

FOOD AND NUTRITION CULTURE COLLECTION (FNCC)

INTRODUCTION

Food and Nutrition Culture Collection (FNCC) was established in 1991, initiated by Dr. Slamet Sudarmadji, Director Food and Nutrition Development and Research Center (FANDARC), Gadjah Mada University, period 1 985 to March 1 995. FNCC researchers and technicians devote to themselves to the development of the culture collection. the main purposes of FNCC are to collect, characterize, preserve and distribute microbial cultures of food and industrial significance. FNCC also contributes to the development of research, education, and industrial application related to food microbiology. Training courses are also occasionally offered.

FNCC greatly indebted to the various established culture collection and research organization in the world, namely, Institute of Fermentation Osaka (IFO, Japan); Japan Collection of Microorganisms (JCM, Japan); IAM Culture Collection (The University of Tokyo, Japan); Centraalbureau voor Schimmelcultures (CBS, The Netherlands); and CSIRO, North Ryde (Australia) that already made contributions in training and provide cultures. Future cooperation from all culture collection institutions is expected and appreciated.

We continue to be committed in providing the best service, assistance and technical support available.

PERSONALS

Director of IUC Food and Nutrition FNCC Staff	: Dr. Ir. Eni Harmayani, M.Sc.
Curator	: Dr Endang Sutriswati Rahayu
Bacteria	: Dr Eni Harmayani Dr Tyas Utami
Yeast	Dr Retno Indrati Nur Cahyanto MSc
Filamentous Fungi	: Sardjono MS Dr Endang Sutriswati Rahayu
Technicians	: Joko Sutriyanto Agus Sarwoko Pri Haryono

ORDERING CULTURES

Cultures are provided to research and industrial laboratories and education all establishments upon request. The cultures are prepared on agar slants. All orders should be addressed to :

Food and Nutrition Culture Collection
IUC Food and Nutrition Gadjah Mada University
Jl Teknika Utara Berek Yogyakarta 55281, Indonesia
Phone/Fax : (0274) 589 242

Fee : Rp. 25.000,- per culture for research and educational purposes and Rp. 50.000,- per culture for industrial/commercial purposes; plus Rp. 5.000,- for domestic postage.

HOW TO USE THE CATALOGUE

The strain of microorganisms listed in this catalogue are classified into three parts: bacteria, yeast, and fungi. In each part, strains are alphabetically arranged according to the scientific name of the species Example of the strain description are presented below:

Acetobacter aceti (Pasteur) Beijerinck”

0016 ²⁾ < - IFO 3283 (K. Kondo, 1954 vinegar) ⁴⁾

Lactobacillus fermeritum Beijernick”

0096 ²⁾ < - TTA 2 ³⁾ (Djaafar 1994 fermented cassava *tape*) ⁴⁾

- 1) Scientific name of species and authority of the scientific name
- 2) FNCC accession number.
- 3) Accession number of other Culture Collection or individual.
- 4) History of the strain (person concerned year and source of isolation)

I. BACTERIA

Acetobacter aceti (Pasteur) Beijerincki

0016 < - IFO 3283 (K. Kondo, 1954, Vinegar)

0017 < - IFO 3284 (K. Kondo, 1954, Vinegar)

0025 < - CCRC 11681

Agrobacterium tumefaciens (Smith & Townsend) Conn

0087 < - IFO 12667

Alcaligenes xylosoxydans subsp. *denitrificans* (Ruger & Tan) Kiredjian et all.

0078 < - IFO 15125 (Type strain).

Bacillus amyloliquefaciens Priest et all.

0079 < - IFO 14141

Bacillus amylolyticus Nakamura

0080 < - IFO 13625 (Type strain)

Bacillus cereus Frankland and Frankland

0057 < - IFO 13690

Bacillus coagulans Hammer

0081 < - IFO 3557

Bacillus macerans Schardinger

0082 < - IFO 15041

Bacillus megaterium de Bary

0083 < - IFO 12108

Bacillus polymyxa (Prazmowski) Mace

0084 < - IFO 13003

Bacillus stearothermophilus Donk

0058 < - IFO 12550

Bacillus subtilis (Ehrenberg) Cohn.

0059 < - IFO 3335

0060 < - IFO 13719 (Type strain)

0061 < - IFO 14140

Brevibacterium flavum Okumura et all

0030 < - CCRC 10027

0031 < - CCRC 12470

Brevibacterium lipolyticum

0087 < - NRRL B-4202

Clostridium acetobutylicum McCoy et al

0085 < - IFO 13948 (Type strain)

Corynebacterium glutanicum (Kinoshita et al) Abe et al

0062 < - IFO 12168

Corynebacterium hoagii (Morse) Ebersson

0126 < - JCM 1319 (Type strain)

Escherichia coli (Miguta) Castellani & Chalmers

0091 < - IFO 3301

Gordona rubropertinctus (Hefferan) Stackebrandt, Smida & Collins

0130 < - JCM 3204 (Type strain)

Gordona terrae (Tsukamura) Stackebrandt, Smida & Collins

0131 < - JCM 3229 (Type strain)

Lactobacillus acidophilus (Moro) Hansen & Møcquot

0051 < - IFO 13951 (Type strain)

0109 < - TAR-3 (Djaafar, 1994, young bamboo-pickle)

0116 < - TMO 1 (Djaafar, 1994 moromi)

Lactobacillus brevis (Orla Jensen) Bergey et al

0021 < - IFO 3345

0022 < - IFO 13110

0028 < - CCRC 14028

0029 < - CCRC 14060

Lactobacillus bulgaricus (Orla-Jensen) Weiss et al

(*Lactobacillus delbrueckii* subsp *bulgaricus*)

0041 < - CSCC LB-1 (Australia)

0053 < - IFO 13953

Lactobacillus casei

0090 < - NRRL B-1922

Lactobacillus delbrueckii subsp. *delbrueckii* (Leichmann) Beijerinck

0045 - IFO 3202

Lactobacillus plantarum (Orla Jensen) Bergey et al

0020 < - IFO 3074 (as *Lactobacillus cucumeris*).

0026 < - CCRC 10069 (Type strain)

0027 < - CCRC 12251

0127 < - JCM 1551

0136 < - JCM 8344
0137 < - JCM 8347

Lactobacillus rhamnosus Collins et al.
(*Lactobacillus casei* subsp. *rhamnosus*)

0052 < - IFO 3452
0098 < - TGR-1 (Djaafar, 1994, fermented cassava-*growol*)
0099 < - TGR-2 (Djaafar, 1994, fermented cassava-*growol*, produces bacteriocin)
0100 < - TGR-21 (Djaafar, 1994, fermented cassava-*growol*)
0101 < - TGR-22 (Djaafar, 1994, fermented cassava-*growol*)
0105 < - TTK-1 (Djaafar, 1994, fermented dunian meat-*tempoyak*)
0113 < - TTE-1 (Djaafar, 1994, *tempe*)
0114 < - TTE-2 (Djaafar, 1994, *tempe*)

Lactobadilus murinus Hemme et al.

0115 < - TTE-3 (Djaafar, 1994, *tempe*)

Lactococcus lactis subsp. *lactis* (Lister) Schleifer et al.

0086 < - IFO 12007, produces nisin
0120 < - TNO Nutrition and Food Research, The Netherlands produces nisin
0133 < - JCM 5805 (Type strain)

Leuconostoc mesenteroides subsp. *mesenteroides* Tsenkovskii van Teighem.

0023 < - IFO 12060.
0092 < - TGA-1 (Djaafar, 1994, fermented dried cassava-*gatot*)
0093 < - TGA-2 (Djaafar, 1994, fermented dried cassava *gatot*)

Morganella morganii (Winslow et al) Brenner et al

0121 <- JD-37 (Atmadjaja, 1994, fish, produces histamin)
0122 <- NCTC 10041 (*Proteus morganii*, produces histamin)

Nitrobacter winogradskyi Winslow et al.

0054 <- IFO 14298

Nitrosomonas europaea Winogradskyi

0955 <- IFO 14298

Nocardia asteroides (Eppinger) Blanchard

0067 <- IFO 3384

Nocardia erythropolis

0088 <- NRRL B-1532

Nocardia farcinica Trevisan

0132 <- JCM 3316

Pseudomonas aeruginosa (Schroter) Migula

0063 <- IFO 12689

Pseudomonas cepacia Palleroni & Holmes

0069 <- IFO 15124

Pseudomonas uluorescens Migula

0070 <- IFO 13922

Pseudomonas puticla (Trevisan) Migula

0071 <- IFO 14796

Pediococcus acidilactici Lindner

0110 <- TAT-1 (Djaafar 1 994 egg plant pickle)

Pediococcus halophilus Mees

0032 <- CCRC 12576

0033 <- CCRC 12816

Pediococcus pentosaceus Mees

0018 <- IFO 12230 (as *Pediococcus cerevisiae*)

0019 <- IFO 12232 (as *Pediococcus cerevisiae*)

0046 <- NRRL B-14009

0094 <- TGA 3 (Djaafar, 1994, fermented dried cassava *gatot*)

0111 <- TAT-2 (Djaafar, 1994, egg plant-pickle)

0119 <- TMO4 (Djaafar, 1994 moromi)

Propionibacterium propionicum (Pine & Georg) Charfreitag et al.

0068 <- IFO 14587 (Type strain)

Rhodococcus equi (Magnusson) Godfellow & Alderson

0064 <- IFO 3730

0124 <- JCM 1311 (Type strain)

Rhodococcus erythropolis (Gray & Thornton) Godfellow & Alderson

0065 <- IFO 12320

0128 <- JCM 3201 (Type strain)

Rhodococcus fascians (Tilford) Goodfellow

0125 <- JCM 1316 (Type strain)

Rhodococcus rhodochrous (Zopf) Tsukamura

0066 <- IFO 3338

0129 <- JCM 3202 (Type strain)

Salmonella

0139 - (Harmayani, et al. 1995, raw beef)

0142 - (Harmayani, et al. 1995, *rendang* spices)

0146 - (Harmayani, et al. 1995, raw chicken meat)

Salmonella choleraesuis subsp. ***choleraesuis*** (Gaerter) Le Minor, Veron 'and Popoff
serovar typhimurium

0050 <- IFO 12529 as *Salmonella typhimurium*

0134 <- JCM 6977 as *Salmonella typhimurium*

0135 <- JCM 6978 as *Salmonella typhimurium*

Sphingomonas paucimobilis (Hormes et al.) Yabuuchi et al.

0072 <- IFO 13935 (Type strain)

Staphylococcus aureus Rosenbach

0047 <- IFO 13276

0140 - (Harmayani, et al. 1995, raw beef)

0141 - (Harmayani, et al. 1995, fish)

0143 - (Harmayani, et al. 1995, raw chicken meat)

0144 - (Harmayani, et al. 1995, chicken *opor*)

0145 - (Harmayani, et al. 1995, beef *rendang*)

Staphylococcus epidermidis (Winslow & Winslow) Evans

0048 <- IFO 3762

Streptococcus raffinolactis Orla Jensen and Hansen

0112 <- TAT-3 (Djaafar, 1 994, egg plant-pickle)

Streptococcus thermophilus (Orla-Jensen) Farrow & Collins

0015 <- IFO 13957

0040 <- NRRLB4148

Streptomyces ambofaciens Pinnert Sindico

0073 <- IFO 12836 (Type strain)

Streptomyces olivaceus (Waksman) Waksman & Henrici

0074 <- IFO 3409

Streptomyces ohvochromogenes (Waksman) Waksman & Henrici

0075 <- IFO 13873

Streptomyces violascens (Preobrazhens kaya & Sveshnikova) Pridham

0076 <- IFO 12920 (Type strain)

Variovorax paradoxus (Davis) Willems et al

0138 <- IFO 15149 (Type train)

Xanthomonas campetritys

0089 <- NRRL B-1459A

Zymomonas mobilis subsp ***mobilis*** (Lindner) De Ley & Swings

0056 <- IFO 13756

II. YEAST

Candida curvata (biddens & Lodder) Lodder & Kreger-van Rij.
3001

Candida kefyr (Beijerinck) van Uden & Buckley
3035 <- JCM 1617

Candida krusei (Castellani) Langeron & Guerra
3034 <- JCM 1609 (Type strain)

Candida lipolytica (Wickerham et al.) van der Walt & von Arx
3010 <- NRRL Y-1095 (as *Yarrowia ilpolytica*)

Candida norvegensis Dietrichson ex van Uden & Buckley
3043 <- JCM 2307 (Type strain)

Candida tropicalis (Castellani) Berkhout
3023 <- IFO 1400
3033 <- JCM 1541 (Type strain)

Candida utilis (Herineberg) Lodder & Kreger-van Rij
3019 <- IFO 0396
3036 <- JCM 1624

Candida wicherhamii
3055 <- JCM 9568

Cryptococcus curvatus (Diddens & Lodder) Golubev
3032 <- JCM 1 532 (Type strain)

Debaryomyces hansenii var. hansenli
3040 <- JCM 1990 (Type strain)

Debaryomyces polymorphus (Klocker) Price & Phaff
3037 <- 1628

Geotrichum candidum Butler & Petersen
3009 <- NRRL Y-552 (as *Endomyces geotrichum*)

Kluyveromyces lactis (Dombrowski) van der Walt
3024 <- IFO 0433
3025 <- IFO 1090

Kluyveromyces marxianus (Hansen) van der Walt

3011 <- IFO 10005

3026 <- IFO 1735

3038 <- JCM 1630

3061 <- NCYC 0587

3061 <- ATCC 10022

Kluyveromyces thermotolerans (Philippov) Yarrow

3028 <- IFO 10067

Kockovaella thailandica Nakase et al.

3029 <- IFO 10521

Lipomyces starkeyi Lodder & Kreger-van Rij

3048 <- JCM 5995 (Type strain)

Pichia burtonii Boidin, Pignal, Lehodey, Vey & Abadie

3045 <- JCM 3708 (Type strain)

Pichia guilliermondii Wickerham

3041 <- JCM 2190

Pichia ohmeri (Etchells & Bell) Kreger-van Rij

3042 <- JCM 2280

Rhodosporidium toruloides Banno

3046 <- JCM 3792 (Type strain)

Rhodotorula glutinis (Fresenius) Harrison

3053 <- JCM 8208 (Type strain)

Saccharomyces bayanus Saccardo

3018 <- IFO 0251

Saccharomyces caribergensis

3059 <- NCYC 0354

Saccharomyces cerevisiae Meyen ex Hansen

3004 - wine yeast

3005 - brewing yeast

3012 <- # 254 (Red star), fuel ethanol (John Labatt, Ltd.)

3014 <- # 3 Ale brewing yeast, non-flocculent (John Labatt, Ltd.)

3015 <- # 30 Ale brewing yeast, flocculent (John Labatt, Ltd.)

3022 <- NRRL Y-2034

Saccharomyces cerevisiae Meyen ex Hansen (continued)

- 3049 <- JCM 7255 (Type strain)
- 3056 <- JCM 2214
- 3057 <- JCM 2215
- 3058 <- JCM 5918
- 3060 <- FSCC 0211

Saccharomyces diastaticus Andrews et Gilliland ex van der Walt

- 301 3 <- # 62 Polyploid (John Labatt Ltd)

Saccharomyces kluyvery Phaff, Miller & Shifrine

- 3051 <- JCM 7257 (Type strain)

Saccharomyces pestorianus Hansen

- 3050 < JCM 7256

Saccharomyces uvarum (caribergensis)

- 3003 <- Brewing yeast
- 3016 <- # 27 Larger brewing yeast, non-flocculent (John Labatt, Ltd.)
- 3017 <- # 15 Larger brewing yeast, flocculent, (John Labatt, Ltd.)

Saccharomycopsis fibulgera (Lindner) Klockner

- 3020 <- IFO 1711
- 3021 <- NRRL Y-1062
- 3027 <- N-4 (Indrati & Rahayu, 1994, *ragi tape*, curdled milk)
- 3052 <- JCM 7609 (Type strain)

Schizosaccharomyces pombe Lindner

- 3054 <- JCM 8274 (Type strain)

Trichosporon cutaneum (de Beurmann, Gougerot & Vaucher) Ota

- 3030 <- JCM 1462 (Type strain)

Wilhiopsis saturnus (Klockner) Zender

- 3044 <- JCM 3624 (Type strain)

Yarrowia lipolytica (Wickerham, Kurtzman & Herman) van der Walt & von Arx

- 3039 <- JCM 1694

Zygosaccharomyces rouxii (Boutroux) Yarrow

- 3006 as *Saccharomyces rouxi*, Boutroux
- 3007 <- IFO 0505 (as *Zygosaccharomyces soya* strain Kikkoman)
- 3008 <- IFO 1877 (as *Saccharomyces rouxil*, miso paste).
- 3047 <- JCM 5924

III. FUNGI

Absidia corymbifera (Cohn) Saccardo & Trotter

6021 <- FRR 3957

6022 <- FRR 4122

Altemaria alternata (Fries) Keissler

6023 <- FRR 3779

6024 <- FRR 4004

Aspergillus awamori Nakaz

6171 <- RR3FS1 (Beras Merah)

Aspergillus candidus Link

6026 <- FRR 3974

6106 <- (Sardjono, et al., 1992 rice)

6134 <- BJ1 (Utami, et al., 1995, geplak)

6135 <- IIH3 1 (Utami, et al., 1995, geplak)

Aspergillus flavipes (Bainier & Sartory) Thom & Church

6163 <- X (Joho Keling)

Aspergillus flavus Link ex Fries

6002

6027 <- FRR 3961

6028 <- FRR 3963

6107 <- (Sardjono, et al., 1992, rice)

6109 <- (Sardjono, et al., 1992, peanut)

6122 <- WD 3 (Dinihari, et al., 1995, dahlia roots)

6124 <- WD 5 (Dinihari, et al., 1995, dahlia roots)

6133 <- 3 (Utami, et al., 1995, geplak)

6143 <- R-4 (Indrati, et al., 1995, koji, Bantul)

6144 <- R-5 (Indrati, et al., 1995, koji, Bantul)

6145 <- R-6 (Indrati, et al., 1995, koji, Bantul)

6146 <- R-7 (Indrati, et al., 1995, koji, Bantul)

6147 <- R-8 (Indrati, et al., 1995, koji, Bantul)

6148 <- R-9 (Indrati, et al., 1995, koji, Bantul)

6149 <- R-10 (Indrati et al., 1995, koji, Bantul)

6152 <- 18-16a (D) (Indrati et al., 1995, koji Bantul)

6154 <- 18-20 (C) (Indrati, et al., 1995, koji, Bantul)

Aspergillus flavus Link ex Fries (Continued)

- 6158 <- from spices
- 6159 <- from spices
- 6160 <- from spices
- 6161 <- from spices
- 6162 <- from spices
- 6177 <- XXII C5 (Sardjono et al., 1994, corn)
- 6181 <- XXII SB1-5 (Sardjono et al., 1994, soybean)
- 6183 <- I C02 3 (Sardjono et al., 1994 corn)
- 6184 <- XXII MB1 (Sardjono et al., 1994, mungbean)

Aspergillus fumigatus Fresenius

- 6120 <- WD-1 (Dinihari, et al., 1995, dahlia roots)
- 6121 <- WD-2 (Dinihari, et al., 1995, dahlia roots)
- 6123 <- WD-4 (Dinihari, et al., 1995, dahlia roots)
- 6127 <- WD-8 (Dinihari, et al., 1995, dahlia roots)
- 6166 <- PBi-1-RS-1 (Kedhawung)

Aspergillus japonicus var. *aculeatus* (Saito) Nakazawa

- 6029 <- FRR 4091
- 6170 <- X-2-RS-1 a (Seprantu)

Aspergillus niger van Tieghem

- 6003
- 6018 <- NRRL A-11, 264
- 6030 <- FRR 3802
- 6088 <- IFO 6341
- 6089 <- IFO 6342
- 6096 <- IFO 6661
- 6097 <- IFO 6428
- 6098 <- IFO 8541
- 6114 <- Cei IFO 31125
- 6138 <- WL (Utami, et al., 1995, geplak)
- 6172 <- CB2MS1 (Sardjono et al., 1994, tholo bean)
- 6174 <- ((Sardjono et al., 1994, spices)

Aspergillus niveus Blochwitz

- 6185 <- I PP3-4 (Sardjono et al., 1994, pepper)

Aspergillus ochraceus Wilhelm

- 6031 <- FRR 3946
- 6032 <- FRR 3960

Aspergillus oryzae (Ahlburg) Cohn

6004 <- NRRL 1989
6005 <- NRRL 42250
6087 <- IFO 4079
6086 <- IFO 30113 (*Aspergillus oryzae* var. *oryzae*, sake brewing)
6142 <- R-3 (Indrati, et al., 1995, koji, Bantul)
6151 <- 18-12 (R) (Indrati, et al., 1995, koji, Bantul)
6556 <- Ao-Jpn (Koji-Japan)
6169 <- 31-51

Aspergillus parasiticus Speare

6033 <- FRR 2774
6034 <- FRR 2752
6165 <- EA-2-RS-1 a (Kembang Ceplik)

Aspergillus puniceus Kwon-Chung & Fennel

61 79 <- I CO3-5 (Sardjono et al., 1994, corn)

Aspergillus restrictus G. Smith

6035 <- FRR 2967
6036 <- FRR 2973

Aspergillus sojae Sakaguchi & Yamada

6006 <- NRRL 1984 *Aspergillus flavus* var. *sojae*
6007
6084 <- IFO 30112 (shoyu brewing)
6085 <- IFO 32074 -
6155 <- As-Jpn (Koji-Japan)
6168 <- 4-14

Aspergillus tamarii Kita

6037 <- FRR 3977
6038 <- FRR 4065
6108 <- (Sardjono, et al., 1992, peanut)
6137 <- WL-3 (Utami, et al., 1995, geplak)
6150 <- 18-11 (A) (Indrati, et al., 1995, koji, Bantul)
6153 <- 18-18 (B) (Indrati, et al., 1995, koji, Bantul)
6167 <- 17-35
6175 <- XXII SB8-6 ((Sardjono et al., 1994, soybean)
6176 <- I PP3-11 (Sardjono et al., 1994, pepper)
6178 <- XXII SB3-4 (Sardjono et al., 1994, soybean)
6180 <- I PP3-12 (Sardjono et al., 1994, pepper)
6186 <- XXII SB-8 (Sardjono et al., 1994, soybean)

Aspergillus terreus Thom

6039 <- FRR 3989

6040 <- FRR4019

6125 <- WD-6 (Dinihari, et al., 1995, dahlia roots)

6126 <- WD-7 (Dinihari, et al., 1995, dahlia roots)

6188 <- XXII C02-1 (Sardjono et al., 1994, corn)

Aspergillus versicolor (Vuillemin) Tiraboschi

6041 <- FRR 3951

6042 <- FRR 3959

Aspergillus wentii Wehmer

6043 <- FRR 2527

6044 <- FRR 3042

Aureobasidium pullulans (de Bary) Arnaud

6141 <- CBS 584.75

Cladosporium cladosporioides (Fresenius) de Vries

6045 <- FRR 3881

6046 <- FRR 4051

Chiamydomucor oryzae

6099 <- NRRL A-14766

Curvularia lunata Nelson & Haasis

6047 <- FRR 4061

6048 <- FRR 4103

Eurotium amstelodami L. Mangin

6187 <- XXII SB14-1 (Sardjono et al., 1994, soybean)

Eurotium chevalieri L. Mangin

6049 <- FRR 3954

6050 <- FRR 4021

6132 <- IIH3-1 (Utami, et al., 1995, geplak)

6136 <- WB-1 (Utami, et al., 1995, geplak)

Eurotium rubrum Konig et al.

6051 < FRR 3058

6052 < FRR 3953

Fusarium longipes

6053 <- FRR 3956

6054 <- FRR 4003

6115 <- NRRL 13369

Fusarium morilliforme (Swada) Wollenweber

6055 <- FRR 4101

6056 <- FRR 4102

Fusarium semitectum Berkeley & Ravenel

6057 <- FRR 3941

6058 <- FRR 3942

Fusarium solani (Martius) Appel & Wollenweber

6060 <- FRR4130

6116 <- NRRL13414

Geomyces pannorum var. *pannorum* (Link) Sigler & Carmichael

6093 <- IFO 32033

Mucor plumbeus van Tieghem

6061 <- FRR 4095

6062 <- FRR 4906

Mucor racemosus Fresenius f. *racemosus*

6100 <- IFO 4581

Monascus purpureus Went

6008 <- NRRL2897; Used for making angkak

Neurospora sitophila Shear & Dodge

6101 <- IFO 4596

Nigrospora oryzae

6063 <- FRR 4005

Penicillium brasilianum

6139 <- BG 2 (Utami et al., 1995 geplak)

Penicillium camembertii Thom

6014 <- IFO 5855

6117 <- NRRL 875

Penicillium candidum

6020 <- NRRL 876

Penicillium citrinum Thom

6066 <- FRR 2759

6067 <- FRR 2685

6110 <- (Sardjono, et al., 1992, rice)

6111 <- (Sardjono, et al., 1992, rice)

6112 <- (Sardjono, et al., 1992, peanut)

6113 <- (Sardjono, et al., 1992, soybean)

Penicillium crustosum Thom

6064 <- FRR 4149

6065 <- FRR 4165

Penicillium funiculosum Thom

6017 <- CCRC 30438; Used for dextranase production

6068 <- FRR 3684

6069 <- FRR 4000

6140 <- PIIH1 (Utami, et al., 1995, geplak)

Penicillium giabrum (Wehmer) Westling

6070 <- FRR 3190

6071 <- FRR 3210

Penicillium oxalicum Currie & Thom

6072 < FRR 4141

6073 < FRR 4166

Penicillium pinophilum Hedgecock apud Thom

6016 <- CCRC 31558; Used for production of dextranase

6074 <- FAR 3685

6075 <- FRR 4009

Penicillium purpurogenum Stoll

6090 <- IFO 5688

6091 <- IFO 6022

Penicillium roqueforti Thom

6015 <- IFO 4622 (T. Hasegawa, roquefort cheese).

6019 <- NRRL 3360

Rhizomucor miehei (Coorrey & Emerson) Schipper

6102 <- IFO 9740

6103 <- IFO 9741

Rhizomucor pusilus (Lindt) Schipper

6104 <- IFO 4578

6105 <- IFO 4579

Rhizopus oligosporus Saito

6010 <- NRRL 2710

Rhizopus oryzae Went & Prinsen Geerlings

6011

6078 <- FRR 3948

6079 <- FRR 4048

6157 <- Ro-Jpn (Koji-Japan)

Rhizopus microsponis var. ***rhizopodiformis*** van Thighem

6076 <- FRR 4050

6077 <- FRR 4121

Syncephalastrum racemosum (Cohn) Schroter

6080 <- FRR 4124

6081 <- FRR 4125

Trichoderma reesei Simmons

6012 <- NRRL 3653 Used for the sacharification cellulose from jerami

6128 <- CBS 189.79

6129 <- CBS 256.62

Trichoderma viride Persoon & Fries

6013 <- Used for sacharification cellulose from jerami

6130 <- CBS 383.78

6131 <- CBS 392.92

Wallemia sebi (Fries) von Arx

6082 <- FRR 3972

6083 <- FRR 3051

IV. NUMERICAL INDEX BACTERIA

- 0015 - *Streptococcus thermophilus*
- 0016 - *Acetobacter aceti*
- 0017 - *Acetobacter aceti*
- 0018 - *Pediococcus pentosaceus*
- 0019 - *Pediococcus pentosaceus*

- 0020 - *Lactobacillus plantarum*
- 0021 - *Lactobacillus brevis*
- 0022 - *Lactobacillus brevis*
- 0023 - *Leuconostoc mesenteroides* subsp. *mesenteroides*
- 0025 - *Acetobacter aceti*
- 0026 - *Lactobacillus plantarum*
- 0027 - *Lactobacillus planterum*
- 0028 - *Lactobacillus brevis*
- 0029 - *Lactobacillus brevis*

- 0030 - *Brevibacterium flavum*
- 0031 - *Brevibacterium flavum*
- 0032 - *Pediococcus halophilus*
- 0033 - *Pediococcus halophilus*

- 0040 - *Streptococcus thermophilus*
- 0041 - *Lactobacillus bulgaricus*
- 0045 - *Lactobadilus delbrueckii* subsp. *delbrueckii*
- 0046 - *Pediococcus pentosaceus*
- 0047 - *Staphylococcus aureus*
- 0048 - *Staphylococcus epidermidis*

- 0050 - *Salmonella typhimurium*
- 0051 - *Lactobacillus acidophilus*
- 0052 - *Lactobacillus rhamnosus*
- 0053 - *Lactobacillus bulgaricus*
- 0054 - *Nitrobacter winogradskyi*
- 0055 - *Nitrosomonas europaea*
- 0056 - *Zymomonas mobilis* subsp. *mobilis*
- 0057 - *Bacillus cereus*
- 0058 - *Bacillus stearothermophilus*

0059 - *Bacillus subtilis*
0060 - *Bacillus subtilis*
0061 - *Bacillus subtilis*
0062 - *Corynebacterium glutanicum*
0063 - *Pseudomonas aeruginosa*
0064 - *Rhodococcus equi*
0065 - *Rhodococcus erythropolis*
0066 - *Rhodococcus rhodochrous*
0067 - *Nocardia asteroides*
0068 - *Propionibacterium propionicus*
0069 - *Pseudomonas cepacia*

0070 - *Pseudomonas fluorescens*
0071 - *Pseudomonas putida*
0072 - *Sphingomonas paucimobilis*
0073 - *Streptomyces ambofaciens*
0074 - *Streptomyces olivaceus*
0075 - *Streptomyces olivochromogenes*
0076 - *Streptomyces violascens*
0077 - *Agrobacterium tumefaciens*
0078 - *Alcaligenes xylosoxydans* subsp. *denitrificans*
0079 - *Bacillus amyloliquefaciens*

0080 - *Bacillus amylolyticus*
0081 - *Bacillus coagulans*
0082 - *Bacillus macerans*
0083 - *Bacillus megaterium*
0084 - *Bacillus polymyxa*
0085 - *Clostridium acetobutylicum*
0086 - *Lactococcus lactis* subsp. *lactis*
0087 - *Brevibacterium lipolyticum*
0088 - *Nocardia erythropolis*
0089 - *Xanthomonas campestris*

0090 - *Lactobacillus casei*
0091 - *Escherichia coli*
0092 - *Leuconostoc mesenteroides* subsp. *mesenteroides*
0093 - *Leuconostoc mesenteroides* subsp. *mesenteroides*
0094 - *Pediococcus pentosaceus*
0095 - *Lactobacillus plantarum*
0096 - *Lactobacillus fermentum*
0097 - *Lactobacillus fermentum*
0098 - *Lactobacillus rhamnosus*
0099 - *Lactobacillus rhamnosus*

0100 - *Lactobacillus rhamnosus*
0101 - *Lactobacillus rhamnosus*
0102 - *Lactobacillus fermentum*
0103 - *Lactobacillus fermentum*
0104 - *Lactobacillus fermentum*
0105 - *Lactobacillus rhamnosus*
0106 - *Lactobacillus rhamnosus*
0107 - *Lactobacillus plantarum*
0108 - *Lactobacillus plantarum*
0109 - *Lactobacillus acidophilus*

0110 - *Pediococcus acidilactici*
0111 - *Pediococcus pentosaceus*
0112 - *Streptococcus raffinolactis*
0113 - *Lactobacillus rhamnosus*
0114 - *Lactobacillus rhamnosus*
0115 - *Lactobacillus murinus*
0116 - *Lactobacillus acidophilus*
0117 - *Lactobacillus plantarum*
0118 - *Lactobacillus fermentum*
0119 - *Pediococcus pentosaceus*

0120 - *Lactococcus lactis* subsp. *lactis*
0121 - *Morganella morganii*
0122 - *Morganella morganii*
0123 - *Lactobacillus plantarum*
0124 - *Rhodococcus equi*
0125 - *Rhodococcus fascians*
0126 - *Corynebacterium hoagii*
0127 - *Lactobadilus plantarum*
0128 - *Rhodococcus erythropolis*
0129 - *Rhodococcus rhodochrous*

0130 - *Gordona rubropertinctus*
0131 - *Gordona terrae*
0132 - *Nocardia farcinica*
0133 - *Lactococcus lactis* subsp. *lactis*
0134 - *Salmonella choleraesuis* subsp. *choleraesuis*
0135 - *Salmonella choleraesuis* subsp. *choleraesuis*
0136 - *Lactobadillus plantarum*
0137 - *Lactobadilus plantarum*
0138 - *Variovorax paradoxus*
0139 - *Salmonella* sp

0140 - *Staphylococcus aureus*
0141 - *Staphylococcus aureus*
0142 - *Salmonella sp*
0143 - *Staphylococcus aureus*
0144 - *Staphylococcus aureus*
0145 - *Staphylococcus aureus*
0146 - *Salmonella sp*

V. NUMERICAL INDEX YEAST

- 3001 - *Candida curvata*
- 3003 - *Saccharomyces uvarum (caribergensis)*
- 3004 - *Saccharomyces cerevisiae*
- 3005 - *Saccharomyces cerevisiae*
- 3006 - *Zygosaccharomyces rouxii*
- 3007 - *Zygosaccharomyces rouxii*
- 3008 - *Zygosaccharomyces rouxii*
- 3009 - *Geotricum candidum*

- 3010 - *Candida lipolytica*
- 3011 - *Kluyveromyces marxianus*
- 3012 - *Saccharomyces cerevisiae*
- 3013 - *Saccharomyces diastaticus*
- 3014 - *Saccharomyces cerevisiae*
- 3015 - *Saccharomyces cerevisiae*
- 3016 - *Saccharomyces uvarum (caribergensis)*
- 3017 - *Saccharomyces uvarum (caribergensis)*
- 3018 - *Saccharomyces bayanus*
- 3019 - *Candida utilis*

- 3020 - *Saccharomycopsis fibuligera*
- 3021 - *Saccharomycopsis fibuligera*
- 3022 - *Saccharomyces cerevisiae*
- 3023 - *Candida tropicalis*
- 3024 - *Kluyveromyces lactis*
- 3025 - *Kluyveromyces lactis*
- 3026 - *Kluyveromyces marxianus*
- 3027 - *Saccharomycopsis fibuligera*
- 3028 - *Kluyveromyces thermotolerans*
- 3029 - *Kockovaella thailandica*

- 3030 - *Trichosporon cutaneum*
- 3032 - *Cryptococcus curvatum*
- 3033 - *Candida tropicalis*
- 3034 - *Candida krusei*
- 3035 - *Candida kefyr*
- 3036 - *Candida utilis*
- 3037 - *Debaryomyces polymorphus*

- 3038 - *Kluyveromyces marxianus*
- 3039 - *Yarrowia lipolytica*

- 3040 - *Debaryomyces hansenii*
3041 - *Pichia guilliermondii*
3042 - *Pichia ohmeri*
3043 - *Candida norvegensis*
3044 - *Williopsis saturnus*
3045 - *Pichia burtonii*
3046 - *Rhodospodium toruloides*
3047 - *Zygosaccharomyces rouxii*
3048 - *Lipomyces starkeyi*
3049 - *Saccharomyces cerevisiae*
- 3050 - *Saccharomyces pastorianus*
3051 - *Saccharomyces kluyveri*
3052 - *Saccharomycopsis fibuligera*
3053 - *Rhodotorula glutinis*
3054 - *Schizosaccharomyces pombe*
3055 - *Candida wicherhamii*
3056 - *Saccharomyces cerevisiae*
3057 - *Saccharomyces cerevisiae*
3058 - *Saccharomyces cerevisiae*
3059 - *Saccharomyces carlbergensis*
- 3060 - *Saccharomyces cerevisiae*
3061 - *Kluyveromyces marxianus*
3061 - *Kluyveromyces marxianus*

VI. NUMERICAL INDEX FUNGI

- 6002 - *Aspergillus flavus*
6003 - *Aspergillus niger*
6004 - *Aspergillus oryzae*
6005 - *Aspergillus oryzae*
6006 - *Aspergillus sojae*
6007 - *Aspergillus sojee*
6008 - *Monascus purpureus*
- 6010 - *Rhizopus oligosporus*
6011 - *Rhizopus oryzae*
6012 - *Trichoderma reesei*
6013 - *Trichoderma viride*
6014 - *Penidiilum camembertii*
6015 - *Penidiilum roqueforti*
6016 - *Penicilium pinophilum*
6017 - *Penicillium funiculosum*
6018 - *Aspergillus niger*
6019 - *Penidihium roqueforti*
6020 - *Penicilium candidum*
- 6021 - *Absidia corymbifera*
6022 - *Absidia corymbifera*
6023 - *Alternaria alternata*
6024 - *Alternaria alternata*
6025 - *Aspergillus candidus*
6026 - *Aspergillus candidus*
6027 - *Aspergillus flavus*
6028 - *Aspergillus flavus*
6029 - *Aspergillus japonicus* var. *acufeatus*
6030 - *Aspergillus niger*
- 6031 - *Aspergillus ochraceus*
6032 - *Aspergillus ochraceus*
6033 - *Aspergillus parasiticus*
6034 - *Aspergillus parasiticus*
6035 - *Aspergillus restrictus*
6036 - *Aspergillus restrictus*
6037 - *Aspergillus tamaris*

6038 - *Aspergillus tamarii*
6039 - *Aspergillus terreus*
6040 - *Aspergillus terreus*
6041 - *Aspergillus versicolor*
6042 - *Aspergillus versicolor*
6043 - *Aspergillus wentii*
6044 - *Aspergillus wentii*
6045 - *Cladosporium cladosporioides*
6046 - *Cladosporium cladosporioides*
6047 - *Curvularia lunata*
6048 - *Curvularia lunata*
6049 - *Eurotium chevalieri*
6050 - *Eurotium chevalleri*

6051 - *Eurotium rubrum*
6052 - *Eurotium rubrum*
6053 - *Fusarium longipes*
6054 - *Fusarium longipes*
6055 - *Fuserium moniliforme*
6056 - *Fusarium moniliforme*
6057 - *Fusarium semitectum*
6058 - *Fusarium semitectum*

6060 - *Fusarium solani*
6061 - *Mucor plumbeus*
6062 - *Mucor plumbeus*
6063 - *Nigrospora oryzae*
6064 - *Penicillium crustosum*
6065 - *Penicillium crustosum*
6066 - *Penicillium citrinum*
6067 - *Penicillium citrinum*
6068 - *Penicillium funiculosum*
6069 - *Penicillium funiculosum*
6070 - *Penicillium glabrum*
6071 - *Penicillium glabrum*

6072 - *Penicillium oxalicum*
6073 - *Penicillium oxalicum*
6074 - *Penicillium pinophilum*
6075 - *Penicillium pinophilum*
6076 - *Rhizopus microsporus* var. *rhizopodiformis*
6077 - *Rhizopus microsporus* var. *rhizopodiformis*
6078 - *Rhizopus oryzae*
6079 - *Rhizopus oryzae*

6080 - *Syncephalastrum racemosum*
6081 - *Syncephalastrum racemosum*
6082 - *Wallemia sebi*
6083 - *Wallemia sebi*
6084 - *Aspergillus sojae*
6085 - *Aspergillus sojae*
6086 - *Aspergillus oryzae*
6087 - *Aspergillus oryzae*
6088 - *Aspergillus niger*
6089 - *Aspergillus niger*

6090 - *Penicillium purpurogenum*
6091 - *Penicillium purpurogenum*
6093 - *Geomyces pannorum* var. *pannorum*
6096 - *Aspergillus niger*
6097 - *Penicillium citrinum*
6098 - *Penicillium citrinum*
6099 - *Chlamydomucor oryzae*

6100 - *Mucor racemosus* Fresenius f. *racemosus*
6101 - *Neurospora sitophila*
6102 - *Rhizomucor miehei*
6103 - *Rhizomucor miehei*
6104 - *Rhizomucor pusillus*
6105 - *Rhizomucor pusillus*
6106 - *Aspergillus candidus*
6107 - *Aspergillus flavus*
6108 - *Aspergillus tamaris*
6109 - *Aspergillus flavus*

6110 - *Penicillium citrinum*
6111 - *Penicillium citrinum*
6112 - *Penicillium citrinum*
6113 - *Penicillium citrinum*
6114 - *Aspergillus niger*
6115 - *Fusarium longipes*
6116 - *Fusarium solani*
6117 - *Penicillium camembertii*

6120 - *Aspergillus fumigatus*
6121 - *Aspergillus fumigatus*
6122 - *Aspergillus flavus*
6123 - *Aspergillus fumigatus*

6124 - *Aspergillus flavus*
6125 - *Aspergillus terreus*
6126 - *Aspergillus terreus*
6127 - *Aspergillus fumigatus*
6128 - *Trichoderma reesei*
6129 - *Trichoderma reesei*

6130 - *Trichoderma viride*
6131 - *Trichoderma viride*
6132 - *Eurotium chevalieri*
6133 - *Aspergillus flevus*
6134 - *Aspergillus candidus*
6135 - *Aspergillus candidus*
6136 - *Eurotium chevalieri*
6137 - *Aspergillus tamaris*
6138 - *Aspergillus niger*
6139 - *Penicillium brasilianum*

6140 - *Penicillium funiculosum*
6141 - *Aureobasidium pullulans*
6142 - *Aspergillus oryzae*
6143 - *Aspergillus flavus*
6144 - *Aspergillus flavus*
6145 - *Aspergillus flavus*
6146 - *Aspergillus flavus*
6147 - *Aspergillus flavus*
6148 - *Aspergillus flavus*
6149 - *Aspergillus flavus*

6150 - *Aspergillus tamaris*
6151 - *Aspergillus oryzae*
6152 - *Aspergillus flavus*
6153 - *Aspergillus tamaris*
6154 - *Aspergillus flavus*
6155 - *Aspergillus sojae*
6556 - *Aspergillus oryzae*
6157 - *Rhizopus oryzae*
6158 - *Aspergillus flavus*
6159 - *Aspergillus flavus*

6160 - *Aspergillus flavus*
6161 - *Aspergillus flavus*
6162 - *Aspergillus flavus*
6163 - *Aspergillus flavipes*

6165 - *Aspergillus parasiticus*
6166 - *Aspergillus fumigatus*
6167 - *Aspergillus tamarii*
6168 - *Aspergillus sojae*
6169 - *Aspergillus oryzae*

6170 - *Aspergillus japonicus* var. *aculeatus*
6171 - *Aspergillus awamori*
6172 - *Aspergillus niger*
6174 - *Aspergillus niger*
6175 - *Aspergillus tamarii*
6176 - *Aspergillus tamerii*
6177 - *Aspergillus flavus*
6178 - *Aspergillus tamerii*
6179 - *Aspergillus puniceus*

6180 - *Aspergillus tameri*
6181 - *Aspergillus flavus*
6183 - *Aspergillus flavus*
6184 - *Aspergillus flavus*
6185 - *Aspergillus niveus*
6186 - *Aspergillus tamarii*
6187 - *Eurotium amstelodami*
6188 - *Aspergillus terreus*