	1.0	l

**1000X Vitamins :

Pantothenic acid	1.0	g
Nicotinic acid	10.0	g
Inositol	10.0	g
Biotin	10.0	mg
Distilled water to	1.0	l

***10,000X Minerals:

Boric acid	5.0	g
$MnSO_4$	4.0	g
$ZnSO_4$ x 7 H_2O	4.0	g
$FeCl_2$ x 6 H_2O	2.0	g
Molybdic acid	0.4	g
KI	1.0	g
$CuSO_4$ x 5 H_2O	0.4	g
Citric acid	10.0	g

After autoclaving, a few drops of preservative (1:1:2 chlorobenzene:dichloroethane: chlorobutane) is added to mineral stock.

107. ANTIBIOTIC MEDIUM 3 (Difco 0243)

REFERENCES AT VTT

1. Enari, T.-M. & Mäkinen, V., Über die wachstums- und gärungsbegrenzenden Faktoren bei der kontinuierlichen Gärung. Brauwissenschaft 14 (1961), 253-256.

2. Enari, T.-M. & Kauppinen, V., Interaction of cobalt and iron in the riboflavin production of *Candida guilliermondii*. Acta Chem. Scand. 15 (1961), 1513-1516.

3. Enari, T.-M., Puputti, E. & Mäkinen, V., Einwirkungen des Extraktgehalts der Würze, der Verdünnungsgeschwindigkeit und der Belüftung bei der kontinuierlichen Gärung. Brauwissenschaft 16 (1963), 360-364.

4. Mäkinen, V. & Enari, T.-M., Verhalten der untergärigen Bruchhefen bei der kontinuierlichen Gärung. Brauwelt 105 (1965), 739-740.

5. Mäkinen, V., Aromiaineiden muodostuminen jatkuvassa käymisessä. Kemian Teollisuus 26 (1969), 207-213.

6. Mäkinen, V. & Enari, T.-M., Flavor compounds in continuous fermentation. Brewers Digest 44 (1969), 72-76.

7. Manni, S., Ilmastuksen ja hiivakantojen vaihtelun vaikutus teolliseen leivontahiivaprosessiin. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1969. 68 p.+ app. 2 p.

8. Nurmento, L., Aromiaineiden muodostumisesta jatkuvassa käymisessä. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1969. 96 p.

9. Enari, T.-M., Mäkinen, V. & Haikara, A., Aromin muodostuminen käymisessä. Mallasjuomat 1970:1, 1-13.

10. Enari, T.-M., Mäkinen, V. & Haikara, A., The formation of flavor compounds during fermentation. Technical Quarterly of MBAA 7 (1970) 1, 11-15.

11. Mäkinen, V., Haikara, A. & Enari, T.-M., Influence of nitrogenous compounds on beer fermentation. Suomen Kemistilehti 1970:B43, 443-447.

12. Mäkinen, V., The effect of temperature upon the formation of some flavour compounds in continuous fermentation. VTT Tiedotus, Serie IV - Chemie 1970:114. 10 p.

13. Mäkinen, V., The effect of fermentation time and method on the formation of some flavour compounds in brewing. VTT Tiedotus, Serie IV - Chemie 1970:116. 14 p.

14. Fluori leivinhiivan kasvatuksessa. VTT Research Reports 1, Helsinki 1970. 5 p.

15. Mäkinen, V., Continuous fermentation and formation of some flavour compounds of beer. University of Helsinki, Department of General Microbiology, Doctor thesis. VTT Publication 162, Helsinki 1971. 26 p.+ app. 44 p.

16. Mäkinen, V. & Enari, T.-M., Das Verhalten untergäriger Hefen bei unterschiedlichen Gärbedingungen und die Bildung einiger Aromastoffe. Brauwissenschaft 24 (1971) 5, 141-145.

17. Mäkinen, V, & Mäkinen, K.V., Veden fluoraus ja panimoteollisuus. Mallasjuomat 1971:4, 99-105.

18. Raines, T. & Markkanen, P., Vasikan renniini ja sen substituutit. Karjantuote 54 (1971) 9, 324-329.

19. Kujala, T., Vierteen aminohappokoostumuksen vaikutus käymisessä muodostuviin oluen aromiaineisiin. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1971. 76 p.+ app. 7 p.

20. Markkanen, P., Itiöintiin ja amylaasin muodostumiseen vaikuttavista tekijöistä *Bacillus subtilis* NCIB 8646:lla. University of Helsinki, Department of General Microbiology, MSc thesis, Helsinki 1971. 27 p.+ app. 22 p.

21. Markkanen, P., α-amylaasin ja proteolyyttisten entsyymien tuottaminen *Bacillus subtili*ksella. University of Helsinki, Department of General Microbiology, LicPhil thesis, Helsinki 1971. 72 p.

22. Haikara, A. & Mäkinen, V., Nachweis von in Brauereien auftretenden wilden Hefen mittels des immunologischen Fluoreszenzverfahrens. Brauwissenschaft 25 (1972) 9, 226-271.

23. Markkanen, P. & Enari, T.-M., The effect of phosphate on α-amylase production and sporulation by *Bacillus subtilis*. Acta Chem. Scand. 26 (1972), 3543-3548.

24. Haikara, A., Panimossa esiintyvien villihiivakontaminanttien osoittaminen immunologisella fluoresenssimenetelmällä. University of Helsinki, Department of Microbiology, MSc thesis, Helsinki 1972. 57 p.

25. Schneitz, C., Eri *Saccharomyces cerevisiae*-kantojen soveltuminen leivinhiivan teolliseen valmistukseen. University of Helsinki, Department of Microbiology, MSc thesis, Helsinki 1971. 118 p.+ app. 3 p.

26. Hakkarainen, M., Amylolyyttisten ja glukanolyyttisten entsyymien tuottaminen homeilla. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1972. 85 p.

27. Mäkinen, V., Stirred batch fermentations in the beer manufacture. Proc. 1st Nat. Meeting Biophysics and Biotechnology in Finland, Helsinki 1973, 139-141.

28. Markkanen, P., Some aspects of production of exoenzymes by *Bacillus subtilis*. Proc. 1st Nat. Meeting Biophysics and Biotechnology in Finland, Helsinki 1973, 148-150.

29. Mannio, M. & Enari, T.-M., Über die Wirkung von *Fusarium*-Schimmelpilzen der Gerste bei der Bierherstellung. Brauwissenschaft 26 (1973), 134-137.

30. Suortti, T., Rehuhiivan kasvatus sulfiittijäteliemessä. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1973. 114 p.

31. Reinvall, A., Ravinteiden ja niiden lisäyksen vaikutus ekstrasellulaaristen entsyymien muodostumiseen *Bacillus subtili*ksella. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1973. 69 p.+ app. 16 p.

32. Peake, S., Isolation, purification and properties of *Fusarium* toxins. Industrial Training Report for University of Bath, Applied Biochemistry, UK. Espoo 1973. 44 p.

33. Kurkinen, M., Toksiinien eristäminen *Stachybotrys alternans*-homeesta. Report, Helsinki 1973. 25 p.+ app. 14 p.

34. Korpinen, E.-L., Kurkinen, M., Nummi, M. & Enari, T.-M., Studies on *Stachybotrys alternans*. Acta Path. Microbiol. Scand. 1974:B82, 7-11.

35. Markkanen, P.H. & Bailey, M.J., Simultaneous production of α-amylase, ß-glucanase and proteolytic enzymes by *Bacillus subtilis*. J. Appl. Chem. Biotechnol. 24 (1974), 93-103.

36. Markkanen, P.H. & Suihko, M.-L., The use of UV radiation on the improvement of enzyme production by *Bacillus subtilis*. Finn. Chem. Lett. 2 (1974), 89-92.

37. Okkonen, L., Nukleiinihappopitoisuuden alentaminen single cell protein-tuotteista., Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1974. 57 p.+ app. 8 p.

38. Ojanen, T., *Fusarium*-toksiinien vaikutus viherlevän fotosynteesiin. University of Helsinki, Department of Biochemistry, MSc thesis, Helsinki 1974. 26 p.

39. Kurkinen, M., Toksiinien eristäminen *Stachybotrys alternans* -homeesta. University of Helsinki, Department of Biochemistry, MSc thesis, Helsinki 1974. 17 p.+ app. 22 p.

40. Eklund, E., Hatakka, A., Linko, M., Markkanen, P., Mustranta, A., Nybergh, P. & Vuori, A., Selluloosapitoiset jätteet yksisoluproteiinituotannon raaka-aineena. 1. Auringonkukan siemenkuorten happohydrolyysi. VTT Research Reports 9, Helsinki 1974. 40 p.

41. Bailey, M.J. & Markkanen, P., Use of mutagenic agents in improvement of α-amylase production by *Bacillus subtilis*. J. Appl. Chem. Biotechnol. 25 (1975), 73-79.

42. Nummi, M., Niku-Paavola, M.-L. & Enari, T.-M., Der Einfluss eines *Fusarium*-Toxins auf die Gersten-Vermälzung. Brauwissenschaft 28 (1975) 5, 130-133.

43. Markkanen, P., Biotechnical production of extracellular enzymes by *Bacillus subtilis*. University of Helsinki, Department of General Microbiology, Doctor thesis. VTT Publication 12, Helsinki 1975. 37 p.+ app. 31 p.

44. Leisola, M. & Linko, M., Determination of the activities of a cellulase complex. Proc. Symp. Enzymatic Hydrolysis of Cellulose, Aulanko 1975, 297-313.

45. Enari, T.-M., Markkanen, P. & Korhonen, E., Cellulase production by *Aspergillus awamori*. Proc. Symp. Enzymatic Hydrolysis of Cellulose, Aulanko 1975, 171-180.

46. Markkanen, P. & Eklund, E., Enzymatic hydrolysis of furfural process waste. Proc. Symp. Enzymatic Hydrolysis of Cellulose Aulanko 1975, 337-350.

47. Nummi, M., Niku-Paavola, M.-L. & Enari, T.-M., Effect of a *Fusarium*-Toxin on the development of α-amylase activity in germinating barley. Bios 1975:7-8, 266-269.

48. Bhumibhamon, O., Production and application of microbial extracellular multienzyme complexes on spent grains and other food industrial by-products. University of Helsinki, Department of Microbiology, Lic (Agr & For) thesis, Helsinki 1975. 117 p.

49. Harju, M., Heran käyttö rehuhiivan tuottoon. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1975. 98 p.+ app. 6 p.

50. Suihko, M.-L., Eri leipomohiivakantojen (*Saccharomyces cerevisiae* Hansen) ja hapantaikinahiivan (*Torulopsis holmii* Lodder) asetaatti-, propionaatti-, sorbaatti-, sokeri- ja rasvatoleranssi. University of Helsinki, Department of Microbiology, Lic (Agr & For) thesis, Helsinki 1975. 66 p.

51. Nevalainen, H., Sellulaasinegatiivisten mutanttikantojen eristys *Trichoderma viride* homesienestä. University of Helsinki, Department of Genetics, MSc thesis, Helsinki 1975. 87 p.

52. Uusitalo, H., *Trichoderma viride*-homesienen alustaansa erittämät proteiinit analysoituina polyakrylamidigeelielektroforeesin avulla. University of Helsinki, Department of Genetics, MSc thesis, Helsinki 1975 p.+ app. 5 p.

54. Suihko, M.-L. & Mäkinen, V., Eri leipomohiivakantojen (*Saccharomyces cerevisiae* Hansen) ja erään hapantaikinahiivan (*Torulopsis holmii* Lodder) asetaatti-, propionaatti-, sorbaatti-, sokeri- ja rasvatoleranssi. VTT Research Reports 11, Helsinki 1975. 37 p.

55. Mäkinen, V. & Suihko, M.-L., Semi-continuous cultivation in production of baker's yeast. Proc. 2nd Nat. Meeting Biophysics and Biotechnology in Finland, Espoo 1976, 126-128.

56. Haikara, A. & Enari, T.-M., The detection of wild yeast contamination by the immunofluorescence technique. Proc. 15th EBC Congress, Nice 1975, 363-375.

57. Pajunen, E. & Mäkinen, V., The effect of pH and agitation of beer fermentation. Proc. 15th EBC Congress, Nice 1975, 525-538.

58. Markkanen, P.H. & Bailey, M.J., Effect of alteration of aeration and temperature on production of α-amylase by *Bacillus subtilis*. J. Appl. Chem. Biotechnol. 25 (1975), 863-865.

59. Hatakka, A., Anttonen, E., Mustranta, A. & Nybergh, P., Production of microbial protein from enzymatic hydrolyzates of waste cellulose. Proc. 2nd Nat. Meeting Biophysics and Biotechnology in Finland, Espoo 1976, 99-101.

60. Mäkinen, V., Panimohiivakannat ja niiden ominaisuuksien testaus. Mallasjuomat 1976:2, 35-46.

61. Harju, M., Heikonen, M., Kreula, M. & Linko, M., Heran käyttö rehuhiivan tuottoon. Karjantuote 1975:11. 4 p.

62. Eklund, E., Hatakka, A., Mustranta, A. & Nybergh, P., Acid hydrolysis of sunflower seed husks for production of single cell protein. Eur. J. Appl. Microbiol. 2 (1976), 143-152.

63. Palva, T. & Nevalainen, H., Improvement of the enzyme-producing properties of fungal strains using mutagenesis. Proc. 2nd Nat. Meeting Biophysics and Biotechnology in Finland, Espoo 1976, 93-95.

64. Harju, M., Heikonen, M., Kreula, M. & Linko, M., Nutrient supplementation of Swiss cheese whey for the production of feed yeast. Milchwissenschaft 31 (1976) 9, 530-534.

65. Pajunen, E., Inverkan av pH och ompumpning på jäsningen med olika jäststammar. 17th Scand. Brew. Technol. Meeting, Lillehammer 1976, 118-143.

66. Mustranta, A., Selluloosapitoisten materiaalien entsymaattinen hydrolyysi. University of Turku, Department of Biochemistry, LicPhil thesis, Helsinki 1976. 75 p.+ app. 6 p.

67. Weckström, L., Enzymatisk hydrolys av hemicellulosa ur bisulfitavlut. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1976. 57 p.

68. Hatakka, A., Mustranta, A. & Nybergh, P., Selluloosapitoisten materiaalien entsymaattinen hydrolyysi ja hydrolysaattien käyttö biomassan tuotantoon. Report, Helsinki 1976. 218 p.

69. Escudier, J.-L., The effect of *Candida krusei* on the properties of baker's yeast. Report on practical work in Finland for Ecole Nationale Superieure des Industries, Agricoles et Alimentaires, Douai, France. Helsinki 1976. 21 p.

70. Enari, T.-M. & Markkanen, P., Production of cellulolytic enzymes by fungi. Adv. Biochem. Eng. 5 (1977), 1-24.

71. Niku-Paavola, M.-L. & Nummi, M., Homeiden tuottamat myrkyt ja niiden tutkimus. Kemia-Kemi 4 (1977) 4, 151-153.

72. Pajunen, E., Jääskeläinen, K., Vehviläinen, H. & Mäkinen, V., Estergehalt während der Biergärung und -lagerung. Brauwissenschaft 30 (1977) 5, 129-133.

73. Frankenhaeuser, M., Harju, M., Heikonen, M., Kreula, M. & Linko, M., ß-galaktosidaasin valmistaminen hiivoilla. Karjantuote 60 (1977) 4, 6-8.

74. Markkanen, P., Reinvall, A. & Linko, M., Increase of ß-glucanase production by *Bacillus subtilis* by use of starch feeding during fermentor cultivation. J. Appl. Chem. Biotechnol. 26 (1976) 1, 41-46.

75. Viikari, L. & Linko, M., Reduction of nucleic acid content of SCP. Proc. Biochem. 12 (1977) 4, 17-19, 35.

76. Ilus, T., Ward, P.J. & Nummi, M., A new mycotoxin from *Fusarium*. Phytochem. 16 (1977), 1839-1840.

77. Leisola, M. & Linko, M., Use of dyed avicel cellulose to determine the solubilizing activity of a cellulase complex. Finn. Chem. Lett. 1977, 172-176.

78. Roering, K., ß-glukosidaasin tuotto. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1977. 39 p.+ app. 10 p.

79. Filbin, M., Production of cellobiase by strains of *Aspergillus* species and *Trichoderma viride*. Industrial Training Report for University of Bath, UK. Espoo 1977. 24 p.

80. Baranger, P., *Candida krusei* contamination in baker's yeast. Report on practical work in Finland for Ecole Nationale Superieure des Industries, Agricoles et Alimentaires, Douai, France. Helsinki 1977. 19 p.

81. Nybergh, P., Mustranta, A., Hatakka, A. & Markkanen, P., Selluloosapitoiset jätteet yksisoluproteiinituotannon raaka-aineena. 2. Furfuraaliprosessin jätteen entsymaattinen hydrolyysi. VTT Research Reports 15, Helsinki 1977. 53 p.

82. Hatakka, A., Anttonen, E., Nybergh, P., Mustranta, A. & Eklund, E., Selluloosapitoiset jätteet yksisoluproteiinituotannon raaka-aineena. 3. Biomassan tuotto selluloosapitoisten jätteiden entsymaattisilla hydrolysaateilla. VTT Research Reports 16, Helsinki 1977. 44 p.

83. Suihko, M.-L. & Mäkinen, V., Leipomohiivan puolijatkuva kasvatus. VTT Research Reports 17, Helsinki 1977. 29 p.

84. Nevalainen, K.M.H. & Palva, E.T., Production of extracellular enzymes in mutants isolated from *Trichoderma viride* unable to hydrolyze cellulose. Appl. Environ. Microbiol. 35 (1978) 1, 11-16.

85. Linko, M., Markkanen, P., Bailey, M. & Leisola, M., Production of cellulases and hemicellulases by *Trichoderma viride*. Proc. Biocon. Symp., New Delhi 1977, 329-350.

86. Nummi, M. & Niku-Paavola, M.-L., Water soluble toxins of *Stachybotrys alternans*. Ann. Nutr. Alim. 31 (1977), 761-770.

87. Viikari, L., Klemola, M. & Linko, M., Production of xylanases. Proc. Symp. Biocon. in Food Technology, Helsinki 1978, 115-118.

88. Niku-Paavola, M.-L., Ilus, T., Ward, P.J. & Nummi, M., Thin layer analysis of *Fusarium* toxins in grain samples. Arch. de l'Institut Pasteur de Tunis 1977:3-4, 269-278.

89. Viikari, L., Linko, M. & Enari, T.-M., Production of xylanases. Proc. 1st Eur. Congr. Biotechnology, Interlaken 1978, 147-150.

90. Bailey, M., Markkanen, P., Roering, K. & Linko, M., Production of ß-glucosidase (cellobiase) by *Aspergillus* sp. Proc. 1st Eur. Congr. Biotechnology, Interlaken 1978, 3-5.

91. Vaisto, T., Heikonen, M., Kreula, M. & Linko, M., Selluloosaa pilkkovien entsyymien käyttö AIV-rehussa. Karjatalous 54 (1978) 10, 26-28.

92. Niku-Paavola, M.-L. & Nummi, M., Etudes sur les toxines de *Stachybotrys alternans*. Mycotoxines, compte rendu de la Reunion de la Société Francaise de Toxicologie, Pont-a-Mousson 1977. III. Identification des Mycotoxines, 103-109.

93. Harju, M., Heikonen, M., Kreula, M., Pajunen, E. & Linko, M., Teollisuusalkoholin ja alkoholijuomien valmistus herasta. Karjantuote 61 (1978) 9, 4-6.

94. Vaisto, T., Heikonen, M., Kreula, M. & Linko, M., The use of cellulases for increasing the sugar content of AIV-silage. J. Sci. Agr. Soc. Finland 50 (1978), 392-397.

95. Armston, A., A study of the growth factors required by *Lactobacillus brevis* VTT E 38 and the detection of beer spoilage lactic acid bacteria using immune sera. Industrial Training Report for University of Bath, Applied Biochemistry, UK. Espoo 1978. 69 p.+ app. 1 p.

96. Klemola, M., Homeiden ja *Bacillus*-kantojen ksylanaasin tuottokyvyn vertailu. University of Helsinki, Department of Microbiology, MSc thesis, Helsinki 1978. 61 p.

97. Klemola, M., Hemisellulaasien tuotto. Report, Helsinki 1978. 6 p.+ app. 9 p.

98. Ahvenainen, J., Panimohiivan rasvahapot ja sterolit. University of Helsinki, Department of General Microbiology, MSc thesis, Helsinki 1978. 45 p.

100. Vaisto, T., Sellulaasien vaikutus AIV-rehuun. Helsinki University of Technology, Department of Chemistry, MSc thesis. Espoo 1978. 83 p.+ app. 8 p.

101. Arokivi, R., ß-glukosidaasin tuottaminen *Aspergillus* -homeilla. University of Helsinki, Department of Microbiology, MSc thesis, Helsinki 1978. 65 p.

102. Viikari, L., Biomassan nukleiinihappopitoisuuden alentaminen. Helsinki University of Technology, Department of Chemistry, LicTech thesis, Espoo 1978. 83 p.+ app. 3 p.

103. Ylimäki, A., Koponen, H., Hintikka, E.-L., Nummi, M., Niku-Paavola, M.-L., Ilus, T. & Enari, T.-M., Sienet ja eräät niiden muodostamat toksiinit suomalaisessa viljassa. VTT Research Reports 18, Helsinki 1978. 42 p.

104. Enari, T.-M. & Pajunen, E., Hapen vaikutus flavoriyhdisteiden muodostumiseen olutkäymisessä. Mallas ja Olut 1979:3, 65-76.

105. Linnainmaa, K., Sorsa, M. & Ilus, T., Epoxytrichothecene mycotoxins as c-mitotic agents in Allium. Hereditas 90 (1979), 151-156.

106. Ylimäki, A., Koponen, H., Hintikka, E.-L., Nummi, M., Niku-Paavola, M.-L., Ilus, T. & Enari, T.-M., Mycoflora and occurrence of *Fusarium* toxins in Finnish grain. VTT Publication 21, Helsinki 1979. 28 p.

107. Nevalainen, H. & Palva, E.T., Improvement of amyloglucosidase production of *Aspergillus awamori* by mutagenic treatments. J. Chem. Technol. Biotechnol. 29 (1979), 390-395.

108. Mustranta, A., Linko, M., Harju, M. & Heikonen, M., Production and use of lactase. Kemia-Kemi 6 (1979) 6, 306-308.

109. Karvonen, E., Leisola, M. & Virkkunen, J., Automatic enzyme analysis in pilot fermentation. Kemia-Kemi 6 (1979) 6, 309-310.

110. Kivikoski, K., *Lactobacillus brevis* E38:n kasvutekijän puhdistaminen. University of Helsinki, Department of Biochemistry, MSc thesis, Helsinki 1979. 22 p.

111. Harju, L., *Trichoderma reesei*n ja *Aspergillus niger*in ß-glukosidaasien puhdistus ja osittainen karakterisointi. University of Helsinki, Department of Biochemistry, MSc thesis, Helsinki 1979. 43 p.

112. Alenius, M., ß-galaktosidaasin tuotto. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1979. 70 p.+ app. 11 p.

113. Nevalainen, H., Solunulkoisten home-entsyymien tuoton parantaminen mutageenin avulla: *Trichoderma reesei* -sellulaasit. University of Helsinki, Department of Genetics, LicPhil thesis, Helsinki 1979. 48 p.+ app. 7 p.

114. Saltel, L., Detection des contaminants microbiologique par la méthode de bioluminescence. Report on practical work in Finland for Ecole Nationale Superieure des Industries, Agricoles et Alimentaires, Douai, France. Espoo 1979. 51 p.+ app. 34 p.

115. Ojamo, H., Eräiden hydrolyyttisten mikrobientsyymien tuoton automaattinen seuranta. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1979. 64 p.

117. Suihko, M.-L. & Mäkinen, V., Sitruunahapon tuottaminen. Report, Helsinki 1979. 34 p.

118. Nevalainen, K.M.H., Palva, E.T. & Bailey, M.J., A high cellulase-producing mutant strain of *Trichoderma reesei*. Enzyme Microb. Technol. 2 (1980), 59-60.

119. Leisola, M. & Ojamo, H., Automatic analyzers in monitoring of enzyme production. Food Proc. Eng. Vol. 2: Enzyme Eng. in Food Processing. Applied Science Publishers Ltd. 1980, 295-300.

120. Karvonen, E. & Meskanen, A., Monitoring and control of enzyme fermentation processes using a computer coupled autoanalyzer. Dechema-Kurs, Mess- und Regeltechnische Probleme in Bioreaktoren, Zürich 1979, 139-144.

121. Home, S., Mallastuksen nopeuttaminen entsyymien avulla. Mallas ja Olut 1980:1, 21-26.

122. Sorsa, M., Linnainmaa, K., Penttilä, M. & Ilus, T., Evaluation of mutagenicity of epoxytrichothecene mycotoxins in *Drosophila melanogaster*. Hereditas 92 (1980), 163-165.

123. Leisola, M., Ojamo, H., Kauppinen, V., Linko, M. & Virkkunen, J., Measurement of α-amylase and glucoamylase activities produced during fermentation. Enzyme Microb. Technol. 2 (1980), 121-125.

124. Nummi, M., Niku-Paavola, M.-L., Enari, T.-M. & Raunio, V., Immunoelectrophoretic detection of cellulases. FEBS Letters 113 (1980) 2, 164-166.

125. Weckström, L. & Leisola, M., Enzymatic hydrolysis of hemicellulose from bisulphite waste. Proc. 6th Int. Ferm. Symp., London, Canada 1980, 21-26.

126. Viikari, L., Nybergh, P. & Linko, M., Hydrolysis of cellulose by *Trichoderma reesei* enzymes and simultaneous production of ethanol by *Zymomonas* sp. Proc. 6th Int. Ferm. Symp. London, Canada 1980, 137-142.

127. Norppa, H., Penttilä, M., Sorsa, M., Hintikka, E.-L. & Ilus, T., Mycotoxin T-2 of *Fusarium tricinctum* and chromosome changes in Chinese hamster bone marrow. Hereditas 93 (1980), 329-332.

128. Penttilä, L., Erään oluesta eristetyn bakteerin biokemiallinen karakterisointi. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1980. 76 p.

129. Vehmaanperä, J., Alhaisia ß-galaktosidaasiaktiivisuuksia tuottavien *Aspergillus niger* -mutanttien indusointi, eristys ja karakterisointi. University of Helsinki, Department of General Microbiology, MSc thesis, Helsinki 1980. 65 p.+ app. 2 p.

130. Öster, H., Produktion av ß-galaktosidas med olika mögelstammar. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1980. 61 p.+ app. 12 p.

131. Patchett, R., The promotion of gushing of beer using artificial fungal contamination. Industrial Training Report for University of Bath, Applied Biochemistry, UK. Espoo 1980. 35 p.

132. Thurston, P.A., Taylor, R. & Ahvenainen, J., Effects of linoleic acid supplements on the synthesis by yeast of lipids and acetate esters. J. Inst. Brew. 87 (1981), 92-95.

133. Enari, T.-M., Ilus, T., Niku-Paavola, M.-L., Nummi, M., Ylimäki, A. & Koponen, H., Formation of *Fusarium* metabolites in barley grain. Eur. J. Appl. Microbiol. Biotechnol. 11 (1981), 241-243.

134. Ilus, T., Niku-Paavola, M.-L. & Enari, T.-M., Chromatographic analysis of *Fusarium* toxins in grain samples. Eur. J. Appl. Microbiol. Biotechnol. 11 (1981), 244-247.

135. Bailey, M.J. & Nevalainen, K.M.H., Induction, isolation and testing of stable *Trichoderma reesei* mutants with improved production of solubilizing cellulase. Enzyme Microb. Technol. 3 (1981), 153-157.

136. Haikara, A., Penttilä, L., Enari, T.-M. & Lounatmaa, K., Microbiological, biochemical, and electron microscopic characterization of a *Pectinatus* strain. Appl. Environ. Microbiol. 41 (1981) 2, 511-517.

137. Nevalainen, K.M.H., Induction, isolation and characterization of *Aspergillus niger* mutant strains producing elevated levels of ß-galactosidase. Appl. Environ. Microbiol. 41 (1981), 593-596.

138. Viikari, L., Linko, M. & Enari, T.-M., Ethanol from cellulosic materials. The Ekman Days. Proc. Int. Symp. Wood and Pulping Chemistry, Stockholm 1981, 18-22.

139. Enari, T.-M., Niku-Paavola, M.-L. & Nummi, M., Comparison of cellulolytic enzymes from *Trichoderma reesei* and *Aspergillus niger*. Proc. 2nd Symp. Bioconversion and Biochemical Engineering, New Delhi 1980, 87-95.

140. Suihko, M.-L. & Mäkinen, V., *Candida krusei* in baker's yeast production. Eur. J. Appl. Microbiol. Biotechnol. 13 (1981), 113-116.

141. Mustranta, A., Karvonen, E., Ojamo, H. & Linko, M., Production of mold lactase. Biotechnol. Lett. 3 (1981), 333-338.

142. Nummi, M., Fox, P.C., Niku-Paavola, M.-L. & Enari, T.-M., Nephelometric and turbidometric assays of cellulase activity. Anal. Biochem. 116 (1981), 133-136.

143. Nummi, M., Niku-Paavola, M.-L., Enari, T.-M. & Raunio, V., Isolation of cellulases by means of biospecific sorption on amorphous cellulose. Anal. Biochem. 116 (1981), 137-141.

144. Enari, T.-M., Niku-Paavola, M.-L., Harju, L., Lappalainen, A. & Nummi, M., Purification of *Trichoderma reesei* and *Aspergillus niger* ß-glucosidase. J. Appl. Biochem. 3 (1981), 157-163.

145. Haikara, A., Enari, T.-M. & Lounatmaa, K., The genus *Pectinatus*, a new group of anaerobic beer spoilage bacteria. Proc. 18th EBC Congress, Copenhagen 1981, 229-240.

146. Ahvenainen, J. & Mäkinen, V., The effect of pitching yeast aeration on fermentation and beer flavour. Proc. 18th EBC Congress, Copenhagen 1981, 285-291.

147. Bailey, M.J., The effect of ß-glucosidase on some assays for cellulolytic enzymes. Biotechnol. Lett. 3 (1981) 12, 695-700.

148. Suihko, M.-L. & Enari, T.-M., The production of ethanol from D-glucose and D-xylose by different *Fusarium* strains. Biotechnol. Lett 3 (1981) 12, 723-728.

149. Laurila, H., Protoplastien valmistaminen *Curvularia inaequalis* homeesta. University of Helsinki, Department of General Microbiology, MSc thesis, Helsinki 1981. 78 p.+ app. 4 p.

150. Haikara, A. & Boije-Backman, S., The use of optical brighteners in the detection of bacterial and yeast contaminants in beer. Brauwissenschaft 35 (1982) 5, 113-117.

151. Haikara, A., *Pectinatus* panimokontaminanttina. Mallas ja Olut 1982:4, 101-108.

152. Ahvenainen, J., Lipid composition of aerobically and anaerobically propagated brewer's bottom yeast. J. Inst. Brew. 88 (1982), 367-370.

153. Harrach, B., Nummi, M., Niku-Paavola, M.-L., Mirocha, C.J. & Palyusik, M., Identification of "water-soluble" toxins produced by a *Stachybotrys atra* strain from Finland. Appl. Environ. Microbiol. 44 (1982), 494-495.

154. Perttula, M., Hiivalaktaasin tuottaminen. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1982. 79 p.+ app. 4 p.

155. Lindberg, K., Etanolintuotto *Zymomonas*-bakteereilla. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1982. 81 p.+ app. 6 p.

156. Suomalainen, I., D-ksyloosin fermentaatio etanoliksi *Fusarium oxysporum* -homeella immobilisointitekniikkaa käyttäen. University of Helsinki, Department of Biochemistry, MSc thesis, Helsinki 1982. 35 p.

157. Suomalainen, I., D-ksyloosin katabolia D-ksyluloosiksi *Fusarium oxysporum* -homeella. Report, Espoo 1982. 17 p.

158. Pullen, A., Isolation of gushing factors produced by *Aspergillus fumigatus* and *Penicillium* sp. in liquid culture medium. Investigation into the stability of gushing factors produced by *Fusarium culmorum* in contaminated barley and malt. Industrial Training Report for University of Bath, Applied Biochemistry, UK. Espoo 1982. 26 p.

159. Suihko, M.-L. & Drazic, M., Pentose fermentation by yeasts. Biotechnol. Lett. 5 (1983) 2, 107-112.

160. Helander, I., Hakalehto, E., Ahvenainen, J. & Haikara, A., Characterization of lipopolysaccharides of *Pectinatus cerevisiophilus*. FEMS Microbiol. Lett. 18 (1983), 223-226.

161. Bailey, M.J. & Rättö, M., Production and some properties of cellulolytic and xylanolytic enzymes. Proc. Symp. Bioconversion of Plant Raw Material by Microorganisms, Tvärminne 1982, 105-117.

162. Linko, M., Rättö, M., Viikari, L. & Bailey, M., Organisms and enzymes for the hydrolysis of cellulose and xylan. Proc. Int. Symp. Ethanol from Biomass, Winnipeg, Canada 1982, 371-396.

163. Suihko, M.-L., Suomalainen, I. & Enari, T.-M., D-xylose catabolism in *Fusarium oxysporum*. Biotechnol. Lett. 5 (1983) 8, 525-530.

164. Ahvenainen, J., The role of lipids in brewing. University of Helsinki, Department of General Microbiology, Doctor thesis. VTT Publications 12, Espoo 1983. 26 p.+ app. 24 p.

165. Home, S., Maunula, H. & Linko, M., Cellulases - a novel solution to some malting and brewing problems. Proc. 19th EBC Congress, London 1983, 385-392.

166. Haikara, A., Malt and beer from barley artificially contaminated with *Fusarium* in the field. Proc. 19th EBC Congress, London 1983, 401-408.

167. Knowles, J.K.C., Nevalainen, K.M.H., Penttilä, M.E., Salovuori, I.A. & Teeri, T.T., The cloning of fungal cellulase genes. Proc. Alko Yeast Symposium, Helsinki 1983. In: Gene Expression in Yeast, eds. Korhola, M. & Väisänen, E., Foundation for Biotechnical and Industrial Fermentation Research 1 (1983), 187-188.

168. Suihko, M.-L., The fermentation of different carbon sources by *Fusarium oxysporum*. Biotechnol. Lett. 5 (1983) 11, 721-724.

169. Nummi, M., Niku-Paavola, M.-L., Lappalainen, A., Enari, T.-M. & Raunio, V., Cellobiohydrolase from *Trichoderma reesei*. Biochem. J. 215 (1983), 677-683.

170. Haikara, A., Immunological characterization of *Pectinatus cerevisiophilus* strains. Appl. Environ. Microbiol. 46 (1983) 5, 1054-1058.

171. Teeri, T., Salovuori, I. & Knowles, J., The molecular cloning of the major cellulase gene from *Trichoderma reesei*. Biotechnol. 1 (1983), 696-699.

172. Sandström. C.-J., Protoplastfusion mellan *Candida pseudotropicalis* (Basgal) and *Saccharomyces cerevisiae* (Hansen). University of Helsinki, Department of General Microbiology, MSc thesis, Helsinki 1983. 72 p.

173. Tarkkanen, T., Etanolin tuotto herasta. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1983. 81 p.+ app. 6 p.

174. Siika-aho, M., Mikrobirenniinin tuottaminen. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1983. 97 p.+ app. 7 p.

175. Hakalehto, E., *Pectinatus cerevisiophilus* -bakteerien pintaproteiinit. University of Helsinki, Department of Microbiology, MSc thesis, Helsinki 1983. 52 p.

176. Jakeman, S., An investigation into the causes of inefficient ethanol production in sucrose fermentation by *Zymomonas mobilis* VTT-E-78082. Industrial Training Report for University of Bath, UK. Espoo 1983. 36 p.

177. Haikara, A., Beer spoilage organisms. Occurrence and detection with particular reference to a new genus *Pectinatus*. University of Helsinki, Department of Microbiology, Doctor thesis. VTT Publications 14, Espoo 1984. 47 p.+ app. 58 p.

178. Suihko, M.-L. & Poutanen, K., D-xylulose fermentation by free and immobilized *Saccharomyces cerevisiae* cells. Biotechnol. Lett. 6 (1984) 3, 189-194.

179. Viikari, L., Formation of levan and sorbitol from sucrose by *Zymomonas mobilis*. Appl. Microbiol. Biotechnol. 19 (1984), 252-255.

180. Penttilä, M.E., Nevalainen, K.M.H., Raynal, A. & Knowles, J.K.C., Cloning of *Aspergillus niger* genes in yeast. Expression of the gene coding *Aspergillus* ß-glucosidase. Mol. Gen. Genet. 194 (1984), 494-499.

181. Suihko, M.-L., D-xylose fermentation by *Fusarium oxysporum* and other fungi. University of Helsinki, Department of Microbiology, Doctor thesis. VTT Publications 17, Espoo 1984. 31 p.+ app. 40 p.

182. Enari, T.-M. & Suihko, M.-L., Ethanol production by fermentation of pentoses and hexoses from cellulosic materials. CRC Crit. Rev. Biotechnol. 1 (1984) 3, 229-240.

183. Lundell, R., Mustranta, A., Kaila, E. & Karppinen, J., A novel process for the production of enzymes. Proc. 3rd Eur. Congr. Biotechnology, München 1984, Vol. I, 529-532.

184. Holmberg, A., Ojamo, H., Perttula, M. & Ranta, J., Utilization of models in the prediction and optimization of yeast beta-galactosidase production. Proc. 3rd Eur. Congr. Biotechnology, München 1984, Vol. I, 699-704.

185. Bailey, M.J. & Oksanen, J., Cellulase production by mutant strains of *Trichoderma reesei* on non-cellulosic media. Proc. 3rd Eur. Congr. Biotechnology, München 1984, Vol. II, 157-162.

186. Poutanen, K. & Puls, J., Enzymatic hydrolysis of steam-pretreated lignocellulosic materials. Proc. 3rd Eur. Congr. Biotechnology, München 1984, Vol. II, 217-222.

187. Viikari, L., Suihko, M.-L. & Linko, M., Enhancement of pentose fermentation by *Fusarium oxysporum*. Proc. 3rd Eur. Congr. Biotechnology, München 1984, Vol. II, 425-429.

188. Suihko, M.-L. & Mäkinen, V., Tolerance of acetate, propionate and sorbate by *Saccharomyces cerevisiae* and *Torulopsis holmii*. Food Microbiol. 1 (1984), 105-110.

189. Viikari, L., Formation of sorbitol by *Zymomonas mobilis*. Appl. Microbiol. Biotechnol. 20 (1984), 118-123.

190. Haikara, A., Mögelflorans inverkan på korn-, malt- och ölkvaliteten. Proc. 19th Nordic Brew. Technol. Meeting, Turku 1984. Foundation for Biotechnical and Industrial Fermentation Research 2 (1984), 42-51.

191. Nummi, M. & Lappalainen, A., Combination of three techniques for the study of complex enzyme mixtures: polyacrylamide gel electrophoresis, immunodiffusion and detection of enzyme activity. J. Biochem. Biophys. Methods 11 (1985), 295-302.

192. Knowles, J., Nevalainen, H., Salovuori, I., Penttilä, M., Teeri, T., Niku-Paavola, M.-L. & Lehtovaara, P., The cloning of fungal cellulase genes and their expression in yeast. Proc. 16th FEBS Congress, Moscow 1984, Part C, 237-242.

193. Niku-Paavola, M.-L., Biochemistry of *Trichoderma reesei* VTT-D-80133 cellulases. Proc. Soviet-Finland Seminar Bioconversion of Plant Raw Materials by Microorganisms, Tashkent 1983, 26-31.

194. Lehtovaara, P., Ulmanen, I. & Palva, I., In vivo transcription initiation and termination sites of an α-amylase gene from *Bacillus amyloliquefaciens* cloned in *Bacillus subtilis*. Gene 30 (1984), 11-16.

195. Hakalehto, E., Haikara, A., Enari, T.-M. & Lounatmaa, K., Hydrochloric acid extractable protein patterns of *Pectinatus cerevisiophilus* strains. Food Microbiol. 1 (1984), 209-216.

196. Kantelinen, A., Entsyymintuotto kaksifaasitekniikalla. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1984. 82 p.+ app. 1 p.

198. Livio, H.-L., Mikrobiperoksidaasien tuottaminen. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1985. 84 p.

199. Simell, M., Ligniinin biologinen hajottaminen. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1985. 92 p.

200. Lantto, R., Oluessa viskositeettia aiheuttavan *Bacillus*-lajin karakterisointi. University of Helsinki, Department of General Microbiology, MSc thesis, Espoo 1985. 49 p.

201. Laurila, H.O., Nevalainen, H. & Mäkinen, V., Production of protoplasts from the fungi *Curvularia inaequalis* and *Trichoderma reesei*. Appl. Microbiol. Biotechnol. 21 (1985), 210-212.

204. Patent FI 53590. Ribonucleic acid-containing product of biomass. Yhtyneet Paperitehtaat Oy. Linko, M. & Viikari, L., 28 Feb. 1978. 11 p.

205. Nummi, M., Perrin, J.-M., Niku-Paavola, M.-L. & Enari, T.-M., Measurement of xylanase activity with insoluble xylan substrate. Biochem. J. 226 (1985), 617-620.

209. Haikara, A., Detection of *Pectinatus* contaminants in beer. Proc. Am. Soc. Brew. Chem. 43 (1985) 1, 43-46.

210. Haikara, A., Lantto, R., Mäkinen, V. & Lounatmaa, K., Ropiness of beer caused by *Bacillus* sp. Proc. 20th EBC Congress, Helsinki 1985, 443-450.

211. Haikara, A., Detection of anaerobic, gram-negative bacteria in beer. Monatsschrift für Brauwissenschaft 38 (1985) 6, 239-243.

213. Buchert, J., Ksylonihapon tuottaminen mikrobeilla. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1985. 58 p.+ app. 3 p.

214. Puls, J., Poutanen, K. & Viikari, L., The effect of steaming pretreatment on the biotechnical utilization of wood components. Bioenergy 84. Biomass Conversion, eds. Egneus, H. & Ellegård, A., Elsevier Applied Science Publishers, London 1985, Vol. III, 173-180.

215. Niku-Paavola, M.-L., Lappalainen, A., Enari, T.-M. & Nummi, M., A new appraisal of the endoglucanases of the fungus *Trichoderma reesei*. Biochem. J. 231 (1985), 75-81.

216. Poutanen, K., Puls, J. & Viikari, L., Biotechnical utilization of wood components. Finnish-Soviet Seminar, Espoo 1984. VTT Symposium 60, Espoo 1985, 139-145.

217. Okunev, O.N., Lappalainen, A., Niku-Paavola, M.-L. & Nummi, M., Xylanase and cellobiohydrolase from *Aspergillus terreus*. Finnish-Soviet Seminar, Espoo 1984. VTT Symposium 60, Espoo 1985, 171-181.

218. Ulmanen, I., Lundström, K., Lehtovaara, P., Sarvas, M., Ruohonen, M. & Palva, I., Transcription and translation of foreign genes in *Bacillus subtilis* by the aid of a secretion vector. J. Bacteriol. 162 (1985) 1, 176-182.

219. Puls, J., Poutanen, K., Körner, H.-U. & Viikari, L., Biotechnical utilization of wood carbohydrates after steaming pretreatment. Appl. Microbiol. Biotechnol. 22 (1985), 416-423.

220. Nevalainen, H., Genetic improvement of enzyme production in industrially important fungal strains. University of Helsinki, Department of Genetics, Doctor thesis. VTT Publications 26, Espoo 1985. 58 p.+ app. 34 p.

221. Oksanen, J., Ahvenainen, J. & Home, S., Microbial cellulase for improving filtrability of wort and beer. Proc. 20th EBC Congress, Helsinki 1985, 419-425.

222. Knowles, J.K.C., Penttilä, M., Teeri, T.T., André, L., Salovuori, I. & Lehtovaara, P., Transfer of genes coding for fungal glucanases into yeast. Proc. 20th EBC Congress, Helsinki 1985, 251-258.

223. Viikari, L. & Gisler, R., By-products in the fermentation of sucrose by different *Zymomonas*-strains. Appl. Microbiol. Biotechnol. 23 (1986), 240-244.

224. Viikari, L., By-product formation in ethanol fermentation by *Zymomonas mobilis*. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 27, Espoo 1986. 39 p.+ app. 35 p.

225. Poutanen, K., Puls, J. & Linko, M., The hydrolysis of steamed birchwood hemicellulose by enzymes produced by *Trichoderma reesei* and *Aspergillus awamori*. Appl. Microbiol. Biotechnol. 23 (1986), 487-490.

226. Viikari, L. & Linko, M., Rate and yield limiting factors in continuous fermentation of sucrose by *Zymomonas mobilis*. Biotechnol. Lett. 8 (1986) 2, 139-144.

227. Haikara, A., Uudet panimokontaminantit. Mallas ja Olut 1986:3, 69-77.

228. Teeri, T., Molecular cloning of cellulase genes from *Trichoderma reesei*. Biotechnology Research Foundation, Scientific Report 1982-1985. Stiftelsen Bioteknisk Forskning, Lund 1985, 67-72.

229. Boije-Backman, S. & Haikara, A., Akridiinioranssivärjäys - nopea kontaminanttien osoitusmenetelmä. Mallas ja Olut 1986:3, 79-85.

230. Viikari, L., Ranua, M., Kantelinen, A., Sundquist, J. & Linko, M., Bleaching with enzymes. Proc. 3rd Int. Conf. Biotechnol. in the Pulp and Paper Industry, Stockholm 1986, 67-69.

231. Lehtovaara, P., Knowles, J., André, L., Penttilä, M., Teeri, T., Salovuori, I., Niku-Paavola, M.-L. & Enari, T.-M., The application of recombinant DNA for the production of pure enzymes for the pulp and paper industry. Proc. 3rd Int. Conf. Biotechnol. in the Pulp and Paper Industry, Stockholm 1986, 90-92.

232. Puls, J., Poutanen, K., Schmidt, O. & Linko, M., α-1,2-glucuronidase in the hydrolysis of hemicellulose. Proc. 3rd Int. Conf. Biotechnol. in the Pulp and Paper Industry, Stockholm 1986, 93-95.

233. Leikas, A., Immobilisoidun hiivan käyttö oluen valmistuksessa. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1986. 119 p.

234. Niku-Paavola, M.-L., Endoglucanases of *Trichoderma reesei*. Proc. Soviet Finnish Seminar on Microbial Degradation of Lignocellulose Raw Materials, Tbilisi 1985, 9-16.

235. Buchert, J., Viikari, L., Linko, M. & Markkanen, P., Production of xylonic acid by *Pseudomonas fragi*. Biotechnol. Lett. 8 (1986) 8, 541-546.

236. Viikari, L. & Korhola, M., Fructose metabolism in *Zymomonas mobilis*. Appl. Microbiol. Biotechnol. 24 (1986), 471-476.

237. Bailey, M., Utilization of glucoisosaccharinic acid by a bacterial isolate unable to metabolize glucose. Appl. Microbiol. Biotechnol. 24 (1986), 493-498.

238. Lappalainen, A., Purification and characterization of xylanolytic enzymes from *Trichoderma reesei*. Biotechnol. Appl. Biochem. 8 (1986), 437-448.

239. Niku-Paavola, M.-L., Lappalainen, A., Enari, T.-M. & Nummi, M., *Trichoderma reesei* cellobiohydrolase II. Purification by immunoadsorption and hydrolytic properties. Biotechnol. Appl. Biochem. 8 (1986), 449-458.

240. Salovuori, I., Biosynthesis of an inducible glycosylated secretory enzyme (CBH I) of *Trichoderma reesei*. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 34, Espoo 1987. 70 p.

241. Penttilä, M., Lehtovaara, P., Nevalainen, H., Bhikhabhai, R. & Knowles, J., Homology between cellulase genes of *Trichoderma reesei*: complete nucleotide sequence of the endoglucanase I gene. Gene 45 (1986), 253-263.

242. Nikkola, M., *Klebsiella pneumoniae*-bakteerin alfa-asetolaktaattidekarboksylaasigeenin eristäminen. University of Helsinki, Department of Genetics, MSc thesis, Espoo 1987. 51 p.

243. Mäkinen, V. & Leikas, A., Immobilisoidun hiivan käyttö oluen valmistuksessa. Mallas ja Olut 1987:1, 4-16.

244. Salovuori, I., Makarow, M., Rauvala, H., Knowles, J. & Kääriäinen, L., Low molecular weight high-mannose type glycans in a secreted protein of the filamentous fungus *Trichoderma reesei*. Bio/Technology 5 (1987), 152-156.

245. Teeri, T.T., Lehtovaara, P., Kauppinen, S., Salovuori, I. & Knowles, J., Homologous domains in *Trichoderma reesei* cellulolytic enzymes: gene sequence and expression of cellobiohydrolase II. Gene 51 (1987), 43-52.

246. Viikari, L., Ranua, M., Kantelinen, A., Linko, M. & Sundquist, J., Application of enzymes in bleaching. Proc. 4th Int. Symp. Wood and Pulping Chemistry, Paris 1987, Vol. 1, 151-154.

247. Puls, J. & Poutanen, K., Analytical use of xylanolytic enzymes. Proc. 4th Int. Symp. Wood and Pulping Chemistry, Paris 1987, Vol. 1, 211-214.

248. Niku-Paavola, M.-L., Ligninolytic enzymes of the white rot fungus *Phlebia radiata*. Proc. 4th Int. Symp. Wood and Pulping Chemistry, Paris 1987, Vol. 2, 301-303.

249. Mustranta, A., Pere, J. & Poutanen, K., Comparison of different carriers for adsorption of *Saccharomyces cerevisiae* and *Zymomonas mobilis*. Enzyme Microb. Technol. 9 (1987), 272-276.

250. Teeri, T.T., The cellulolytic enzyme system of *Trichoderma reesei*. Molecular cloning, characterization and expression of the cellobiohydrolase genes. University of Helsinki, Department of Genetics, Doctor thesis. VTT Publications 38, Espoo 1987. 52 p.+ app. 41 p.

251. Bailey, M.J., A comparison of bacterial strains growing on glucoisosaccharinic acid. In: Wood and cellulosics (eds. Kennedy, J.F., Phillips, G.O. & Williams, P.A.), Ellis Horwood Ltd., Chichester, UK, 1987, 331-337.

252. Buchert, J., Poutanen, K., Puls, J., Hukka, R. & Viikari, L., Microbial production of xylonic acid. Proc. 4th European Congress on Biotechnology (eds. Neijssel, O.H., van der Meer, R.R. & Luyben, K.Ch.A.M.), Elsevier Science Publishers B.V., Amsterdam 1987, Vol. 3, 281-284.

253. Penttilä, M., Construction and characterization of cellulolytic yeasts. University of Helsinki, Department of Genetics, Doctor thesis. VTT Publications 39, Espoo 1987. 53 p.+ app. 63 p.

254. Penttilä, M.E., André, L., Saloheimo, M., Lehtovaara, P. & Knowles, J.K.C., Expression of two *Trichoderma reesei* endoglucanases in the yeast *Saccharomyces cerevisiae*. Yeast 3 (1987), 175-185.

255. Penttilä, M.E., André, L., Lehtovaara, P., Bailey, M.J., Teeri, T.T. & Knowles, J.K.C., Efficient secretion of two fungal cellobiohydrolases in *Saccharomyces cerevisiae*. Gene 63 (1988), 103-112.

256. Penttilä, M.E., Suihko, M.-L., Lehtinen, U., Nikkola, M. & Knowles, J.K.C., Construction of brewer's yeasts secreting fungal endo-ß-glucanase. Curr. Genet. 12 (1987), 413-420.

257. Enari, T.-M., Knowles, J., Lehtinen, U., Nikkola, M., Penttilä, M., Suihko, M.-L., Home, S. & Vilpola, A., Glucanolytic brewer's yeast. Proc. 21st EBC Congress, Madrid 1987, 529-536.

258. Lehtinen, U., Panimohiivatransformaatio *Trichoderma reesei*n ß-1,4-glukanaasia koodaavalla geenillä. University of Helsinki, Department of General Microbiology, MSc thesis, Espoo 1987. 66 p.

259. Poutanen, K., Rättö, M., Puls, J. & Viikari, L., Evaluation of different microbial xylanolytic systems. J. Biotechnol. 6 (1987), 49-60.

260. Teeri, T.T., Kumar, V., Lehtovaara, P. & Knowles, J., Construction of cDNA libraries by blunt-end ligation: High-frequency cloning of long cDNAs from filamentous fungi. Anal. Biochem. 164 (1987), 60-67.

261. Knowles, J., Lehtovaara, P., Penttilä, M., Teeri, T., Harkki, A. & Salovuori, I., The cellulase genes of *Trichoderma*. Antonie van Leeuwenhoek 53 (1987) 5, 335-341.

262. Pajunen, E., Mäkinen, V. & Gisler, R., Secondary fermentation with immobilized yeast. Proc. 21st EBC Congress, Madrid 1987, 441-448.

263. Haikara, A. & Lounatmaa, K., Characterization of *Megasphaera* sp., a new anaerobic beer spoilage coccus. Proc. 21st EBC Congress, Madrid 1987, 473-480.

264. Mustranta, A., Production of peroxidase by *Inonotus weirii*. Appl. Microbiol. Biotechnol. 27 (1987), 21-26.

265. Suihko, M.-L., Panimohiivojen kehittäminen yhdistelmä- DNA-tekniikalla. Mallas ja Olut 1987:5, 139-148.

267. Holmström, L., Kalvosuodatus kasvatusliuosten väkevöinnissä. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1987. 74 p.+ app. 52 p.

268. Kantelinen, A., Poutanen, K., Linko, M. & Markkanen, P. Semicontinuous enzyme production in an aqueous two-phase system. Annals of the New York Academy of Sciences, Enzyme Engineering 8, 501 (1987), 229-232.

269. Niku-Paavola, M.-L., Ligninolytic enzymes of the white rot fungus *Phlebia radiata*. Lignin enzymic and microbial degradation. INRA Congress, Paris 1987, 119-123.

270. Hatakka, A., Kantelinen, A., Tervilä-Wilo, A. & Viikari, L., Production of ligninases by *Phlebia radiata* in agitated cultures. Lignin enzymic and microbial degradation. INRA Congress, Paris 1987, 185-189.

271. Penttilä, M., Nevalainen, H., Rättö, M., Salminen, E. & Knowles, J., A versatile transformation system for the cellulolytic filamentous fungus *Trichoderma reesei*. Gene 61 (1987), 155-164.

272. Buchert, J. & Viikari, L., The role of the xylonolactone in xylonic acid production by *Pseudomonas fragi*. Appl. Microbiol. Biotechnol. 27 (1988), 333-336.

273. Saloheimo, M., Lehtovaara, P., Penttilä, M., Teeri, T.T., Ståhlberg, J., Johansson, G., Pettersson, G., Claeyssens, M., Tomme, P. & Knowles, J.K.C., EGIII, a new endoglucanase from *Trichoderma reesei*: the characterization of both gene and enzyme. Gene 63 (1988), 11-21.

274. Kantelinen, A., Waldner, R., Niku-Paavola, M.-L. & Leisola, M.S.A., Comparison of two lignin-degrading fungi: *Phlebia radiata* and *Phanerochaete chrysosporium*. Appl. Microbiol. Biotechnol. 28 (1988), 193-198.

275. Sundberg, M., Sienten ekstrasellulaariset esteraasit. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1988. 77 p.

276. Buchert, J., Biotechnical production of xylonic acid. Helsinki University of Technology, Department of Chemistry, LicTech thesis, Espoo 1988. 42 p.+ app. 37 p.

277. Poutanen, K., Characterization of xylanolytic enzymes for potential applications. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 47, Espoo 1988. 59 p.+ app. 50 p.

278. Poutanen, K., An α-L-arabinofuranosidase of *Trichoderma reesei*. J. Biotechnol. 7 (1988), 271-282.

279. Buchert, J., Puls, J. & Poutanen, K., Comparison of *Pseudomonas fragi* and *Gluconobacter oxydans* for production of xylonic acid from hemicellulose hydrolyzates. Appl. Microbiol. Biotechnol. 28 (1988), 367-372.

280. Poutanen, K. & Sundberg, M., An acetyl esterase of *Trichoderma reesei* and its role in the hydrolysis of acetyl xylans. Appl. Microbiol. Biotechnol. 28 (1988), 419-424.

281. Poutanen, K. & Puls, J., Characteristics of *Trichoderma reesei* ß-xylosidase and its use in the hydrolysis of solubilized xylans. Appl. Microbiol. Biotechnol. 28 (1988), 425-432.

282. Bailey, M.J. & Siika-aho, M., Production of microbial rennin. Biotechnol. Lett. 10 (1988) 3, 161-166.

283. Viikari, L., Carbohydrate metabolism in *Zymomonas*. CRC Crit. Rev. Biotechnol. 7 (1988) 3, 237-261.

284. Lappalainen, A., Cellulolytic and xylanolytic enzymes of *Trichoderma reesei*. University of Helsinki, Department of Biochemistry, Doctor thesis. VTT Publications 50, Espoo 1988. 54 p.+ app. 51 p.

285. Ilkko, A., *Bacillus subtilis* ja *Bacillus circulans* ksylaania hydrolysoivien entsyymien tuottajina. Helsinki University of Technology, Department of Chemistry, MSc thesis, Espoo 1988. 78 p.+ app. 1 p.

286. Bailey, M.J. & Poutanen, K., Production of xylanolytic enzymes by strains of *Aspergillus*. Appl. Microbiol. Biotechnol. 30 (1989), 5-10.

287. Patent FI 76377. Mikrobiologinen valmistusmenetelmä. Suomen Rehu Oy. Ojamo, H., Ylinen, L. & Linko, M., 10.5.1989. 8 p.

289. Buchert, J. & Viikari, L., Oxidative D-xylose metabolism of *Gluconobacter oxydans*. Appl. Microbiol. & Biotechnol. 29 (1988), 375-379.

290. Rättö, M. & Poutanen, K., Production of mannan-degrading enzymes. Biotechnol. Lett. 10 (1988) 9, 661-664.

291. Knowles, J.K.C., Lehtovaara, P., Murray, M. & Sinnott, M. L., Stereochemical course of the action of the cellobioside hydrolases I and II of *Trichoderma reesei*. J. Chem. Soc., Chem. Commun., 1988, 1401-1402.

292. Niku-Paavola, M.-L., Ligninases of the white rot fungus *Phlebia radiata*. Proc. Finnish-Soviet Seminar on Bioconversion of plant raw materials by microorganisms, Helsinki 1987. VTT Symposium 88, Espoo 1988, 74-84.

293. Poutanen, K., Enzymatic hydrolysis of hemicelluloses. Proc. Finnish-Soviet Seminar on Bioconversion of plant raw materials by microorganisms, Helsinki 1987. VTT Symposium 88, Espoo 1988, 141-150.

294. Pessa, E. & Bailey, M.J., Enzymic maceration of fruits and vegetables. Proc. Finnish-Soviet Seminar on Bioconversion of plant raw materials by microorganisms, Helsinki 1987. VTT Symposium 88, Espoo 1988, 192-203.

295. Home, S., Vilpola, A. & Suihko, M.-L., ß-glukanasaktiv bryggerijäst i pilotförsök. Referat 20. Nordiske Bryggeritekniske Mfde, Odense 1988. Bryggeriforeningen, Kfbenhavn 1988, 205-210.

296. Niku-Paavola, M.-L., Karhunen, E., Salola, P. & Raunio, V., Ligninolytic enzymes of the white-rot fungus *Phlebia radiata*. Biochem. J. 254 (1988), 877-883.

297. Lankinen, P., Panimohiivojen vertailu Pilot-panimokäymisissä ja karakterisointi geelielektro-foreesilla. University of Helsinki, Department of microbiology, MSc thesis, Helsinki 1989. 75 p.

299. Vanhanen, S., Penttilä, M., Lehtovaara, P. & Knowles, J., Isolation and characterization of the 3-phosphoglycerate kinase gene (*pgk*) from the filamentous fungus *Trichoderma reesei*. Curr. Genet. 15 (1989), 181-186.

300. Buchert, J., Puls, J. & Poutanen, K., The use of steamed hemicellulose as substrate in microbial conversions. Appl. Biochem. Biotechnol. 20/21 (1989), 309-318.

301. Walther, I., Kälin, M., Reiser, J., Suter, F., Fritsche, B., Saloheimo, M., Leisola, M., Teeri, T., Knowles, J.K.C. & Fiechter, A., Molecular analysis of a *Phanerochaete chrysosporium* lignin peroxidase gene. Gene 70 (1988), 127-137.

302. Harkki, A., Uusitalo, J., Bailey, M., Penttilä, M. & Knowles, J.K.C., A novel fungal expression system: secretion of active calf chymosin from the filamentous fungus *Trichoderma reesei*. Bio/Technol. 7 (1989), 596-603.

303. Kantelinen, A., Lignin-degrading enzymes of *Phlebia radiata*. Helsinki University of Technology, Department of Chemical Engineering, Laboratory of Biochemistry and Microbiology, LicTech thesis, Espoo 1989. 59 p.+ app. 12 p.

304. Kantelinen, A., Hatakka, A. & Viikari, L., Production of lignin peroxidase and laccase by *Phlebia radiata*. Appl. Microbiol. Biotechnol. 31 (1989), 234-239.

305. Aarnio, T., Protoplast fusion and continuous cultivation as methods for improving acetic acid tolerance of baker's yeast. Helsinki University of Technology, Department of Chemical Engineering, Laboratory of Biochemistry and Microbiology, LicTech thesis, Espoo 1989.104 p.

306. Stenberg, K., Expression of human tissue-type plasminogen activator (t-PA) in the filamentous fungus *Trichoderma reesei*. University of Helsinki, Department of General Microbiology, MSc thesis, Espoo 1989. 61 p.

307. Tomme, P., van Tilbeurgh, H., Pettersson, G., van Damme, J., Vandekerckhove, J., Knowles, J., Teeri, T. & Claeyssens, M., Studies of the cellulolytic system of *Trichoderma reesei* QM 9414. Eur. J. Biochem. 170 (1988), 575-581.

308. Kennedy, J.F., Stevenson, D.L., White, C.A. & Viikari, L., The chromatographic behaviour of a series of fructo-oligosaccharides derived from levan produced by the fermentation of sucrose by *Zymomonas mobilis*. Carbohydrate Polymers 10 (1989), 103-113.

309. Poutanen, K. & Puls, J., The xylanolytic enzyme system of *Trichoderma reesei*. In: Plant Cell Wall Polymers. Biogenesis and Biodegradation (eds. Lewis, N.G. & Paice, M.G.), American Chemical Society, Washington DC, 1989, 630-640.

310. Niku-Paavola, M.-L., Raaska, L. & Itävaara, M., Detection of white-rot fungi by a non-toxic stain. Mycol. Res. 94 (1989) 1, 27-31.

311. Haikara, A., Invasion of anaerobic bacteria into pitching yeast. Proc. 22nd EBC Congress, Zürich 1989, 537-544.

312. Kronlöf, J., Härkönen, T., Hartwall, P., Home, S. & Linko, M., Main fermentation with immobilized yeast. Proc. 22nd EBC Congress, Zürich 1989, 355-362.

313. Suihko, M.-L., Penttilä, M., Sone, H., Home, S., Blomqvist, K., Tanaka, J., Inoue, T. & Knowles, J., Pilot-brewing with α-acetolactate decarboxylase active yeasts. Proc. 22nd EBC Congress, Zürich 1989, 483-490.

315. Perttula, M., Viikari, L., Kristjansson, J., Pere, J. & Konradsdottir, M., Treatment of evaporator condensates using thermophilic bacteria. In: Non-waste Technology, Vol. II, VTT Symposium 103 (ed. Korhonen, M), Espoo 1989, 353-358.

316. Saloheimo, M, Barajas, V., Niku-Paavola, M.-L & Knowles, J., A lignin peroxidase-encoding cDNA from the white-rot fungus *Phlebia radiata*: characterization and expression of *Trichoderma reesei*. Gene 85 (1989), 343-351.

317. Niku-Paavola, M.-L. & Karhunen, E., Protein properties of the ligninolytic enzymes of *Phlebia radiata*. Soviet-Finnish Seminar on Bioconversion of Plant Raw Materials by Microorganisms, Riga 1988. USSR Academy of Sciences, Pushchino, 1989, 58-66.

318. Bailey, M.J. & Poutanen, K., Production of enzymes for the selective hydrolysis of xylan in lignocellulosic biomass. Soviet-Finnish Seminar on Bioconversion of Plant Raw Materials by Microorganisms, Riga 1988. USSR Academy of Sciences, Pushchino, 1989, 84-95.

319. Suihko, M.-L., Home, S. & Linko, M., Panimohiivojen testaus erilaisilla teollisilla vierteillä. Mallas ja Olut 1990:1, 5-16.

320. Bailey, M.J. & Pessa, E., Strain and process production of polygalacturonase. Enzyme Microb. Technol. 12 (1990), 266-271.

321. Zurbriggen, B., Bailey, M.J., Penttilä, M.E., Poutanen, K. & Linko, M., Pilot scale production of a heterologous *Trichoderma reesei* cellulase in *Saccharomyces cerevisiae*. J. Biotechnol. 13 (1990), 267-278.

322. Suihko, M.-L. & Haikara, A., Maintenance of the anaerobic beer spoilage bacteria *Pectinatus* and *Megasghaera*. Food Microbiol. 7 (1990), 33-41.

323. Karhunen, E., Kantelinen, A. & Niku-Paavola, M.-L., Mn-dependent peroxidase from the lignin-degrading white rot fungus *Phelebia radiata*. Arch. Biochem. Biophys. 279 (1990), 25-31.

324. Holm, L., Koivula, A.K., Lehtovaara, P.M., Hemminki, A. & Knowles, J.K.C., Random mutagenesis used to probe the structure and function of *Bacillus stearothermophilus* alpha-amylase. Protein Eng. 3 (1990), 181-191.

325. Niku-Paavola, M.-L., Karhunen, E., Kantelinen, A., Viikari, L., Lundell, T. & Hatakka A., The effect of culture conditions on the production of lignin modifying enzymes by the white-rot fungus *Phlebia radiata*. J. Biotechnol. 13 (1990), 211-221.

326. Karhunen, E., Niku-Paavola, M.-L., Viikari, L., Haltia, T., van der Meer, R.A. & Duine, J.A., A novel combination of prosthetic groups in a fungal laccase; PQQ and two copper atoms. FEBS Lett. 267 (1990), 6-8.

327. Suihko, M.-L., Blomqvist, K., Penttilä, M., Gisler, R. & Knowles, J., Recombinant brewer's yeast strains suitable for accelerated brewing. J. Biotechnol. 14 (1990), 285-300.

329. Rättö, M., Bacterial hemicellulases. University of Helsinki, Department of microbiology, Lic (Agr & For) thesis, Helsinki 1990. 58 p.

330. Nopeutettuun käymiseen soveltuvan panimohiivan kehittäminen. Research report (ed. Suihko, M.-L.), VTT, Biotechnical Laboratory, Espoo 1990. 34 p.

331. Suihko, M.-L., Vilpola, A. & Home, S., Glukanolyyttisten panimohiivojen vertailu pääkäymisessä. Mallas ja Olut 1990:4, 101-107.

332. Rouvinen, J., Bergfors, T., Teeri, T., Knowles, J.K.C. & Jones, T.A., Three-dimensional structure of cellobiohydrolase II from *Trichoderma reesei*. Science 249 (1990), 380-386.

333. Bailey, M.J., Effect of temperature of polygalacturonase production by *Aspergillus niger*. Enzyme Microb. Technol. 12 (1990), 622-624.

334. Bailey, M.J. & Ojamo, H., Downstream processing of extracellular enzymes of *Aspergillus niger*. In: Separations for Biotechnology (ed. Pyle, D.L.), Vol 2, Elsevier, London 1990, 529-538.

335. Poutanen, K., Sundberg, M., Korte, H. & Puls, J., Deacetylation of xylans by acetyl esterases of *Trichoderma reesei*. Appl. Microbiol. Biotechnol. 33 (1990), 506-510.

336. Puls, J., Poutanen, K. & Lin, J.J., Enzymatic accessibility of hemicellulose in hardwood pulps to enzymes. In: Biotechnology in Pulp and Paper Manufacture. Applications and Fundamental Investigations (eds. Kirk, T.K. & Chang, H.-M.), Butterworth-Heinemann, Boston 1990, 183-190.

337. Niku-Paavola, M.-L., Karhunen, E., Kantelinen, A. & Viikari, L., Lignin-modifying enzymes from the white-rot fungus *Phlebia radiata*. In: Biotechnology in Pulp and Paper Manufacture. Applications and Fundamental Investigations (eds. Kirk, T.K. & Chang, H.-M.), Butterworth-Heinemann, Boston 1990, 439-446.

338. Poutanen, K., Bailey, M., Sundberg, M., Rättö, M. & Puls, J., Enzymatic solubilization of xylans. In: Biotechnology in Pulp and Paper Manufacture. Applications and Fundamental Investigations (eds. Kirk, T.K. & Chang, H.-M.), Butterworth-Heinemann, Boston 1990, 575-581.

339. Saloheimo, M., Barajas, V., Niku-Paavola, M.-L., Henrissat, B. & Knowles, J., Characterization of genes coding for ligninolytic enzymes of the white-rot fungus *Phlebia radiata*. In: Biotechnology in Pulp and Paper Manufacture. Applications and Fundamental Investigations (eds. Kirk, T.K. & Chang, H.-M.), Butterworth-Heinemann, Boston 1990, 631-637.

340. Haikara, A., Mattila-Sandholm, T. & Manninen, M., Rapid detection of contaminants in pitching yeast using automated turbidometry. J. Amer. Soc. Brew. Chem. 48 (1990) 3, 92-95.

341. Bailey, M.J. & Linko, M., Production of ß-galactosidase by *Aspergillus oryzae* in submerged bioreactor cultivation. J. Biotechnol. 16 (1990), 57-66.

342. Buchert, J., Biotechnical oxidation of D-xylose and hemicellulose hydrolyzates by *Gluconobacter oxydans*. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 70, Espoo 1990. 53 p.+ app. 46 p.

343. Tenkanen, M., Xylan-deacetylating esterases of *Trichoderma reesei*. Helsinki University of Technology, Laboratory of Biochemistry and Microbiology, LicTech thesis, Espoo 1990. 51 p.+ app. 27 p.

344. Ritschkoff, A.-C., Paajanen, L. & Viikari, L., The production of extracellular hydrogen peroxide by some brown-rot-fungi. The Internaional Research Group on Wood Preservation. 21st Ann. Meeting, Rotorua, New Zealand 1990. Document No: IRG//WP/1446. 4 p.

345. Henrissat, B., Saloheimo, M., Lavaitte, S. & Knowles, J., Structural homology among the peroxidase enzyme family revealed by hydrophobic cluster analysis. Proteins: Structure, Function, and Genetics 8 (1990), 251-257.

346. Suihko, M.-L., Penttilä, M. & Home, S., Nopeutettuun käymiseen soveltuvan panimohiivan kehittäminen. Mallas ja Olut 1990:6, 165-175.

347. Bailey, M.J. & Ojamo, H., Selective concentration of polygalacturonase and ß-D-glucosidase of *Aspergillus niger* culture filtrate using mineral adsorbents. Bioseparation 1 (1990) 2, 133-139.

348. Sundberg, M., Poutanen, K., Markkanen, P. & Linko, M., An extracellular esterase of *Aspergillus awamori*. Biotechnol. Appl. Biochem. 12 (1990), 670-680.

349. Uusitalo, J.M., Nevalainen, K.M.H., Harkki, A.M., Knowles, J.K.C. & Penttilä, M.E., Enzyme production by recombinant *Trichoderma reesei* strains. J. Biotechnol. 17 (1991) 1, 35-50.

350. Buchert, J., Niemelä, K., Puls, J. & Poutanen, K., Improvement in the fermentability of steamed hemicellulose hydrolysate by ion exclusion. Proc. Biochem. Int. 25 (1990) 5, 176-180.

351. Zurbriggen, B.D., Penttilä, M., Viikari, L. & Bailey, M.J., Pilot scale production of a *Trichoderma reesei* endo-ß-glucanase by brewer's yeast. J. Biotechnol. 17 (1991), 133-146.

352. Aarnio, T.H., Suihko, M.-L. & Kauppinen, V.S., Isolation of acetic acid-tolerant baker's yeast variants in a turbidostat. Appl. Biochem. Biotechnol. 27 (1991), 55-63.

353. Aarnio, T.H. & Suihko, M.-L., Electrofusion of an industrial baker's yeast strain with a sour dough yeast. Appl. Biochem. Biotechnol. 27 (1991), 65-74.

354. Sundberg, M. & Poutanen, K., Purification and properties of two acetylxylan esterases of *Trichoderma reesei*. Biotechnol. Appl. Biochem. 13 (1991), 1-11.

355. Tenkanen, M., Schuseil, J., Puls, J. & Poutanen, K., Production, purification and characterization of an esterase liberating phenolic acids from lignocellulosics. J. Biotechnol. 18 (1991), 69-84.

356. Harkki, A., Mäntylä, A., Penttilä, M., Muttilainen, S., Bühler, R., Suominen, P., Knowles, J. & Nevalainen, H., Genetic engineering of *Trichoderma* to produce strains with novel cellulase profiles. Enzyme Microb. Technol. 13 (1991), 227-233.

357. Vanhanen, S., Isolation and characterization of genes involved in basic metabolism of the filamentous fungus *Trichoderma reesei*. University of Helsinki, Department of Genetics, Doctor thesis. VTT Publications 75, Espoo 1991. 119 p.

358. Saloheimo, M., Molecular biology of lignin-degrading enzymes from *Phlebia radiata*. University of Helsinki, Department of Genetics, Doctor thesis. VTT Publications 76, Espoo 1991. 73 p.+ app. 38 p.

359. Perttula, M., Konrádsdóttir, M., Pere, J., Kristjánsson, J.K. & Viikari, L., Removal of acetate from NSSC sulphite pulp mill condensates using thermophilic bacteria. Wat. Res. 25 (1991) 5, 599-604.

360. Konradsdottir, M., Perttula, M., Pere, J., Viikari, L. & Kristjansson, J.K., *In situ* enrichment of thermophilic acetate-utilizing bacteria. System. Appl. Microbiol. 14 (1991), 190-195.

361. Kantelinen, A., Sundquist, J., Linko, M. & Viikari, L., The role of reprecipitated xylan in the enzymatic bleaching of kraft pulp. Proc. 6th Int. Symp. on Wood and Pulping Chemistry, Melbourne 1991. Vol. I, 493-500.

362. Buchert, J. & Niemelä, K., Oxidative detoxification of wood-derived inhibitors by *Gluconobacter oxydans*. J. Biotechnol. 18 (1991) 1, 1-12.

363. Buchert, J., A xylose-oxidizing membrane-bound aldose dehydrogenase of *Gluconobacter oxydans* ATCC 621. J. Biotechnol. 18 (1991) 1, 103-114.

364. Maltseva, O.V., Niku-Paavola, M.-L., Leontievsky, A.A., Myasoedova, N.M. & Golovleva, L.A., Ligninolytic enzymes of the white rot fungus *Panus tigrinus*. Biotechnol. Appl. Biochem. 13 (1991) 3, 291-302.

365. Bailey, M.J., Puls, J. & Poutanen, K., Purification and properties of two xylanases from *Aspergillus oryzae*. Biotechnol. Appl. Biochem. 13 (1991) 3, 380-389.

366. Maltseva, O.V., Niku-Paavola, M.-L., Myasoedova, N.M., Baskunov, B.P. & Golovleva, L.A., Comparative studies of degradation of lignin model compounds by pure ligninolytic enzymes of *Panus tigrinus* and *Phlebia radiata*. Bioconversion of plant raw materials - biotechnology advancement. Finnish-Soviet Seminar, Mustio 1990. VTT Symposium 122. Espoo 1991, 60-69.

367. Kantelinen, A., Ranua, M., Viikari, L., Sundquist, J. & Linko, M., Biobleaching. Bioconversion of plant raw materials - biotechnology advancement. Finnish-Soviet Seminar, Mustio 1990. VTT Symposium 122. Espoo 1991, 82-92.

368. Puls, J., Tenkanen, M., Korte, H. & Poutanen, K., Products of hydrolysis of beechwood acetyl-4-O-methylglucuronoxylan by a xylanase and an acetyl xylan esterase. Enzyme Microb. Technol. 13 (1991) 6, 483-486.

369. Saloheimo, M., Niku-Paavola, M.-L. & Knowles, J.K.C., Isolation and structural analysis of the laccase gene from the lignin-degrading fungus *Phlebia radiata*. J. Gen. Microbiol. 137 (1991), 1537-1544.

370. Mattila-Sandholm, T., Haikara, A. & Skyttä, E., The effect of *Pediococcus damnosus* and *Pediococcus pentosaceus* on the growth of pathogens in minced meat. Int. J. Food Microbiol. 13 (1991), 87-94.

371. Suihko, M.-L., Home, S. & Linko, M., Panimohiivan sokereiden käyttö ja vierteen sokerikoostumuksen vaikutus käymiseen ja oluen laatuun. Mallas ja Olut 1991:1, 5-13.

372. Ahvenainen, J., Posti, S. & Haikara, A., Rapid detection of yeast in liquid sugar products. Proc. 1990 Sugar Processing Research Conf., San Francisco 1990. Sugar Processing Research, Inc. 1991, 78-88.

373. Livio, H.-L., Biotechnical production and use of pyruvic acid with special reference to coenzyme regeneration. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 77. Espoo 1991. 100 p.

374. Suihko, M.-L., Lehtinen, U., Zurbriggen, B., Vilpola, A., Knowles, J. & Penttilä, M., Construction and analysis of recombinant glucanolytic brewer's yeast strains. Appl. Microbiol. Biotechnol. 35 (1991), 781-787.

375. Kronlöf, J., Evaluation of a capacitance probe for determination of viable yeast biomass. Proc. 23rd EBC Congress, Lissabon 1991, 233-240.

376. Linko, M. & Kronlöf, J., Main fermentation with immobilized yeast. Proc. 23rd EBC Congress, Lissabon 1991, 353-360.

377. Stenius, V., Majamaa, E., Haikara, A., Henriksson, E. & Virtanen, H., Beer off-flavours originating from anaerobic spore-forming bacteria in brewery adjuncts. Proc. 23rd EBC Congress, Lissabon 1991, 529-536.

378. Haikara, A. & Home, S., Mash filtration difficulties caused by split barley kernels: a microbiological problem. Proc. 23rd EBC Congress, Lissabon 1991, 537-544.

379. Haikara, A. & Home, S., Haljenneiden jyvien aiheuttamat suodatusvaikeudet, mikrobiologinen ongelma. Mallas ja Olut 1991:5, 133-141.

380. Blomqvist, K., Suihko, M.-L., Knowles, J. & Penttilä, M., Chromosomal integration and expression of two bacterial α-acetolactate decarboxylase genes in brewer's yeast. Appl. Environ. Microbiol. 57 (1991) 10, 2796-2803.

381. Ritschkoff, A.-C. & Viikari, L., The influence of crystalline and amorphous cellulose on extracellular hydrogen peroxide production by brown-rot fungi. The International Research Group on Wood Preservation, Document No. IRG/WP/1482, Kyoto. 9 p.

382. Ritschkoff, A.-C., Buchert, J. & Viikari, L., The identification of the carbohydrate degrading enzymes from the crude extract of brown-rot fungus *Gloeophyllum trabeum*. The International Research Group on Wood Preservation. Document No. IRG/WP/1483, Kyoto. 10 p.

383. Haikara, A., Henriksson, E., Kronlöf, J. & Suihko, M.-L., ATP-bioluminesenssimenetelmä hiivan elävyyden ja prosessihygienian seurannassa. Mallas ja Olut 1991:6, 165-174.

384. Nyström, M., Ehsani, N. & Ojamo, H., Separation of lignocellulosics hydrolyzing enzymes with modified ultrafiltration membranes. Bioseparation 2 (1991), 187-196.

385. Ritschkoff, A.-C. & Viikari, L., The production of extracellular hydrogen peroxide by brown-rot fungi. Material und Organismen 26 (1991) 2, 157-167.

386. Kumar, V., Ramakrishnan, S., Teeri, T.T., Knowles, J.K.C. & Hartley, B.S., *Saccharomyces cerevisiae* cells secreting an *Aspergillus niger* ß-galactosidase grow on whey permeate. Bio/Technology 10 (1992) 1, 82-85.

387. Suihko, M.-L., Vilpola, A. & Linko, M., Hiivausmäärän ja uutepitoisuuden vaikutus käymiseen. Mallas ja Olut 1992:3, 68-81.

388. Rättö, M., Poutanen, K. & Viikari, L., Production of xylanolytic enzymes by an alkalitolerant *Bacillus circulans* strain. Appl. Microbiol. Biotechnol. 37 (1992), 470-473.

389. Helander, I.M., Hurme, R., Haikara, A. & Moran, A.P., Separation and characterization of two chemically distinct lipopolysaccharides in two *Pectinatus* species. J. Bacteriol. 174 (1992) 10, 3348-3354.

390. Tenkanen, M., Puls, J. & Poutanen, K., Two major xylanases of *Trichoderma reesei*. Enzyme Microb. Technol. 14 (1992) 7, 566-574.

391. Patent US 5108925. Process for accelerated beer production by integrative expression in the *PGK1* or *ADC1* genes. Oy Panimolaboratorio-Bryggerilaboratorium Ab. Enari, T.-M., Nikkola, M.J., Suihko, M.-L., Penttilä, M.E., Knowles, J.K.C. & Lehtovaara-Helenius, P.M., 28. Apr. 1992. 46 p.

392. Tenkanen, M., Buchert, J., Puls, J., Poutanen, K. & Viikari, L., Two main xylanases of *Trichoderma reesei* and their use in pulp processing. In: Xylans and Xylanases (eds. Visser, J., Beldman, G., Kusters-van Someren, M.A. & Voragen, A.G.J.), Elsevier Science Publishers, Amsterdam 1992, 547-550.

393. Ritschkoff, A.-C., Buchert, J. & Viikari, L., Identification of carbohydrate degrading enzymes from the brown-rot fungus *Gloeophyllum trabeum*. Mat. u. Org. 27 (1992) 1, 19-29.

394. Ritschkoff, A.-C., Pere, J., Buchert, J. & Viikari, L., The role of oxidation in wood degradation by brown-rot fungi. The International Research Group on Wood Preservation, Document No: IRG/WP/1562-92, IRG Secretariat, Stockholm 1992, 8 p.

395. Blomqvist, K., The bacteria *budABC* operon; isolation and application for accelerated brewing. VTT, Biotechnical Laboratory and University of Umeå, Department of Microbiology, Doctor thesis, Umeå 1992, 74 p.+ app. 68 p.

396. Mäntylä, A., Rossi, K.H., Vanhanen, S.A., Penttilä, M.E., Suominen, P.L. & Nevalainen, K.M.H., Electrophoretic karyotyping of wild-type and mutant *Trichoderma longibrachiatum* (*reesei*) strains. Curr. Genet. 21 (1992), 471-477.

397. Kronlöf, J. & Haikara, A., Contamination of immobilized yeast bioreactors. J. Inst. Brew. 97 (1992), 375-380.

398. Hoffren, A.-M., Saloheimo, M., Thomas, P., Overington, J., Johnson, M.S. & Blundell, T.M., Modelling the lignin peroxidase LIII of *Phlebia radiata* using a knowledge-based approach. J. Chim. Phys. 88 (1991), 2659-2662.

399. Buchert, J., Ranua, M., Kantelinen, A. & Viikari, L., The role of two *Trichoderma reesei* xylanases in the bleaching of pine kraft pulp. Appl. Microbiol. Biotechnol. 37 (1992), 825-829.

400. Kantelinen, A., Enzymes in bleaching of kraft pulp. Helsinki University of Technology, Department of Chemistry, Doctor thesis. VTT Publications 114. Espoo 1992. 86 p.+ app. 51 p.

401. Kantelinen, A., Rantanen, T., Poutanen, K. & Viikari, L., Hydrolysis of isolated xylans of birch chips and birch sulphate pulp by purified xylanases. In: Lignocellulosics. Science, Technology, Development and Use (eds. Kennedy, J.F.,Phillips, G.O. & Williams, P.A.), Ellis Horwood, New York 1992, 121-125.

402. Kronlöf, J. & Linko, M., Production of beer using immobilized yeast encoding α-acetolactate decarboxylase. J. Inst. Brew. 98 (1992), 479-491.

403. Nordström, K.M. & Laakso, S., Effect of growth temperature on fatty acid composition of ten *Thermus* strains. Appl. Environ. Microbiol. 58 (1992) 5, 1656-1660.

404. Haikara, A., The genera *Pectinatus* and *Megasphaera*. In: The Prokaryotes, 2nd ed., Vol. II, (eds A. Balows, Trüper, H.G., Dworkin, M., Harder, W. & Schleifer, K.-H.), Springer-Verlag, New York 1991, 1993-2004.

405. Patent FI 86745. Sellulolyyttisiä entsyymejä tuottavat hiivakannat ja menetelmät ja välineet niiden rakentamiseksi. Oy Alko Ab. Knowles, J., Penttilä, M., Teeri, T., Nevalainen, H., Salovuori, I. & Lehtovaara-Helenius, P., 30.6.1992. 44 p.

406. Patent appl. PCT/FI 91/00214. Laccase production by recombinant organisms. VTT. Saloheimo, M., Niku-Paavola, M.-L., Penttilä, M., Knowles, J. & Kantelinen, A., filled 8.7.1991. 47 p.

407. Viikari, L., Tenkanen, M., Rättö, M., Buchert, J., Kantelinen, A., Bailey, M., Sundquist, J. & Linko, M., Important properties of xylanases for use in the pulp and paper industry. In: Biotechnology in Pulp and Paper Industry (eds. Kuwahara, M & Shimada, M.). Proc. 5th Int. Conf. on Biotechnology in pulp and paper industry. UNI Publishers Co., Ltd., Tokyo 1992, 101-106.

408. Buchert, J., Kantelinen, A., Rättö, M., Siika-aho, M., Ranua, M. & Viikari, L., Xylanases and mannanases in the treatment of pulp. In: Biotechnology in Pulp and Paper Industry (eds. Kuwahara, M & Shimada, M.). Proc. 5th Int. Conf. on Biotechnology in pulp and paper industry. UNI Publishers Co., Ltd., Tokyo 1992, 139-140.

409. Kvesitadze, E.G., Lomitashvili, T.B., Kvesitadze, G.I. & Niku-Paavola, M.-L., Thermostable endoglucanases of the thermophilic fungus *Allesheria terrestris*. Biotechnol. Appl. Biochem. 16 (1992), 303-307.

410. Carlson, P., Öljytuotteiden mikrobiologisesta pilaantumisesta. University of Helsinki, Department of Microbiology, Lic (Agr & For) thesis, Helsinki 1989. 73 p.

411. Vuorela, A., Geenisäätelytutkimuksiin vaikuttavista tekijöistä eri *Trichoderma reesei*-kannoissa. University of Helsinki, Department of Genetics, MSc thesis, Helsinki 1991. 77 p + app. 3 p.

412. Smolander, M., Livio, H.-L. & Räsänen, L., Mediated amperometric determination of xylose and glucose with an immobilized aldose dehydrogenase electrode. Biosensors & Bioelectronics 7 (1992), 637-643.

413. Perttula, M., Rättö, M., Kondradsdottir, M., Kristjansson, J.K. & Viikari, L., Xylanases of thermophilic bacteria from Icelandic hot springs. Appl. Microbiol. Biotechnol. 38 (1993), 592-595.

414. Skyttä, E., Haikara, A. & Mattila-Sandholm, T., Production and characterization of antibacterial compounds produced by *Pediococcus damnosus* and *Pediococcus pentosaceus*. J. Appl. Bacteriol. 74 (1993), 134-142.

415. Kantelinen, A., Hortling, B., Ranua, M. & Viikari, L., Effects of fungal and enzymatic treatments on isolated lignins and on pulp bleachability. Holzforschung 47 (1993) 1, 29-35.

416. Bailey, M.J. & Viikari, L., Production of xylanases by *Aspergillus fumigatus* and *Aspergillus oryzae* on xylan-based media. World J. Microbiol. & Biotechnol. 9 (1993), 80-84.

417. Kantelinen, A., Hortling, B., Sundquist, J., Linko, M. & Viikari, L., Proposed mechanism of the enzymatic bleaching of kraft pulp with xylanases. Holzforschung 47 (1993), 318-324.

418. Henriksson, E., *Lactobacillus lindneri,* vaikeasti osoitettava panimokontaminantti. Mallas ja Olut 1993:1, 15-20.

419. Hoffrén, A.-M., Saloheimo, M., Thomas, P., Overington, J.P., Johnson, M.S., Knowles, J.K.C. & Blundell, T.L., Modelling of the lignin peroxidase LIII of *Phlebia radiata*: use of a sequence template generated from a 3-D structure. Protein Engineering 6 (1993) 2, 177-182.

420. Blomqvist, K., Nikkola, M., Lehtovaara, P., Suihko, M.-L., Airaksinen, U., Stråby, K.B., Knowles, J.K.C. & Penttilä, M.E., Characterization of the genes of the 2,3-butanediol operons from *Klebsiella terrigena* and *Enterobacter aerogenes.* J. Bacteriol. 175 (1993) 5, 1392-1404.

421. Kantelinen, A., Rantanen, T., Buchert, J. & Viikari, L., Enzymatic solubilization of fibre-bound and isolated birch xylans. J. Biotechnol. 28 (1993), 219-228.

422. Rättö, M., Kantelinen, A., Bailey, M. & Viikari, L., Potential of enzymes for wood debarking. Tappi J. 76 (1993) 2, 125-128.

423. Suihko, M.-L., Home, S. & Linko, M., Wort sugars, yeast sugar uptake and beer quality. Monatsschrift für Brauwissenschaft 46 (1993) 5, 185-192.

424. Stålbrand, H., Siika-aho, M., Tenkanen, M. & Viikari, L., Purification and characterization of two ß-mannanases from *Trichoderma reesei*. J. Biotechnol. 29 (1993), 229-242.

425. Smolander, M., Buchert, J. & Viikari, L., Large-scale applicable purification and characterization of a membrane-bound PQQ-dependent aldose dehydrogenase. J. Biotechnol. 29 (1993), 287-297.

426. Raaska, L., Viikari, L. & Mattila-Sandholm, T., Detection of siderophores in growing cultures of *Pseudomonas* spp. J. Ind. Microbiol. 11 (1993), 181-186.

427. Suihko, M.-L., Vilpola, A. & Linko, M., Pitching rate in high gravity brewing. J. Inst. Brew. 99 (1993), 341-346.

428. Smolander, M., Cooper, J., Schuhmann, W., Hämmerle, M. & Schmidt, H.-L., Determination of xylose and glucose in a flow-injection system with PQQ-dependent aldose dehydrogenase. Analytica Chimica Acta 280 (1993), 119-127.

429. Nyyssönen, E., Penttilä, M., Harkki, A., Saloheimo, A., Knowles, J.K.C. & Keränen, S., Efficient production of antibody fragments by the filamentous fungus *Trichoderma reesei*. Bio/Technology 11 (1993), 591-595.

430. Luonteri, E., α-arabinodaasin tuotto ja puhdistus. Helsinki University of Technology, Department of Chemical Engineering, MSc thesis, Espoo 1993. 88 p. + app. 8 p.

432. Itävaara, M., Problems associated with the liquid cultivation of shiitake, *Lentinula edodes* (Berk.) Pegler. University of Helsinki, Department of Plant Pathology, Doctor thesis. VTT Publications 150, Espoo 1993. 62 p. + app. 44 p.

434. Henriksson, E., Mikrobit happaman ruisleivän valmistuksessa. University of Helsinki, Department of Microbiology, MSc thesis, Espoo 1984. 87 p.

435. Uljas, H., Maitohappobakteerien antagonistiset vaikutukset *Fusarium*-homeiden kasvuun mallastuksessa. University of Helsinki, Department of Microbiology, MSc thesis, Espoo 1992. 108 p. + app. 25 p.

436. Suurnäkki, A., Maitohappobakteerien biosidit mallastuksessa. Helsinki University of Technology, Department of Chemical Engineering, MSc thesis, Helsinki 1992. 114 p. + app. 27 p.

437. Haikara, A., The genera *Pectinatus* and *Megasphaera*. The Prokaryotes, 2nd ed., Vol. II, eds. A. Balows et al., Springer-Verlag, New York 1992, 1993-2004.

438. Haikara, A., Uljas, H. & Suurnäkki, A., Lactic starter cultures in malting - a novel solution to gushing problems. Proc. 24th EBC Congress, Oslo 1993, 163-172.

439. Raaska, L., Cultivation and spawn production of the wood-decaying fungus, shiitake (*Lentinula edodes*). Optimization of spawn growth, production of degradative enzymes and interaction with wood inhabitants. University of Helsinki, Department of Botany, Doctor thesis. VTT Publications 157, Espoo 1993. 84 p. + app. 77 p.

440. Raaska, L. & Mattila-Sandholm, T., The antagonistic activity of *Pseudomonas chlororaphis* and *Pseudomonas fluorescens* against shiitake (*Lentinula edodes*) mycelia. Material und Organismen 26 (1991), 287-302.

441. Tenkanen, M., Puls, J., Rättö, M. & Viikari, L., Enzymatic deacetylation of galactoglucomannans. Appl. Microbiol. Biotechnol. 39 (1993), 159-165.

442. Srisodsuk, M., Reinikainen, T., Penttilä, M. & Teeri, T.T., Role of the interdomain linker peptide of *Trichoderma reesei* cellobiohydrolase I in its interaction with crystalline cellulose. J. Biol. Chem. 268 (1993) 2, 20756-20761.

443. Kronlöf, J. & Määttä, V.-P., Pääkäyminen oluen valmistuksessa immobilisoidun hiivan avulla. Mallas ja Olut 1993:5, 133-147.

444. Bailey, M.J., Buchert, J. & Viikari, L., Production of xylanase by *Trichoderma reesei*. In: Suominen, P. & Reinikainen, T. (Eds.). Proc. 2nd Tricel Symp. *Trichoderma reesei* cellulases and other hydrolases. Espoo 1993. Foundation for Biotechnical and Industrial Fermentation Research 8 (1993), 247-252.

445. Biely, P., Vrsanska, M., Kremnicky, L., Tenkanen, M., Poutanen, K. & Hayn, M., Catalytic properties of endo-ß-1,4-xylanases of *Trichoderma reesei.* In: Suominen, P. & Reinikainen, T. (Eds.). Proc. 2nd Tricel Symp. *Trichoderma reesei* cellulases and other hydrolases. Espoo 1993. Foundation for Biotechnical and Industrial Fermentation Research 8 (1993), 125-135.

446. Siika-aho, M., New hemicellulases of *Trichoderma*. In: Suominen, P. & Reinikainen, T. (Eds.). Proc. 2nd Tricel Symp. *Trichoderma reesei* cellulases and other hydrolases. Espoo 1993. Foundation for Biotechnical and Industrial Fermentation Research 8 (1993), 169-178.

447. Nuutila, A. M., Vestberg, M., Uosukainen, M. & Kauppinen, V., Studies on infection of strawberry hairy roots with arbuscular mycorrhizal fungus. COST 87 - 810 Joint working group meeting, Laukaa, 17-18 Sept. 1993.

448. Vestberg, M., Nuutila, A. M., Kauppinen, V. & Uosukainen, M., Experiments on *in vitro* production of arbuscular mycorrhizal inoculum. Conf. COST-Action 810: Impact of arbuscular mycorrhizas on sustainable agriculture and natural ecosystems, Einsiedeln, 29 Sept. - 2 Oct. 1993.

449. Bailey, M.J., Buchert, J. & Viikari, L., Effect of pH on production of xylanase by *Trichoderma reesei* on xylan- and cellulose-based media. Appl. Microbiol. Biotechnol. 40 (1993), 224-229.

450. Rättö, M., Siika-aho, M., Buchert, J., Valkeajärvi, A. & Viikari, L., Enzymatic hydrolysis of isolated and fibre-bound galactoglucomannans from pine-wood and pine kraft pulp. Appl. Microbiol. Biotechnol. 40 (1993), 449-454.

451. Buchert, J., Salminen, J., Siika-aho, M., Ranua, M. & Viikari, L., The role of *Trichoderma reesei* xylanase and mannanase in the treatment of softwood kraft pulp prior to bleaching. Holzforschung 47 (1993), 473-478.

452. Buchert, J., Tenkanen, M., Viikari, L. & Pitkänen, M., Role of surface charge and swelling on the action of xylanases on birch kraft pulp. Tappi J. 76 (1993) 11, 131-135.

453. Linko, M., Suihko, M.-L., Kronlöf, J. & Home, S., Use of brewer's yeast expressing α-acetolactate decarboxylase in conventional and immobilized fermentations. Techn. Quart., Master Brew. Ass. Amer. 30 (1993) 3, 93-97.

454. Nakari, T., Alatalo, E. & Penttilä, M.E., Isolation of *Trichoderma reesei* genes highly expressed on glucose-containing media: characterization of the *tef1* gene encoding translation elongation factor 1a. Gene 136 (1993) 1-2, 313-318.

455. Ritschkoff, A.-C., Buchert, J. & Viikari, L., Purification and characterization of a thermophilic xylanase from the brown-rot fungus *Gloeophyllum trabeum*. J. Biotechnol. 32 (1994), 67-74.

456. Kronlöf, J., Immobilized yeast in continuous fermentation in beer. Helsinki University of Technology, Doctor thesis. VTT Publications 167, Espoo 1994. 96 p. + app. 47 p.

457. Buchert, J., Ranua, M., Siika-aho, M., Pere, J. & Viikari, L., *Trichoderma reesei* cellulases in the bleaching of kraft pulp. Appl. Microbiol. Biotechnol. 40 (1994), 941-945.

458. Watari, J., Keränen, S., Nomura, M., Sahara, H. & Koshino, S., Construction of flocculent brewers' yeast by chromosomal integration of the yeast flocculation gene *FLO1*. J. Inst. Brew. 100 (1994) 2, 73-77.

459. Manninen, M. & Mattila-Sandholm, T., Methods for the detection of *Pseudomonas* siderophores. J. Microbiol. Methods 19 (1994), 223-234.

460. Hoffrén, A.-M., Computer-aided protein modelling. Applications to antibody and enzyme engineering. University of Joensuu, Department of Chemistry, Doctor thesis. VTT Publications 185, Espoo 1994. 62 p. + app. 79 p.

461. Ojamo, H., Yeast xylose metabolism and xylitol production. Helsinki University of Technology, Doctor thesis. VTT Publications 176, Espoo 1994. 91 p.

462. Viikari, L., Kantelinen, A., Buchert, J. & Puls, J., Enzymatic accessibility of xylans in lignocellulosic materials. Appl. Microbiol. Biotechnol. 41 (1994), 124-129.

463. Wirtanen, G. & Mattila-Sandholm, T., Measurement of biofilm of *Pediococcus pentosaceus* and *Pseudomonas fragi* on stainless steel surfaces. Colloids and Surfaces V: Biointerfaces 2 (1994), 33-39.

464. Kujala, P., Maitohappobakteerien antimikrobiset yhdisteet, niiden tuottoon vaikuttavat tekijät ja aktiivisuus mallastuksessa. University of Helsinki, Department of Applied Chemistry and Microbiology, MSc thesis, Helsinki 1994. 124 p. + app. 18 p.

465. Suurnäkki, A., Kantelinen, A., Hortling, B., Buchert, J. & Viikari, L., Enzymatic solubilization of hemicelluloses in industrial softwood kraft pulps. Holzforschung 48 (1994), 291-296.

466. Saloheimo, A., Henrissat, B., Hoffrén, A.-M., Teleman, O. & Penttilä, M., A novel, small endoglucanase gene, *egl5*, from *Trichoderma reesei* isolated by expression in yeast. Mol. Microbiol. 13 (1994) 2, 219-228.

467. Laitila, A., Maitohappobakteerien kasvun ja mikrobisidien vaikutuksen optimointi mallastuksessa. University of Helsinki, Department of Applied Chemistry and Microbiology, MSc Thesis, Helsinki 1994. 114 p. + app. 12 p.

468. Laine, M., Sideroforien tuottaminen ja niiden antimikrobiaalinen vaikutus elintarvikemikrobeihin ja kasvipatogeeneihin. Helsinki University of Technology, Department of Chemical Engineering, MSc Thesis, Espoo 1993. 101 p. + app. 15 p.

469. Siika-aho, M., Tenkanen, M., Buchert, J., Puls, J. & Viikari, L., An ß-glucuronidase from *Trichoderma reesei* RUT C-30. Enzyme Microb. Technol. 16 (1994), 813-819.

470. Pasanen, H., Mikrobipolysakkaridien biologinen hajottaminen. Helsinki University of Technology, Department of Chemical Engineering, MSc Thesis, Espoo 1995. 73 p. + app. 6 p.

471. Lamminmäki, J., Hiivan immobilisointiin käytettävän huokoisen lasin regenerointi. University of Helsinki, Dept. of Applied Chemistry and Microbiology, MSc Thesis, Espoo 1995. 118 p.

472. Jokela, H., Männyn uuteaineiden entsymaattinen käsittely. Helsinki University of Technology, Dept. of Chemical Engineering, MSc Thesis, Espoo 1995. 97 p. + app. 3 p.

473. Suihko, M.-L. & Haikara, A., Panimohiivan elävyys ja käyttökyky. Mallas ja Olut 1994:5, 133-145.

474. Pat. FI 92333. α-asetolaktaattidekarboksylaasiaktiivisuutta omaava entsyymiä koodaava DNA-sekvenssi ja sen käyttö nopeutettuun oluen valmistukseen soveltuvien hiivakantojen rakentamiseksi. Oy Panimolaboratorio. Enari, T.-M., Nikkola, M., Suihko, M.-L., Penttilä, M., Lehtovaara-Helenius, P. & Knowles, J. 25.10.1994. 42 s.

475. Reinikainen, T., The cellulose-binding domain of cellobiohydrolase I from *Trichoderma reesei*. Interaction with cellulose and application in protein immobilization. VTT Publications 206. Espoo 1994. 115 p. + app. 46 p.

476. Luonteri, E., Siika-aho, M., Tenkanen, M. & Viikari, L., Purification and characterization of three α-arabinosidases from *Aspergillus terreus*. J. Biotechnol. 38 (1995), 279-291.

477. Karwoski, M., Venelampi, O., Linko, P. & Mattila-Sandholm, T., A staining procedure for viability assessment of starter culture cells. Food Microbiol. 12 (1995), 21-29.

478. Stålbrand, H., Saloheimo, A., Vehmaanperä, J., Henrissat, B. & Penttilä, M., Cloning and expression in *Saccharomyces cerevisiae* of a *Trichoderma reesei* ß-mannanase gene containing a cellulose binding domain. Appl. Environ. Microbiol. 61 (1995) 3, 1090-1097.

479. Helander, I.M. & Haikara, A., Cellular fatty acyl and alkenyl residues in *Megasphaera* and *Pectinatus* species: contrasting profiles and detection of beer spoilage. Microbiology 141 (1995), 1131-1137.

480. Sjöberg, A.-M., Wirtanen, G. & Mattila-Sandholm, T., Biofilm and residue investigations of detergents on surfaces of food processing equipment. TransIChemE 73 (1995) C1, 17-21.

481. Wirtanen, G., Ahola, H. & Mattila-Sandholm, T., Evaluation of cleaning procedures in elimination of biofilm from stainless steel surfaces in open process equipment. TransIChemE 73 (1995) C1, 9-16.

482. Nyyssönen, E. & Keränen, S., Multiple roles of the cellulase CBHI I enhancing production of fusion antibodies by the filamentous fungus *Trichoderma reesei.* Curr. Genet. 28 (1995), 71-79.

483. Ritschkoff, A.-C., Rättö, M., Buchert, J. & Viikari, L., Effect of carbon source on the production of oxalic acid and hydrogen peroxide by brown-rot fungus *Poria placenta*. J. Biotechnol. 40 (1995), 179-186.

484. Tenkanen, M., Characterization of esterases acting on hemicellulases. VTT Publications 242. Espoo 1995. 94 p. + app. 59 p.

485. Smolander, M., Electrochemical aldose detection with PQQ-dependent aldose dehydrogenase. VTT Publications 229. Espoo 1995. 60 p. + app. 44 p.

486. Doyle, L.M., McInerney, J.O., Mooney, J., Powell, R., Haikara, A. & Moran, A.P., Sequence of the gene encoding the 16S rRNA of the beer spoilage organism *Megasphaera cerevisiae*. J. Ind. Microbiol. 15 (1995), 67-70.

487. Nakari-Setälä, T. & Penttilä, M., Production of *Trichoderma reesei* cellulases on glucose-containing media. Appl. Environ. Microbiol. 61 (1995) 10, 3650-3655.

488. Sarlin, T., Panimon sivuvirrat ja jätteet. Case: Eräiden sivuvirtojen käsittely ja hyväksikäyttö panimossa. Helsinki University of Technology, Department of Chemical Engineering, Msc Thesis, Espoo. 92 p. + app. 28 p.

489. Wirtanen, G., Biofilm formation and its elimination from food processing equipment. VTT Publications 251. Espoo 1995. 106 p. + app. 48 p.

490. Wirtanen, G., Alanko, T. & Mattila-Sandholm, T., Evaluation of some microbial methods used in the assessment of biofilm on stainless steel surfaces. Proc. 26th Nordic R3-Symp., Helsinki, 8-10 May 1995, 33-40.

491. Haikara, A. & Laitila, A., Influence of lactic acid starter cultures on the quality of malt and beer. Proc. 25th Congr. Eur. Brew. Conv., Brussels 1995, 249-256.

492. Suomalainen, T., Storgårds, E., Mäyrä-Mäkinen, A. & Haikara, A., Lactic acid bacterial starter cultures in the preservation of spent grains used as animal feed. Proc. 25th Congr. Eur. Brew. Conv., Brussels 1995, 733-739.

493. PAT. FI 94875. Menetelmä elintarvikekäyttöön tarkoitetun teollisesti idätettävän siemenmateri-aalin käsittelemiseksi. Haikara, A. & Mattila-Sandholm, T. Oy Panimolaboratorio. 3.11.1995. 34 s.

494. Tenkanen, M., Thornton, J. & Viikari, L., An acetylglucomannan esterase of *Aspergillus oryzae*; purification, characterization and role in the hydrolysis of O-acetyl-galactoglucomannan. J. Biotechnol. 42(1995), 197-206.

495. Salo, S., Pikamenetelmien soveltaminen pintamikrobiologiassa. Helsinki University of Technology, Department of Chemical Engineering, Msc thesis, Espoo 1995. 97 p. + app. 8 p.

496. Nakari-Setälä, T. & Penttilä, M., Production of *Trichoderma reesei* cellulases on glucose-containing media. Appl. Environ. Microbiol. 61 (10) 1995, 3650-3655.

497. Ritschkoff, A.-C., Rättö, M., Buchert, J. & Viikari, L., Production of extracellular hydrogen peroxide and oxalic acid by brown-rot fungus *Poria placenta*. 26th Annu. Meet. The International Research Group on Wood Preservation, Denmark, 11-16 June 1995. Stockholm: IRG Secretariat. IRG/WP-10112. 13 p.

498. Raaska. L. & Mattila-Sandholm, T., Effects of iron level on the antagonistic action of siderophores from non-pathogenic *Staphylococcus* spp. J. Ind. Microbiol. 15(1995), 480-485.

499. Wirtanen, G., Alanko, T. & Mattila-Sandholm, T., Evaluation of epifluorescence image analysis of biofilm growth on stainless steel surfaces. Colloids Surfaces B: Biointerfaces 5(1996), 319-326.

500. Luonteri, A., Tenkanen, M., Siika-Aho, M., Buchert, J. & Viikari, L., α-Arabinosidases of *Aspergillus terreus* and their potentials in pulp and paper applications. *In*: Biotechnology in the Pulp and Paper Industry. Srebotnik, E. & Messner, K. (Eds). Proc. 6th Int. Conf. Biotechnology in the Pulp and Paper Industry. Vienna: Facultas-Universitätsverlag, 1996, 119-122.

501. Laine, M.H., Karwoski, M.T., Raaska, L.R. & Mattila-Sandholm, T.-M., Antimicrobial activity of *Pseudomonas* spp. against food poisoning bacteria and moulds. Lett. Appl. Microbiol. 22(1996), 214-218.

502. Suihko, M.-L., VTT mikrobikokoelman panimopohjahiivat. Mallas ja Olut 1996:3, 69-77.

503. Saulinvaara, A., Mallastuksessa käytettävien maitohappobakteerien kasvatusalustan optimoiminen ja käyttöpreparaatin kehittäminen. Helsinki University of Technology, Department of Chemical Engineering, Msc thesis, Espoo 1996. 111 p. + app. 24 p.

504. Vatunen, E., Raskin mikrobien vuorovaikutukset. Helsinki University of Technology, Department of Chemical Engineering, Msc thesis, Espoo 1996. 92 p. + app. 6 p.

505. Pohjola, N., Hiivan flokkuloituvuuden ja kantajamateriaalin vaikutus immobilisointiin oluen pääkäymisessä. Helsinki University of Technology, Department of Chemical Engineering, Msc thesis, Espoo 1996. 136 p. + app. 53 p.

506. Ilmén, M., Thrane, C. & Penttilä, M., The glucose repressor gene *cre1* of *Trichoderma*: Isolation and expression of a full-length and a truncated mutant form. Mol. Gen. Genet. 251 (1996), 451-460.

507. Suihko, M.-L., Vapaasti luovutettavat panimohiivakannat ja niiden ominaisuudet. VTT mikrobikokoelman raportti, Espoo 1996.

508. Suihko, M.-L., VTT mikrobikokoelman panimopintahiivat. Mallas ja Olut 1996:4, 101-110.

509. Wirtanen, G., Husmark, U. & Mattila-Sandholm, T., Microbial evaluation of the biotransfer potential from surfaces with *Bacillus* biofilms after rinsing and cleaning procedures in closed food-processing systems. J. Food Prot. 59(1996)7, 727-733.

510. Alakomi, H.-L., Stafylokokkien tuottamien sideroforien antagonistinen vaikutus haittamikrobeihin. University of Helsinki, Department of Applied Chemistry and Microbiology, MSc Thesis, Helsinki 1996. 103 p. + app. 4 p.

511. Satokari, R., Olutkontaminanttien osoittaminen PCR-tekniikalla. University of Helsinki, Department of Biosciences, MSc Thesis, Helsinki 1996. 68 p.

512. Ravanko, K., Screening of thermostable laccase. Helsinki University of Technology, Department of Chemical Technology, Msc thesis, Espoo 1996. 97 p.

513. Onnela, M.-L., Suihko, M.-L., Penttilä, M. & Keränen, S., Use of a modified alcohol dehydrogenase, *ADH1*, promoter in construction of diacetyl non-producing brewer's yeast. J. Biotechnol. 49(1996), 101-109.

514. Mattila-Sandholm, T., Laine, M., Manninen, M., Syttä, E. & Haikara, A., Production of antimicrobial compounds of starter cultures against molds and gram-negative bacteria. Proc. Food 2000 Conf. Integrating processing, packaging, and consumer research, Natick, MA, 19-21 Oct. 1993. Hampton, VA: Science and Technology Corporation, 1996. Vol. II, 753-759.

515. Margolles-Clark, E., Hayes, C.K., Harman, G.E. & Penttilä, M., Improved production of *Trichoderma harzianum* endochitinase by expression in *Trichoderma reesei*. Appl. Environ. Microbiol. 62(1996)6, 2145-2151.

516. Salminen, S., Laine, M., von Wright, A., Vuopio-Varkila, J., Korhonen, T. & Mattila-Sandholm, T., Development of selection criteria for probiotic strains to assess their potential in functional foods: A Nordic and European approach. Bioscience Microflora 15(1996)2, 61-67.

517. Helander, I.M., Kilpeläinen, I., Vaara, M., Moran, A.P., Lindner, B. & Seydel, U., Chemical structure of the lipid A component of lipopolysaccharides of the genus *Pectinatus*. Eur. J. Biochem. 224(1994), 63-70.

518. Helander, I., Moll, H. & Zähringer, U., 4-O-(2-amino-2-deoxy-α-D-glucopyranosyl)-3-deoxy-D-*manno*-2-octulosonic acid, a constituent of lipopolysaccharides of the genus *Pectinatus*. Eur. J. Biochem. 213(1993), 377-381.

519. Senchenkova, S.N., Shashkov, A.S., Moran, A.P., Helander, I.M. & Knirel, A., Structures of the O-specific polysaccharide chains of *Pectinatus cerevisiiphilus* and *Pectinatus frisingensis* lipopolysaccharides. Eur. J. Biochem. 232(1995), 552-557.

520. Chatani, M., *Aureobasidium pullulans* -sinistäjäsienen melaiinin mikrobiologinen hajotus. University of Helsinki, Department of Biosciences, MSc Thesis, Helsinki 1996. 82 p. + app. 8 p.

521. Tapani, K.M., Maitohappobakteerien vaikutus mykotoksiineja muodostaviin *Fusarium*-sieniin mallastuksessa. University of Helsinki, Department of Applied Chemistry and Microbiology, MSc Thesis, Helsinki 1996. 96 p. + app. 9 p.

522. Pihlajamäki, O., Biofilmin muodostuminen ja detektio panimoprosessissa. Helsinki University of Technology, Department of Chemical Engineering, Msc thesis, Espoo 1997. 106 p. + app. 25 p.

524. Heine, R., Maitohappobakteereiden antagonististen aineiden tuotto ja vaikutus mallastuksen mikrobeihin. University of Helsinki, Department of Applied Chemistry and Microbiology, MSc Thesis, Helsinki 1996. 86 p. + app. 5 p.

525. Ilmén, M., Onnela, M.-L., Klemsdal, S., Keränen, S. & Penttilä, M., Functional analysis of the cellobiohydrolase I promoter of the filamentous fungus *Trichoderma reesei*. Mol. Gen. Genet. 253 (1996)3, 303-314.

526. Satokari, R., von Wright, A. & Haikara, A., Oluen mikrobiologisten kontaminanttien osoittaminen PCR-tekniikalla. Mallas ja Olut 1997:1, 3-10.

527. Rättö, M., Niku-Paavola, M.-L., Raaska, L., Mattila-Sandholm, T. & Viikari, L., The effect of *Trichoderma harzianum* siderophores on yeasts and wood-rotting fungi. Material u. Organismen 30 (1996)4, 279-292.

528. Alander, M., Korpela, R., Saxelin, M., Vilpponen-Salmela, T., Mattila-Sandholm, T. & von Wright, A., Recovery of *Lactobacillus rhamnosus* GG from human colonic biopsies. Lett. Appl. Microbiol. 24 (1997), 361-364.

529. Ilmén, M., Saloheimo, A., Onnela, M.-L. & Penttilä, M.E., Regulation of cellulase gene expression in the filamentous fungus *Trichoderma reesei*. Appl. Environ. Microbiol. 63(1997)4, 1298-1306.

530. Ruohonen, L., Toikkanen, J., Tieaho, V., Outola, M., Söderlund, H. & Keränen, S., Enhancement of protein secretion in *Saccharomyces cerevisiae* by overproduction of Sso protein, a late-acting component of the secretory machinery. Yeast 13(1997), 337-351.

531. Tapani, K.-M., Laitila, A. & Haikara, A., Maitohappobakteerien vaikutus mykotoksiineja muodostaviin *Fusarium*-sieniin mallastuksessa. Mallas ja Olut 1997:3, 68-75.

533. Hyöky, M., Biofilmin muodostus paperikoneen olosuhteissa. Helsinki University of Technology, Department of Chemical Technology, MSc Thesis, Espoo 1997. 89 p. + app. 6 p.

534. Pellikka, T., Mikrobipolysakkaridia hajottavan entsyymin tuotto, puhdistus ja karakterisointi. University of Kuopio, Department of Environmental Sciences, MSc Thesis, Kuopio 1997. 68 p. + app. 14 p.

535. Toivonen, P., Pakkausmateriaalien ja suojaviljelmien vaikutus rehumäskin säilyvyyteen. Helsinki University of Technology, Department of Chemical Technology, MSc Thesis, Espoo 1998. 122 p. + app. 27 p.

536. Saukkonen, E., *Candida milleri* ja sen vuorovaikutukset hapantaikinan maitohappobakteerien kanssa. University of Helsinki, Faculty of Agriculture and Forestry, Department of Food Technology, Msc Thesis, Helsinki 1998. 91 p.

537. Melander, M., Karakterisering av polysackarider som producerats av mikrober från pappersbruk. Åbo Akademi, Kemisk-Tekniska Fakulteten, MSc Thesis, Åbo1998. 74 p.

538. Hurme, E.U., Wirtanen, G., Axelson-Larsson, L., Pachero, N.A.M. & Ahvenainen, R., Penetration of bacteria through microholes in semirigid aseptic and retort packages. J. Food Prot. 60 (1997) 5, 520-524.

539. Rättö, M., Ritschkoff, A.-C. & Viikari, L., The effect of oxidative pretreatment on cellulose degradation by *Poria placenta* and *Trichoderma reesei* cellulases. Appl. Microbiol. Biotechnol. 48 (1997), 53-57.

540. Kataja, K., Virkajärvi, I & Linko, M., Hiivan kierrätys oluen pääkäymisessä. Mallas ja Olut 1997:4, 107-113.

541. Mattila-Sandholm, T., Demonstration project FAIR2 CT96-1028. *In*: Novel methods for probiotic research. Alander, M., Kauppila, T. & Mattila-Sandholm, T. (Eds). 2nd Workshop FAIR CT96-1028, Cork, 3 Oct. 1997. VTT Symposium 173, 11-17.

542. Laitila, A., Tapani, K.-M. & Haikara, A., Lactic acid starter cultures for prevention of the formation of *Fusarium* mycotoxins during malting. Proc. 26th Congr. Eur. Brew. Conv., Maastricht, 24-29 May 1997, 137-144.

543. Linko, M., Virkajärvi, I., Pohjala, N., Lindborg, K., Kronlöf, J. & Pajunen, E., Main fermentation with immobilized yeast - a breakthrough? Proc. 26th Congr. Eur. Brew. Conv., Maastricht, 24-29 May 1997, 385-394.

544. Haikara, A., Virkajärvi, I., Kronlöf, J. & Pajunen, E., Microbiological contaminations in immobilized yeast bioreactors for primary fermentation. Proc. 26th Congr. Eur. Brew. Conv., Maastricht, 24-29 May 1997, 439-446.

545. Storgårds, E., Pihlajamäki, O. & Haikara, A., Biofilms in the brewing process - a new approach to hygiene management. Proc. 26th Congr. Eur. Brew. Conv., Maastricht, 24-29 May 1997, 717-724.

546. Margolles-Clark, E., Ilmén, M. & Penttilä, M., Expression patterns of ten hemicellulase genes of the filamentous fungus *Trichoderma reesei* on various carbon sources. J. Biotechnol. 57(1997)1-3, 167-179.

547. Helander, I.M., Alakomi, H.-L., Latva-Kala, K. & Koski, P., Polyethyleneimine is an effective permeabilizer of Gram-negative bacteria. Microbiology 143(1997), 3193-3199.

548. Poppius-Levlin, K., Wang, W., Ranua, M., Niku-Paavola, M.-L. & Viikari, L., Biobleaching of chemical pulps by laccase/mediator systems. Proc. Tappi Biological Sciences Symp., San Francisco, CA, 20-23 Oct. 1997, 329-333.

549. Arnold, M., Reittu, A., von Wright, A., Martikainen, P.J., Suihko, M.-L., Bacterial degradation of styrene in waste gases using a peat filter. Appl. Microbiol. Biotechnol. 48 (1997), 738-744.

550. Satokari, R., Juvonen, R., von Wright, A. & Haikara, A., Detection of *Pectinatus* beer spoilage bacteria by using the polymerase chain reaction. J. Food Prot. 60 (1997), 1571-1573

551. Jaskari, J., Kontula, P., Siitonen, A., Jousimies-Somer, H., Mattila-Sandholm, T. & Poutanen, K., Oat ß-glucan and xylan hydrolysates as selective substrates for *Bifidobacterium* and *Lactobacillus* strains. Appl. Microbiol. Biotechnol. 49 (1998), 175-181.

552. Storgårds, E., Suihko, M.-L., Pot, B., Vanhonacker, K., Janssens, D., Broomfield, P.L.E. & Banks, J.G., Detection and identification of *Lactobacillus lindneri* from brewery environments. J. Inst. Brew. 104(1998), 47-54.

553. Toivonen, P., Laitila, A. & Haikara, A., Pakkausmateriaalien ja suojaviljelmien vaikutus rehumäskin säilyvyyteen. Mallas ja Olut 1998:2, 47-56.

554. Helander, I.M., Latva-Kala, K. & Lounatmaa, K., Permeabilizing action of polyethyleneimine on *Salmonella typhimurium* involves disruption of the outer membrane and interactions with lipopolysaccharide. Microbiology 144(1998), 385-390.

556. Juvonen, R., Satokari, R. & Haikara, A., PCR-pohjainen menetelmä valmiin oluen mikrobiologiseen laadunvalvontaan. Mallas ja Olut 1998:4, 100-109.

557. Suihko, M.-L., Uusi menetelmä panimokontaminanttien tunnistamiseen. Mallas ja Olut 1998:4, 110-116.

558 Kontula, P., Jaskari, J., Nollet, L., de Smet, I., von Wright, A., Poutanen, K. & Mattila-Sandholm, T.,The colonization of a simulator of the human intestinal microbial ecosystem by a probiotic strain fed on a fermented oat bran product: effects on the gastrointestinal microbiota. Appl. Microbiol. Biotechnol. 50(1998), 246-252.

559. Mattila-Sandholm, T., Demonstration of nutritional functionality of probiotic foods (FAIR CT96-1028). *In*: Functional Food Research in Europe, Mattila-Sandholm,T. & Kauppila, T. (Eds), 3rd Workshop Demonstration of the nutritional functionality of probiotic foods, FAIR CT96-1028, Haikko Manor, 1-2 Oct. 1998. VTT Symposium 187, 25-37.

560. Mattila-Sandholm, T., Demonstration of functionality of probiotic foods - the EU-approach. *In*: Lactic Acid Bacteria, Villers-Bocage Cedex: Adria Normandie, 1998. Lactic 97, Caen 10-12 Sept. 1997, 349-362

561. Björkroth, K.J., Suihko, M.-L., Bruce, J.L., Palmer, D. & Korkeala, H.J., Characterization of *Leuconostoc* spp. using the RiboPrinter® microbial characterization system. 98th Gen. Meet. Am. Soc. Microbiol., Atlanta, GA, 17-21 May 1998, 5 p. & Qualicon, Inc. 1-1083a-598.

562. Helander, I.M., Alakomi, H.-L., Latva-Kala, K., Mattila-Sandholm, T., Pol, I., Smid, E.J., Gorris, L.G.M. & von Wright, A., Characterization of the action of selected essential oil components on gram-negative bacteria. J. Agric. Food Chem. 46(1998)9, 3590-3595.

563. Mattila-Sandholm, T., Demonstration of nutritional functionality of probiotic foods. 3rd Karlsruhe Nutrition Symp. European Research towards Safer and Better Food, Karlsruhe, 18-20 Oct. 1998, Gaukel, V. & Spiess, W.E.L. (Eds), Karlsruhe: Bundesforschungsanstalt für Ernährung. Proc. Part 1, 139-148.

564. Luonteri, E., Tenkanen, M. & Viikari, L., Substrate specificities of *Penicillium simplicissimum* α-galactosidases. Enzyme Microb. Technol. 22(1998)3, 192-198.

565. Hukari, R., Helander, I. & Vaara, M., Chain length heterogeneity of lipopolysaccharide released from *Salmonella typhimurium* by ethylenediaminetetraacetic acid or polycations. Eur. J. Biochem. 154(1986), 673-676.

566. Rodríguez Couto, S. & Rättö, M., Effect of veratryl alcohol and manganese (IV) oxide on ligninolytic activity in semi solid cultures of *Phanerochaete chrysosporium*. Biodegradation 9(1998), 143-150.

567. Luonteri, E., Fungal α-arabinofuranosidases and α-galactosidases acting on polysaccharides. Espoo: VTT, 1998. VTT Publications 371. 113 p. + app. 59 p.

568. Luonteri, E., Beldman, G. & Tenkanen, M., Substrate specificities of *Aspergillus terreus* α-arabinofuranosidases. Carbohydr. Polym. 37(1998), 131-141.

569. Luonteri, E., Alatalo, E., Siika-Aho, M., Penttilä, M. & Tenkanen, M., α-Galactosidases of *Penicillium simplicissimum*: production, purification and characterization of the gene encoding AGLI. Biotechnol. Appl. Biochem. 28 (1998), 179-188.

570. Luonteri, E., Kroon, P.A., Tenkanen, M., Teleman, A. & Williamson, G., Activity of an *Aspergillus terreus* α-arabinofuranosidase on phenolic-substituted oligosaccharides. J. Biotechnol. 67(1999), 41-48.

571. Ilmén, M., Molecular mechanisms of glucose repression in the filamentous fungus *Trichoderma reesei*. VTT Publications 315. Espoo 1997. 86 p. + app. 48 p.

572 Satokari, R., Juvonen, R., Mallison, K., von Wright, A. & Haikara, A., Detection of beer spoilage bacteria *Megasphaera* and *Pectinatus* by polymerase chain reaction and colorimetric microplate hybridization. Int. J. Food Microbiol. 45(1998), 119-127.

573. Alander, M., Satokari, R., Korpela, R., Saxelin, M., Vilpponen-Salmela, T., Mattila-Sandholm, T. & von Wright, A., Persistence of colonization of human colonic mucosa by a probiotic strain, *Lactobacillus rhamnosus* GG, after oral consumption. Appl. Environ. Microbiol. 65(1999)1, 351-354.

574. Alakomi, H.-L., Raaska, L., Tuominen, U., Lahdenperä, M.-L., von Wright, A. & Mattila-Sandholm, T., Antifungal activities of *Lactobacillus*, *Staphylococcus* and *Pseudomonas*. Proc. COST 914 & COST 915 Joint Workshop Non conventional methods for the control of postharvest disease and microbiological spoilage, Bologna, 9-11 Oct. 1997. Luxembourg: Office for Official Publications of the European Communities, 1998, 141-147.

575. Kontula, P., *In vitro* and *in vivo* characterization of potential probiotic lactic acid bacteria and prebiotic carbohydrates. PhD Thesis. Department of Food Technology, University of Helsinki. Finnish Journal of Dairy Science 54(1999)1, 1-142.

576. Smith, M.T. & Poot, G.A., *Dipodascus capitatus*, *Dipodascus spicifer* and *Geotrichum clavatum*: Genomic characterization. Antonie van Leeuwenhoeck 74(1998), 229-235

577. Kontula, P., von Wright, A. & Mattila-Sandholm, T., Oat bran β-gluco- and xylo-oligosaccharides as fermentative substrates for lactic acid bacteria. Int. J. Food Microbiol. 45(1998)2, 163-169.

578. Alander, M., De Smet, I., Nollet, L., Verstraete, W., von Wright, A. & Mattila-Sandholm, T., The effect of probiotic strains on the microbiota of the Simulator of the Human Intestinal Microbial Ecosystem (SHIME). Int. J. Food Microbiol. 46(1999), 71-79.

579. Niku-Paavola, M.-L., Laitila, A., Mattila-Sandholm, T. & Haikara, A., New types of antimicrobial compounds produced by *Lactobacillus plantarum*. J. Appl. Microbiol. 86(1999), 29-35.

580. Virkajärvi, I., Lindborg, K., Kronlöf, J. & Pajunen, E., Effects of aeration on flavor compounds in immobilized primary fermentation. Monatsschrift für Brauwissenschaft 52(1999) 1/2, 9-12, 25-28.

581. Vehmaanperä, J., Development of *Bacillus* strains for industrial enzyme production by gene technology. PhD Thesis. University of Helsinki, Department of General Microbiology, Helsinki 1990. 81 p. (Vehmaanperä, J., Steinborn, G. & Hofemeister, J. J. Biotechnol. 19(1991), 221-240.