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Y E A S T

A Newsletter for Persons Interested in Yeast

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Marc-André Lachance, Editor
University of Western Ontario, London, Ontario, Canada N6A 5B7

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I wish all readers of the Yeast Newsletter a happy and scientifically prosperous new year!

M.A. Lachance
Editor

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I. American Type Culture Collection. 12301 Parklawn Drive, Rockville, Maryland 20852-1776, U.S.A. Communicated by S.C. Jong.

The strains listed have been added to the ATCC. Complete information on these strains may be obtained upon request from the Mycology and Botany Department of ATCC.

Name	ATCC No.	Depositor & Strain	Significance & Reference
Candida albicans	66396	J.P. Bouchara	Human pathogen (J. Med. Vet. Mycol. 26:327-334, 1988)
Candida shehatae	66277	M. Wayman	Ethanol production from coniferous wood (Can. J. Microbiol. 33:1017-1023, 1987)
Debaryomyces hansenii	66344-66345	K. Tokuoka	High sugar content isolate (J. Gen. Microbiol. 31:411-427, 1985)
Hansenula anomala	66346-66347	K. Tokuoka	High sugar content isolate (J. Gen. Appl. Microbiol. 31:411-427, 1985)
Pichia pastoris	66390-66395	NRRL	Enhanced tryptophan content (U.S. Patent 4,707,449)
Pichia stipitis	66278	M. Wayman	Production of ethanol from coniferous wood (Biotech. Letters 8:479-752, 1986)
Phaffia rhodozyma	66270 66272	E.A. Johnson	Astaxanthin producer (Appl. Environ Microb. 55:116, 1989)
Saccharomyces bayanus	66283	I. Sa-Correia	Ethanol tolerant for making sparkling wines (Appl. Environ. Microbiol. 54:2439-2446, 1988)
Saccharomyces cerevisiae	66257-66259	G. Rodel	Genetics studies (Curr. Gent. 11:47-53, 1986)
Saccharomyces cerevisiae	66312-66331, 66352-66365	A. Tzagoloff	Genetics studies (J. Biol. Chem. 258:4959-9468, 1983; 259:4732-4738, 1984; 260:15362-15370, 1985; 261:17163-17169, 1986; 262:3690-3696, 1986; 262:12275-12287, 1987; 262:16822-16829, 1987) (Eur. J. Biochem. 1979:365-371, 1989) (Mol. Cell Biol. 9:2695-2705, 1989)
Saccharomyces cerevisiae	66438-66349	K. Tokuoka	High sugar content isolate (J. Gen. Appl. Microbiol. 31:411, 1985)
Zygosaccharomyces rouxii	66350-66351	K. Tokuoka	High sugar content isolate (J. Gen. Appl. Microbiol. 31:411, 1985).

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II. National Collection of Yeast Cultures. Institute of Food Research, Colney Lane, Norwich NR4 7UA, United Kingdom. Communicated by P.J.H. Jackman.

1. 1989 Catalogue of Strains. ISSN 0958-4692. Edited by K.A. Painting & P.J.H. Jackman

The new edition contains details of more than 2000 strains including some 800 new accessions since the last edition. The catalogue includes :

- An expanded introduction describing the full range of services offered by NCYC
- 1200 Saccharomyces cerevisiae genetic strains
- 475 Schizosaccharomyces pombe genetic strains
- expanded collection of 'killer' strains
- expanded collection of Pichia angusta (Hansenula polymorpha) genetic strains
- new strain data section listing NCYC identification test results for many strains
- new data on maximum, minimum and optimum growth temperatures
- expanded data on brewing strains

The catalogue (price 15.00 pounds sterling + postage and packing for overseas orders) may be ordered from NCYC at the address above. Please send no money now; you will be invoiced after delivery.

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2. NCYC & NCFB Online Services

These provide the NCYC & NCFB catalogues online and a probabilistic identification program for yeasts (COMPASS). These services are now also accessible from the USA and Canada as well as other countries via the Microbial Strain Data Network. Contact NCYC for further details.

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III. Centraalbureau voor Schimmelcultures, Yeast Division, Julianalaan 67a, 2628 BC DELFT (Netherlands). Communicated by M.Th. Smith.

Recent Acquisitions - Yeasts.

Bensingtonia ingoldii Nakase & Itoh: CBS 7424 = IAM 13923 = JCM 7445, T, ex leaf of Knightia excelsa infected with sooty moulds in New Zealand, T. Boekhout.

Candida oleophila Montrocher: CBS 7410, ex feed oil pipe, A. Jansen.

Candida palmioleophila Nakase & Itoh: CBS 7418 = JCM 5218, T, ex soil, T. Nakase.

Candida tanzawaensis Nakase: CBS 7422 = JCM 1648, T, ex moss Polytrichum commune, T. Nakase.

Chionosphaera apobasidialis Cox: CBS 7430, ex Carpinus caroliniana in USA, K.J. Kwon-Chung.

Leucosporidium lari-marini Saëz & Nguyen: CBS 7420, ex great black-backed gull Larus marinus, H. Saëz.

Pichia pastoris (Guilliermond) Phaff: CBS 7435 = NRRL Y-11430, patent strain, (alcohol-oxidase genes: Koutz et al., Yeast 5:167-177, 1989), NRRL

Rhodosporidium kratochvilovae Hamamoto et al.: CBS 7436 - IAM 13072 = CCY 62-3-1, T. J. Sugiyama.

Rhodotorula pilatii (Jacob et al.) Weijman: CBS 7423 = IGC 4458, rotten tree trunk in Portugal, N. van Uden.

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Publications

1. Roeijmans, H.J., G.W. van Eijk and D. Yarrow. 1989. Some name changes necessitated by the redefinition of the genus Candida. Mycotaxon 35:405-406.

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2. Smith, M. Th., G.A. Poot and T. Kull. 1989. Segregation of Candida pseudolambica sp. nov. from Candida lambica and closely related species by deoxyribonucleic acid relatedness. Studies in Mycology 31:171-176.

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3. Smith, M.Th., J.P. van der Walt and W.H. Batenburg-van der Vegte. 1989. Zygozyma suomiensis sp. nov. (Lipomycetaceae), a new species from Finland. Antonie van Leeuwenhoek 56:283-288.

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4. van der Walt, J.P., M.Th. Smith and Y. Yamada. 1989. Debaryomyces udenii sp. nov. (Saccharomycetaceae), a new species from soil. Antonie van Leeuwenhoek 56:233-239.

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5. van der Walt, J.P., M.Th. Smith, Y. Yamada, T. Nakase and P.D.G. Richards. 1989 Lipomyces japonicus sp. nov. from Japanese soil. System. Appl. Microbiol. 11:302-304.

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IV. Institute of Physiological Chemistry, Ruhr-University, Postfach 10 2148 D-463 Bochum, FRG. Communicated by W. Duntze.

The following abstract, which appeared in the June 1989 issue of the Yeast Newsletter, contained several important typographical errors. The correct version appears here.

1. Steden, M., R. Betz, and W. Duntze. 1989. Isolation and characterization of Saccharomyces cerevisiae mutants supersensitive to G1 arrest by the mating hormone a factor.

Ten independent mutants which are supersensitive (ssl$^-$) to G1 arrest by the mating hormone a-factor were isolated by screening mutagenized Saccharomyces cerevisiae MATα cells on solid medium for increased growth inhibition with a-factor. These mutants carried lesions in two complementation groups, ssl1 and ssl2. Mutations at the ssl1 locus were mating-type specific: Matα ssl1$^-$ cells were supersensitive to a-factor but MATa ssl1$^-$ were not supersensitive to α-factor. In contrast mutations at the ssl2 locus conferred supersensitivity to the mating hormone of the opposite mating type on both MATα and MATa cells. The α-cell specific capacity to inactivate externally added a-factor was shown to be lacking in ssl1$^-$ mutants but only slightly reduced in ssl2$^-$ cells. Complementation analysis showed that ssl2 and sst2, a mutation originally defined as conferring supersensitivity to α-factor to MATa cells, are lesions in the same gene. The ssl1 gene was mapped 30.5 centimorgans distal to ilv5 on chromosome XII.

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V. Institute for Genetics and Selection of Industrial Microorganisms, Moscow 113545, USSR. Communicated by G.I. Naumov.

The following papers have been published recently.

1. Naumov, G.I. 1988. Identification of yeast species belonging to the genus Zygofabospora Kudriavzev emend. Naumov. Mikrobiologiya **57**(1):114-118 (in Russian).

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2. Shchurov, M.N., G.I. Naumov, and V.I. Kondratyeva. 1988. Genetic peculiarities of the yeasts Hansenula wingei and Hansenula canadensis. Mikrobiologiya **57**(2):251-254 (in Russian).

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3. Naumov, G.I. and T.A. Nikonenko. 1988. The incidence and physiological properties of the biologic species Saccharomyces bayanus according to hybridological analysis. Mikrobiologiya **57**(4):648-652 (in Russian).

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4. Naumov, G.I. 1988. Genetic and taxonomic peculiarities of the yeast Pichia angusta CBS 1976. Genetika **24**(5): 819-821 (in Russian).

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5. Shchurov, M.N. and G.I. Naumov. 1988. Hybridization study of the yeast Pichia fabianii (Wickerham) Kurtzman. Biol. Nauki **5**:89-92 (in Russian).

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6. Naumov, G.I. and T.A. Nikonenko. 1988. The East Asia is a probable land of the cultured yeasts Saccharomyces cerevisiae. Izvestiya Sibir. Otd. Acad. Nauk SSSR. Biologiya **20**(3):97-101 (in Russian).

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7. Naumov, G.I. 1988. A hybridological study of the yeast Saccharomyces from the expedition collection of V.I. Kudryavzev (during 1934 and 1936). Mikologiya i Phytopathologiya **22**(4):291-301 (in Russian).

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8. Naumov, G.I. 1988. On the origin of polymeric SUC and MAL markers of American genetic stocks of Saccharomyces. Genetika **24**(12):2253-2254 (in Russian).

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9. Naumov, G.I. 1989. Identification of melibiose fermentation polymeric genes in Saccharomyces cerevisiae. Dokl. Acad. Nauk SSSR **304**(6):1475-1477 (in Russian).

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10. Naumov, G.I. 1989. Differentiation of gene pool of cultured yeast Saccharomyces: eight groups of cultivars. Dokl. Acad. Nauk SSSR 306(5):1253-1255 (in Russian).

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11. Naumov, G.I. and T.I. Filimonova. 1989. Absence of strain-killers from Moscow commercial yeast populations of Saccharomyces. Mikologiya i Phytopathologiya 23(1):34-37 (in Russian).

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12. Naumov, G.I. 1989. On the forthcoming publication of catalogues of the national collection of nonpathogenic and industrial microorganisms (NCM, NCIM). Mikologiya i Phytopathologiya 23(2):189 (in Russian).

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13. Naumov, G.I. 1989. Occurrence of Saccharomyces paradoxus in Estonia. Eesti NSV Teaduste Akadeemia Toimetised. Biologia 38(1):9-12 (in Russian).

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14. Naumov, G.I. and T.A. Nikonenko. 1988. New isolates of the yeast Saccharomyces paradoxus from oak exudates. Biol. Nauki 7:84-87 (in Russian).

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15. Naumov, G.I., M.N. Shchurov, and V.I. Kondratyeva. 1989. Hybridization and recombination in the yeasts Pichia alni, P. bimundalis, P. finlandica, P. glucozyma, P. henricii, P. holstii, P. minuta var. nonfermentans, P. muscicola. Cytologiya i Genetika 23(1):61-65 (in Russian).

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16. Naumov, G.I. 1989. Theodosius Dobzhansky (1900-1975) and Soviet genetics (to the bright memory of great biologist). Genetika 25(6):1131-1134 (in Russian).

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Some of our studies are summarized below.

17. Beritashvili, D.R. and G.I. Naumov. About the electrophoretic karyotype of sibling species of Saccharomyces sensu stricto.

Using pulsed field chromosome electrophoresis we have compared genomes of three biological species: S. cerevisiae, S. bayanus, S. paradoxus. Chromosome number in these species seems to be equal; we didn't separate some double bands, but chromosome sets in each of three species have different electrophoretic behavior.

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18. Naumov, G.I. Saccharomyces douglasii nom. nud. is synonym of S. paradoxus.

The yeast S. douglasii was often used in studies on comparative and molecular genetics (Hawthorne 1983, 1988; Adoutte-Panvier, Davis 1984; Delorme et al. 1988; Herbert et al. 1988a,b) but this taxon had not been described in accordance with taxonomic rules. Using hybridological analysis we identified the taxonomic position of yeast S. douglasii CBS 7400. This strain is easily crossed with test-strains of biological species S. cerevisiae, S. paradoxus and S. bayanus by the method "spore-to-spore". However, hybrids S. cerevisiae x S. douglasii and S. paradoxus x S. douglasii. The data obtained allow one to assign correctly S. douglasii CBS 7400 to the species S. paradoxus Batschinskaia.

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VI. Research Institute for Viticulture and Enology, 833 11 Bratislava, Matuskova 25, Czechoslovakia. Communicated by E. Minárik.

The following paper will be published in "Die Wein-Wissenschaft", Mainz, GFR.

1. Minárik, E. and O. Jungová. 1989. Possibilities to reduce the inhibitory effect of sulphur dioxide by yeast ghost and cellulose preparations. Wein-Wiss. 44.

The inhibitory effect of sulphur dioxide on yeasts may be reduced to a great extent by yeast ghost and cellulose preparations. The fermentation start and the whole course of fermentation may be accelerated. Higher alcohol contents, lower residual sugar and volatile acid formation by yeasts may be achieved by this procedure.

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VII. Molecular Genetics Group, Research School of Biological Sciences, Australian National University, P.O. Box 475, Canberra ACT 2601, Australia. Communicated by G.D. Clark-Walker.

The following is an except from an Introductory Lecture given at the 7th International Symposium on Yeasts. The lecture was entitled "The Genome of Bakers Yeast - the Benchmark for a Eukaryotic Cell".

If we are to gain a complete biochemical and genetical understanding of a eukaryotic cell's basic components, Saccharomyces cerevisiae, is an ideal creature. Its virtues are many. Apart from the recognized attraction of being easy to manipulate like other microorganisms, its haploid lifestyle facilitates isolation of mutants which can then be subjected to genetical analysis because mating, meiosis and sporulation can be readily achieved. Added to this is the ability to transform this organism with vectors containing genomic fragments thereby enabling genes to be isolated by complementation of mutants. Furthermore, yeast's peculiar property of being able to dispense with respiration has allowed analysis of both mitochondrial and nuclear genes involved in mitochondrial biogenesis and function without recourse to conditional mutants. Finally yeast has a small genome which makes it tractable to sequence without this task becoming a financial or intellectual burden. Any attempt to gain a complete knowledge of yeast's genome must address the following questions. How many genes are there, what are their functions, how and when are they expressed and how are they organized? As a consequence of investigating these questions insight may also be obtained into how yeast's genes have evolved and what genes distinguish this organisms from others.

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VIII. Food Research and Development Centre, 3600 Casavant Blvd West, Saint-Hyacinthe, Québec, J2S 8E3. Communicated by P. Gélinas.

The following thesis has been published recently and its content will soon appear as scientific papers.

1. Gélinas, P. 1988. Conditions de culture et cryorésistance de la levure de boulangerie, Saccharomyces cerevisiae, incorporée dans les pâtes congelées. (in French) (transl.: Growth conditions and cryotolerance of bakers' yeast, Saccharomyces cerevisiae, in frozen doughs). Ph.D. thesis, Université Laval, Sainte-Foy, Québec, Canada.

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The following is an abstract of a recently published paper.

1. Gélinas, P., G. Fiset, A. LeDuy, and J. Goulet. 1989. Effect of growth conditions and trehalose content on cryotolerance of bakers' yeast in frozen doughs. Appl. Environ. Microbiol. **55**:2453-2459.

The cryotolerance in frozen doughs and in water suspensions of bakers' yeast (Saccharomyces cerevisiae) previously grown under various industrial conditions was evaluated on a laboratory scale. Fed-batch cultures were very superior to batch cultures, and strong aeration enhanced cryoresistance in both cases for freezing rates of 1 to 56°C/min. Loss of cell viability in frozen doughs or water was related to the duration of the dissolved-oxygen deficit during fed-batch growth. Strongly aerobic fed-batch cultures grown at a reduced average specific rate (μ = 1/0.088 h compared with 1/0.117 h) also showed greater trehalose synthesis and improved frozen-dough stability. Insufficient aeration (dissolved-oxygen deficit) and lower growth temperature (20°C instead of 30°C) decreased both fed-batch-grown yeast cryoresistance and trehalose content. Although trehalose had a cryoprotective effect in Saccharomyces cerevisiae, its effect was neutralized by even a momentary lack of excess dissolved oxygen in the fed-batch growth medium.

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IX. Department of Microbiology, Miami University, Oxford, Ohio 45056, USA. Communicated by J.K. Bhattacharjee.

The following papers have been published during the last three years from my research laboratory.

1. Li, W., S. Okamoto, and J.K. Bhattacharjee. 1989. Cloning and characterization of linked lysine genes (LYS4 and LYS15) of S. cerevisiae. Curr. Genet. 16:7-12.

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2. Storts, D.R. and J.K. Bhattacharjee. 1989. Properties of revertants of lys2 and lys5 mutants as well as α-aminoadipate-semialdehyde hydrogenase from S. cerevisiae. Biochem. Biophys. Res. Commun. **161**:182-186.

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3. Borell, C.W. and J.K. Bhattacharjee. 1988. Cloning and biochemical characterization of LYS5 gene of S. cerevisiae. Curr. Genet. **13**:299-304.

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4. Ye, Z.H. and J.K. Bhattacharjee. 1988. Lysine biosynthesis pathway and biochemical blocks of lysine auxotrophs of S. pombe. J. Bacteriol. 170:5968-5970.

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5. Storts, D.R. and J.K. Bhattacharjee. 1987. Purification and properties of saccharopine dehydrogenase (glutamate forming) in the S. cerevisiae lysine biosynthetic pathway. J. Bacteriol. 169:416-418.

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6. Winston, M.K. and J.K. Bhattacharjee. 1987. Biosynthetic and regulatory role of lys9 mutants of S. cerevisiae. Curr. Genet. 11:393-398.

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X. ALKO Ltd., The Finnish State Alcohol Company, POB 350, SF-00101 Helsinki, Finland. Communicated by M. Korhola.

The following papers have been published since June 1989.

1. Suomalainen, I., J. Londesborough and M. Korhola. 1989. An oxidoreductive pathway for D-xylose assimilation by Rhodosporidium toruloides. J. Gen. Microbiol. 135:1537-1545.

Extracts of Rhodosporidium toruloides grown aerobically on xylose contained xylitol dehydrogenase and D-xylose reductase activities. Extracts of cells grown on glucose contained one-tenth as much xylose reductase and no detectable xylitol dehydrogenase. The xylitol dehydrogenase was purified to near homogeneity, and is a tetramer of 45 kDa subunits. This labile enzyme could be stabilized by glycerol (25%) and was rapidly inactivated by 10 mM-EDTA. It catalyses the reversible, NAD^+-dependent oxidation of xylitol to xylulose. Apparent K_m values of 10 mM-xylitol and 0.3 mM-NAD^+ at 30°C, pH 8.5. Partially purified preparations of xylose reductase catalysed the NADPH-dependent reduction of D-xylose to xylitol, and were 16 times as active with 33 mM-DL-glyceraldehyde as with 33 mM-D-xylose. Apparently R. toruloides grown on xylose has the necessary enzymes to convert xylose to xylulose by the oxidoreductive pathway.

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2. Nuutinen, M. and J. Londesborough. 1988. The stimulation of a casein kinase II from yeast by polyamines occurs with endogenous substrates at cytosolic salt levels. Second Messengers and Phosphoproteins 12(4):197-205.

A casein kinase II that is tightly bound to yeast ribosomes was partially purified and used to phosphorylate YL 44 and an unidentified 36 kDa protein in purified ribosomes. At typical cytosolic salt concentrations the phosphorylation was strongly stimulated by moderate concentrations (200 μM) of spermine or spermidine. The lowest effective concentration of spermine (20 μM, causing < 50% stimulation) was close to that of total spermine reported in non-growing yeast. Increases in free polyamines accompanying the 10-fold increase in total spermine and spermidine in growing yeast may therefore significantly stimulate this phosphorylation.

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3. Londesborough, J. Purification of a Ca^{2+}/calmodulin-dependent protein kinase from baker's yeast. J. Gen. Microbiol. (in press).

A Ca^{2+}- and calmodulin-dependent protein kinase was purified from baker's yeast to near homogeneity. At pH 7.5 and 0.1 M-NaCl it has a native molecular mass close to 100 kDa, and is a dimer of apparently identical 56 kDa autophosphorylatable subunits. At 60 μm-$CaCl_2$ and with mixed histones as substrate, half-maximal activation required concentrations of beef calmodulin above 1 μm. At 0.14 μm-beef calmodulin the enzyme showed apparent negative cooperativity towards ATP, with limiting apparent K_m values of 4 μm and 60 μm ATP. The enzyme has a broad substrate specificity in vitro, including two yeast proteins that yield, respectively, 50 kDa and 200 kDa phosphopolypeptides.

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XI. Laboratoire d'Éthologie et Conservation des Espèces Animales, Museum National d'Histoire Naturelle, Parc zoologique de Paris, 53, Av. de Saint Maurice, 75012 Paris, France. Communicated by H. Saëz.

The following is a recently published paper.

1. Saëz, H. and T.L. Nguyen. 1989. Leucosporidium lari-marini nouvelle espèce de levure isolée chez un oiseau aquatique. Cryptogamie, Mycol. 10(1):81-85.

Description of Leucosporidium lari-marini a new species of basidiomycetous yeast (Basidiomycotina, Ustilaginales, Teliospores-forming yeasts), isolated from a Great black-backed gull (Larus marinus L.) and comparison with other kindred species.

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XII. Istituto de Investigaciones Biomédicas del CSIC, Facultad de Medicina de la U.A.M., Arzobispo Morcillo 4, 28029-Madrid, Spain. Communicated by R. Lagunas.

The following abstract entitled "Toxicity of 2-deoxygalactose, inhibition of glycolysis in Saccharomyces cerevisiae was presented at the 7th Small Meeting on Yeast Transport and Energetics (September 1989, Leiden, The Netherlands).

2-deoxyhexoses are powerful inhibitors of cell growth and glycolysis. Inhibition of growth is due to the effect of these compounds on polysaccharide biosynthesis. However, inhibition of glycolysis occurs by mechanism(s) that, in the case of eukaryotes, are still not understood. This research attempts to establish the site(s) involved in the inhibition of glycolysis by 2-deoxygalactose (2dG) in S. cerevisiae. Data from other authors suggested that, as in the case of bacteria, this inhibition could take place at the level of sugar uptake. This possibility seemed most interesting since the need for a control of the sugar transports in yeast, in response to rapid changes in the environmental conditions, has been recognized since very long but, up to now, this type of control could not be demonstrated.

The results indicate that addition of 2dG to galactose adapted yeast produces a progressive inhibition of fermentation, inhibition that is complete after 40 min of incubation in the presence of the 2-deoxysugar. During this period, 2dG entered yeast cells through the inducible galactose transport at a rate of ca. 1 mmol/g (wet weight) per min. Intracellular 2dG was phosphorylated to 2dG1P until this ester reached a concentration of ca. 30 mM. Accumulated 2dGIP was further metabolized to UDP-2-deoxygalactose and/or UDP-2-deoxyglucose. The intracellular level reached by these compounds was > 2 mM. Removing of 2dG from the medium produced a prompt disappearance of the intracellular 2dG. It also produced a progressive decrease of 2dGIP content whereas the UDP-2-deoxysugar(s) remained constant. Changes in the cellular content of 2dGIP were accompanied by inverse changes in the fermentation capacity of the cells whereas no correlation was observed between 2dG or UDP-2-deoxysugar(s) content and rate of fermentation.

2dG treated cells accumulated great amounts of fructose when fermentation of this sugar was completely abolished. Therefore, the transport of this sugar was not responsible for the stopping of fermentation. In support of this conclusion is the fact that substantial changes in the activity of the glucose transport system were not observed in cells treated with 2dG. By contrast we observed, by measurements of metabolite levels, that the limiting step of fermentation in 2dG treated cells was phosphofructokinase (PFK) since a crossover exists at the level of this enzyme.

None of the known regulatory metabolites of PFK changes in 2dG treated cells as expected in they were responsible for the inhibition of the enzyme. Neither changes in the intracellular pH values were detected. These results indicate that the inhibition of fermentation in 2dG treated cells is produced by a still non-identified factor. Taking into account the good correlation existing between 2dGIP and fermentation capacity of the cells, indeed 2dGIP seems a good candidate.

As a conclusion to this study we propose that the inhibition of glycolysis in yeast produced by the presence of 2dG in the culture medium is due to the inhibition of PFK produced by the enormous accumulation of 2dGIP. We plan to check this possibility.

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XIII. Department of Microbiology, School of Pharmaceutical Sciences, University of Shizuoka, 395 Yada, Shizuoka-shi 422, Japan. Communicated by Y. Iwamoto.

The following is an abstract of a recently published paper.

1. Iwamoto, Y., C. Tominaga and Y. Yanagihara. 1989. Photodynamic activities of food additive dyes on the yeast Saccharomyces cerevisiae. Chem. Pharm. Bull. 37(6):1632-1634.

Photodynamic cell-inactivating activities of food additive dyes on the yeast Saccharomyces cerevisiae were investigated. Activities of dyes not permitted as food additives were also examined. Red No. 105 (rose bengal), Red No. 3 (erythrosine) and Red No. 104 (phloxine), which are permitted as food additives, markedly inactivated yeast cells by photodynamic action. Eosine, matius yellow and guinia green B, which are not permitted, also exhibited moderate cell-inactivating activity by photodynamic action. None of the dyes used in this experiment exhibited petite induction by photodynamic action.

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XIV. Department of Genetics and Development, Columbia University College of Physicians and Surgeons, 701 West 168th Street, New York, N.Y. 10032, USA. Communicated by R. Rothstein.

The following is the abstract of an article that will appear in the December issue of Genetics.

1. Thomas, B.J. and R. Rothstein. 1989. The genetic control of direct repeat recombination in Saccharomyces: the effect of rad52 and rad1 on mitotic recombination at GAL10, a transcriptionally-regulated gene.

Direct repeat recombination events leading to loss of a plasmid integrated at the GAL10 locus in Saccharomyces cerevisiae are stimulated by transcription of the region. We have examined the role of two recombination and repair-defective mutations, rad1 and rad52, on direct repeat recombination in transcriptionally active and inactive sequences. We show that the RAD52 gene is required for transcription-stimulated recombination events leading to loss of the integrated plasmid. Similarly, Gal+ events between the duplicated repeats that retain the integrated plasmid DNA (Gal+ Ura+ replacement events) are reduced 20-fold in the rad52 mutant in sequences that are constitutively expressed. In contrast, in sequences that are not expressed, the rad52 mutation reduces plasmid loss events by only two-fold and Gal+ Ura+ replacements by four-fold. We also observe an increase in disome-associated plasmid loss events in the rad52 mutant, indicative of chromosome gain. The event is not affected by expression of the region. Plasmid loss events in rad1 mutant strains are reduced only two-fold in transcriptionally active sequences and are not affected in sequences that are repressed. However, the rad1 rad52 double mutant shows a decrease in plasmid loss events greater than the sum of the decreases in the rates of this event displayed by either single mutant in both constitutive and repressed DNA, indicating a synergistic interaction between these two genes. The synergism is limited to recombination since the rad1 rad52 double mutant is no more sensitive when compared with either single mutant in its ability to survive radiation damage. Finally, the recombination pathway that remains in the double mutant is positively affected by transcription of the region.

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XV. Université Catholique de Louvain, Unité de Biochimie Physiologique, Place Croix du Sud 1, B-1348 Louvain-La-Neuve, Belgium. Communicated by E. Balzi.

The following is the abstract of a Doctor of Science dissertation prepared by E. Balzi under the supervision of Prof. A. Goffeau and the co-supervision of Prof. J. Bouhamont.

A 40-kb DNA region of Saccharomyces cerevisiae chromosome VII, extending from the PMA1 to the TRP5 genes, has been isolated and analyzed at the molecular level, thus leading to the identification and characterization of several new genes, largely involved in drug resistance. A series of closely-linked mutations has been assigned to different neighbouring genes. The major multiple drug resistance locus, PDR1, was located 4 kb centromere distal to LEU1 and was shown to restore sensitivity to different inhibitors when introduced on multiple copy plasmids into pdr1 mutants. The 120-kDa polypeptide encoded by PDR1 resembles DNA-binding proteins regulating gene transcription. We propose the hypothesis of a general transcriptional control by the PDR1 polypeptide on several DNA targets coding for components of permeability barriers.

A BOR2 mutant, selected for its borrelidin resistance, was observed as cross-resistant to unrelated inhibitors. The wild-type PDR1 gene restored sensitivity to drugs in a BOR2 strain. BOR2 appears thus to be an allele of PDR1. In contrast, the axenomycin resistance mutation ACE1-2 was found to be allelic to the plasma membrane ATPase gene, PMA1, located 1 kb centromere proximal to LEU1 and which restores sensitivity to axenomycin in an AXE1-2 mutant.

A new genetic locus, called PDR6, was located on a 8 kb DNA fragment distal and adjacent to PDR1. PDR6 was shown to confer sensitivity to different drugs, such as cycloheximide, borrelidin and hygromycin B, when introduced on multiple copy plasmids into BOR1 and pdr1 mutants. Another genetic locus, called scl1, previously described as indirectly interfering with cycloheximide resistance, has been identified between LEU1 and PDR1 and characterized as an essential gene. The 30-kDa scl1 encoded polypeptide is potentially capable of entering the secretory pathway.

Finally, we have isolated the ATE1 gene by complementation of an arginyl transferase deficient mutant, ate1. The ATE1 gene was located 8 kb centromere distal to PDR1, and was shown to encode an arginyl-tRNA protein transferase activity, a component of the ubiquitin-mediated degradation pathway. No correlation between the ATE1 gene and the collateral cycloheximide resistance phenotype of the ate1 mutant was found.

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XVI. Biology Department, Brooklyn College of the City University of New York, Brooklyn, N.Y. 11210, USA. Communicated by N.A. Khan.

The following is a summary of a paper recently submitted for publication. 1. Khan, N.A. and N.R. Eaton. 1989. Alpha-methylglucosidase formation in a constitutive MAL3 strain of Saccharomyces cerevisiae.

We have shown in a MAL3 strain (48-1), that the phenotype for constitutive alpha-glucosidase activity and maltose and alpha-methylglucoside fermentation are linked to the MAL3 locus. Genetic data have revealed that the constitutive phenotype in strain 48-1, and alpha-methylglucoside fermentation always co-segregate. The relationship between constitutive maltase production and alpha-methylglucoside fermentation without the presence of MGL1 and MGL3 genes has been discussed.

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XVII. Department of Microbiology. Instituto de Fisiologia Celular. Universidad Nacional Autonoma de Mexico, Apartado 70-600. Mexico DF, Mexico. Communicated by A. Peña.

The following paper has been submitted for publication.

1. Peña, A., S. Uribe, M. Clemente, and N. Sanchez. Characteristics and function of dried yeast rehydrated under different conditions.

The functions of dried yeast cells after rehydration at different temperatures were studied. Both respiration and fermentation were lower when the cells were rehydrated at 0°C, than in cells rehydrated at 40°C. A leakage of low molecular weight materials, higher in the cells rehydrated at the lower temperatures was detected. The increased permeability of the cells was permanent, and not only observed during the rehydration procedure. However, the addition of ADP, ATP, NAD, Mg^{2+}, K_+ and phosphate during rehydration did not produce the recovery of the fermentative activity of the cells. The measurement of glycolytic intermediates and adenine nucleotides revealed higher levels of pyruvate and ADP in the cells rehydrated at 40°C after incubating them with glucose; this was due to a lower activity of pyruvate decarboxylase, and to a higher ATPase activity detected in cells that were toluenized after rehydration at this temperature. Both the cells rehydrated at low or at high temperatures were unable to perform other membrane functions, such as K+ transport and the development of a membrane potential difference, and respiration was insensitive to uncouplers, indicating a general loss of membrane functions, which was independent of the temperature of rehydration. The differences of function seem to be due, not to the leakage of small molecules, but to different enzyme activities recovered at different temperatures of rehydration.

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XVIII. Laboratory of Radiation Microbiology, Faculty of Agriculture, University of Tokyo, Bunkyo-Ku, Tokyo, 113 Japan. Communicated by M. Takagi.

The following papers have been recently published.

1. Sunairi, M., R. Suzuki, M. Takagi and K. Yano. 1988. Self-cloning of genes for n-alkane assimilation from Candida maltosa. Agric. Biol. Chem. 52(2):577-579.

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2. Takagi, M., S. Uchino, M. Sugimoto, S. Kawai, T. Hikiji and K. Yano. 1988. Construction of promoter-probe vectors for Candida maltosa, a n-alkane-assimilating yeast, using the LEU2 gene of Saccharomyces cerevisiae). J. Basic Microbiol. 28(5):335-342.

For the purpose of isolation of promoter regions which are regulated by a carbon source in the medium in an n-alkane-assimilating yeast, Candida maltosa, two promoter-probe vectors were constructed. Each of them consists of the LEU2 gene of Saccharomyces cerevisiae whose 5'-noncoding region was trimmed with BAL31, an autonomously replicating sequence isolated from C. maltosa genome (the TRA region) which we have previously isolated, and the pBR322 sequence. One of them, pPLC2, having the TATA box, lacks the regulatory sequence ("sequence L") of the LEU2 gene, and the other, pPLC1, lacks both the TATA box and sequence L. Using pPLC1 as a shot-gun cloning vector in C. maltosa, many promoter regions which were active when glucose was present in the medium as a carbon source were obtained from the genome of C. maltosa. The sizes of the inserted fragments of two of them were determined. (In this paper, a promoter region refers to a promoter which includes a TATA box, plus a regulatory sequence such as an UAS (upstream activating sequence)-like sequence).

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3. Takagi, M., M. Ohkuma, N. Kobayashi, M. Watanabe and K. Yano. 1989. Purification of cytochrome P-450alk from n-alkane-grown cells of Candida maltosa, and cloning and nucleotide sequencing of the encoding gene. Agric. Biol. Chem. 53(8):2217-2226.

When the cells of an n-alkane-assimilating yeast, Candida maltosa IAM12247, were transferred from a glucose medium to an n-alkane medium, various enzymes are induced in the endoplasmic reticulum and peroxisome. Cytochrome P-45alk, one of these enzymes in the endoplasmic reticulum, was purified after mild solubilization of the membrane, followed by a few steps of chromatography. The enzyme was characterized spectrophotometrically and its N-terminal amino acid sequence (12 residues) was determined. Using oligonucleotide probes prepared to match parts of the N-terminal amino acid sequence and of the partial cDNA sequence of cytochrome P-450alk of C. maltosa EH15, we isolated from a gene library of C. maltosa IAM12247 a clone which had a gene encoding cytochrome P-450alk. By nucleotide sequencing of this gene, the amino acid sequence of this enzyme was deduced. It consisted of 523 amino acids (59,838 daltons), with a non-cleavable sequence in the N-terminal region. The structure of this enzyme was compared with some other members of the cytochrome P-450 superfamily.

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4. Hikiji, T., M. Ohkuma, M. Takagi, and K. Yano. 1989. An improved host-vector system for Candida maltosa using a gene isolated from its genome that complements the his5 mutation of Saccharomyces cerevisiae. Curr. Genet. 16: (in press).

The host-vector of the an n-alkane-assimilating-yeast, Candida maltosa, which we previously constructed using an autonomously replicating sequence (ARS) region isolated from the genome of this yeast, utilizes C. maltosa J288 (leu2$^-$) as a host. As this host had a serious growth defect on n-alkane, we developed an improved host-vector system using C. maltosa CH1 (his$^-$) as host. The vectors were constructed with the Candida ARS region and a DNA fragment isolated from the genome of C. maltosa. Since this DNA fragment could complement histidine auxotrophy of both C. maltosa CH1 and S. cerevisiae (his5$^-$), we termed the gene contained in this DNA fragment C-HIS5. The vectors were characterized in terms of transformation frequency and stability and the nucleotide sequence of C-HIS5 was determined. The deduced amino acid sequence (389 residues) shared 51% homology with that of HIS5 of S. cerevisiae (384 residues; Nishiwaki et al. 1987).

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XIX. Department of Microbiology and Enzymology, Faculty of Chemical Engineering and Materials Science, Delft University of Technology, Julianalaan 67, 2628 BC Delft, The Netherlands. Communicated by W.A. Scheffers.

The following theses have been defended recently.

1. Sweere, A.P.J. 1987. Responses of bakers' yeast to transient environmental conditions relevant to large-scale fermentation processes. Ph.D. Thesis, Delft University of Technology. pp. 181.

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2. Giuseppin, M.L.F. 1988. Optimization of methanol oxidase production of Hansenula polymorpha: an applied study on physiology and fermentation. Ph.D. Thesis, Delft University of Technology. 167 pp.

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3. Van Urk, H. 1989. Transient responses of yeasts of glucose excess. Ph.D. Thesis, Delft University of Technology. 142 pp.

This thesis describes the physiological responses of yeasts when they are transferred from glucose limitation to glucose excess. In certain organisms such as Saccharomyces cerevisiae, bakers' yeast, this change in environmental conditions results in an immediate aerobic fermentation (i.e. production of ethanol and CO_2). This effect is called the short-term Crabtree effect. In other organisms such as Candida utilis this effect is absent. The typical responses of these two yeasts to a pulse of glucose added to a glucose-limited chemostat are described in Chapter II. Not only in terms of production of extracellular metabolites but also with respect to cell composition the two yeasts differed. In C. utilis a significant proportion of the glucose taken up after a glucose pulse was converted into reserve carbohydrates.

Both yeasts did not differ with respect to their respiratory capacities. The specific rate of oxygen consumption after a glucose pulse was the same in both organisms (Chapter II). In vitro studies with isolated mitochondria confirmed this conclusion (Chapter III). The rate of oxidation of various important metabolites such as NADH, pyruvate, malate, 2-oxoglutarate, acetate and ethanol was the same in mitochondria of the two yeasts. Also the results from an electronmicroscopic study of cells of the two yeasts suggested that they may have similar respiratory capacities, since the volume density of mitochondria was the same in both yeasts (Chapter III).

The subcellular localization of key enzymes of pyruvate metabolism was not different in S. cerevisiae and C. utilis (Chapter IV). A major difference between both organisms was the level of pyruvate decarboxylase in cells of glucose-limited chemostat cultures. A high level of this enzyme and a high glycolytic flux are probably decisive for the occurrence of alcoholic fermentation after transition from glucose limitation to glucose excess. In order to verify whether this conclusion, as drawn in Chapter IV, holds in general for the occurrence of the short-term Crabtree effect a comparative study was made with an additional six yeasts.

The analysis of the metabolic fluxes in the selected yeasts, after exposure of glucose-limited cells of glucose excess, is presented in Chapter V. The results allow a more refined interpretation of the metabolic steps leading to the occurrence of the short-term Crabtree effect. The following generalizations can be made with respect to differences in physiological behaviour of Crabtree-positive and Crabtree-negative yeasts: Most Crabtree-positive yeasts did not increase their growth rate upon transition from glucose limitation to glucose excess. In contrast, the Crabtree-negative yeasts exhibited an enhanced rate of biomass production which, in most cases, could be ascribed to intracellular accumulation of reserve carbohydrates. The respiratory capacities of the yeasts from the two classes were not significantly different. However, the rate of ethanol production was positively correlated with the level of pyruvate decarboxylase (Chapter V). Like S. cerevisiae the three other Crabtree-positive yeasts contained higher levels of pyruvate decarboxylase than did the Crabtree-negative yeasts. The presence of pyruvate decarboxylase is, however, not decisive alone: high activities of acetaldehyde dehydrogenases and acetyl-CoA synthetase allow Crabtree-negative yeasts to circumvent reduction of acetaldehyde to ethanol (Chapter V).

A further difference between the two groups of yeasts is the mode of sugar transport. In Crabtree-negative yeasts this may occur via a proton symport mechanism as well as via facilitated diffusion. With one exception, in Crabtree-positive yeasts only facilitated diffusion was encountered (Chapter VI). So far the physiological significance of this difference is not clear. The behaviour of Brettanomyces intermedius, however, is exceptional. This Crabtree-positive yeast consumed glucose at a low rate, moreover, only small amounts of fermentation products were excreted upon addition of glucose to glucose-limited cultures. This weak Crabtree-positive behaviour coincided with the presence of an active glucose-uptake system in this yeast. The hypothesis that is put forward in Chapter VI is that the in vivo activities of the active glucose-uptake systems in Crabtree-negative yeasts and in B. intermedius are rapidly inactivated upon addition of excess glucose.

In the final chapter an attempt is made to draw an overall picture of the short-term Crabtree effect in the light of the results of the preceding chapters. The respiratory and biosynthetic capacities of Crabtree-positive and Crabtree-negative yeasts were similar and, therefore, may not be considered to be a primary cause of the short-term Crabtree effect. It is concluded that the short-term Crabtree effect is a consequence of a high rate of glucose uptake and the presence of a high level of pyruvate decarboxylase. Crabtree-negative yeasts may limit their glycolytic rate by intracellular accumulation of reserve carbohydrates and a different mode of glucose uptake regulation.

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The following are recent publications.

4. Steensma, H.Y., J.C. Crowley and D.B. Kaback. 1987. Molecular cloning of chromosome I DNA from Saccharomyces cerevisiae: isolation and analysis of the CEN1-ADE1-CDC15 region. Mol. Cell. Biol. 7:410-419.

To continue the systematic examination of the physical and genetic organization of an entire Saccharomyces cerevisiae chromosome, the DNA from the CEN1-ADE1-CDC15 region from chromosome I was isolated and characterized. Starting with the previously cloned ADE1 gene (J. C. Crowley and D. B. Kaback, J. Bacteriol. 159:413-417, 1984), a series of recombinant lambda bacteriophages containing 82 kilobases of contiguous DNA from chromosome I were obtained by overlap hybridization. The cloned sequences were mapped with restriction endonucleases and oriented with respect to the genetic map by determining the physical positions of the CDC15 gene and the centromeric DNA (CEN1). The CDC15 gene was located by isolating plasmids from a YCp50 S. cerevisiae genomic library that complemented the cdc15-1 mutation S. cerevisiae sequences from these plasmids were found to be represented among those already obtained by overlap hybridization. The cdc15-1-complementing plasmids all shared only one intact transcribed region that was shown to contain the bona fide CDC15 gene by in vitro gene disruption and one-step replacement to delete the chromosomal copy of this gene. This deletion produced a recessive lethal phenotype that was also recessive to cdc15-1. CEN1 was located by finding a sequence from the appropriate part of the cloned region that stabilized the inheritance of autonomously replicating S. cerevisiae plasmid vectors. Finally, RNA blot hybridization and electron microscopy of R-loop-containing DNA was used to map transcribed regions in the 23 kilobases of DNA that went from CEN1 to CDC15. In addition to the transcribed regions corresponding to the ADE1 and CDC15 genes, this DNA contained five regions that gave rise to polyadenylated RNA, at least two regions complementary to 4S RNA species, and a Ty1 transposable element. Notably, a higher than average proportion of the DNA examined was transcribed into RNA.

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5. Giuseppin, M.L.F., H.M.J. van Eijk, C. Verduyn, I. Bante and J.P. van Dijken. 1988. Production of catalase-free alcohol oxidase by Hansenula polymorpha. Appl. Microbiol. Biotechnol. 28:14-19.

Many of the potential technical applications of alcohol oxidase (MOX; EC 1.1.3.13) are limited by the presence of high activities of catalase in the enzyme preparations. In order to circumvent laborious and costly purification or inactivation procedures, the induction of MOX in a catalase-negative mutant of Hansenula polymorpha has been studied. Emphasis was laid on the induction of activities of MOX and the dissimilatory enzymes in continuous cultures grown on various mixtures of formate/glucose and formaldehyde/glucose. In continuous cultures of the catalase-negative mutant grown on these mixtures, MOX can be induced efficiently. To obtain a stable and productive process, the ratio of the substrates is of critical importance. The optimal ratios of the mixtures for the catalase-negative strain for formate/glucose and formaldehyde/glucose were 3:1 and 1-2:1, respectively. Under identical cultivation conditions the wild-type strain showed similar induction patterns of MOX and the dissimilatory enzymes formaldehyde/dehydrogenase (FaDH) and formate dehydrogenase (FoDH). The MOX levels in the catalase-negative strain were approx. 50% of those in the wild-type strain.

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6. Gommers, P.J.F., B.J. van Schie, J.P. van Dijken and J.G. Kuenen. 1988. Biochemical limits to microbial growth yields: an analysis of mixed-substrate utilization. Biotechnol. Bioeng. 32:86-94.

A theoretical analysis has been made of carbon conversion efficiency during heterotrophic microbial growth. The expectation was that the maximal growth yield occurs when all the substrate is assimilated and the net flow of carbon through dissimilation is zero. This, however, is not identical to a 100% carbon conversion, since assimilatory pathways lead to a net production of CO^2. It can be shown that the amount of CO^2 produced by way of assimilatory processes is dependent upon the nature of the carbon source, but independent of its degree of reduction and varies between 12 and 29% of the substrate carbon. An analysis of published yield data reveals that nearly complete assimilation can occur during growth on substrates with a high energy content. This holds for substrates with a heat of combustion of ca. 550 kJ/mol C, or a degree of reduction higher than 5 (e.g. ethane, ethanol, and methanol). Complete assimilation can also be achieved on substrates with a lower energy content, provided that an auxiliary energy source is present that cannot be used a carbon source. This is

evident from the cell yields reported for Candida utilis grown on glucose plus formate and for Thiobacillus versutus grown on acetate plus thiosulfate. This evaluation of the carbon conversion efficiency during assimilation also made is possible to compare the energy content of the auxillary energy substrate added with the quantity of the carbon source it had replaced. It will be shown that utilization of the auxiliary energy source may lead to extreme changes in the efficiency of dissimilatory processes.

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7. Steensma, H.Y., F.C.M. de Jongh and M. Linnekamp. 1988. The use of electrophoretic karyotypes in the classification of yeasts: Kluyveromyces marxianus and K. lactis. Curr. Gen. 14:311-317.

The relationship between varieties "marxianus" and "lactis" of Kluyveromyces marxianus was investigated. Strains of these varieties readily form hybrids, but their classification in one species has recently been contested. Enzyme patterns and the GC contents of their DNAs differed significantly. Moreover, DNA-DNA reassociation was less than 15%. Since the generally accepted definition of a species is based on gene exchange, we used two approaches for directly detecting genetic recombination in crosses between representatives of both species. First, multiple marked strains were crossed, and the offspring from the resulting hybrids analyzed. Secondly, the fate of individual chromosomes in identical crosses was followed by comparing the karyotypes of the parent strains, the hybrids formed between them, and the descendants of these hybrids. Karyotypes were obtained by orthogonal-field-alternation gel electrophoresis (OFAGE). Gene exchange was not detected with either method. We therefore concluded that the formation of hybrids, even when they produced viable offspring, was not sufficient to include var. "lactis" and var. "marxianus" in one species.

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8. Kaback, D.B., H.Y. Steensma and P. de Jonge. 1989. Enhanced meiotic recombination on the smallest chromosome of Saccharomyces cerevisiae. Proc. Nat. Acad. Sci. USA 86:3694-3698.

Chromosome I is the smallest chromosome in Saccharomyces cerevisiae and contains a DNA molecule that is only 250 kilobases (kb). Approximately 75% of this DNA molecule has been cloned. A restriction map for the entire DNA molecule from chromosome I was determined and most of its genetically mapped genes were located on this physical map. Based on the average rate of recombination (centimorgans/kb) found for other S. cerevisiae chromosomes, the outermost markers on the genetic map of chromosome I were expected to be close to the ends of the DNA molecule. While the rightmost genetic marker was 3 kb from the end, the leftmost marker, CDC24, was located near the middle of the left arm, suggesting that the genetic map would be much longer. To extend the genetic map, a copy of the S. cerevisiae URA3 gene was integrated in the outermost cloned region located 32 kb centromere distal to CDC24, and the genetic map distance between these two genes was determined. The new marker substantially increased the genetic map length of chromosome I. In addition, we determined the relationship between physical and genetic map distance along most of the length of the chromosome. Consistent with the longer genetic map, the average rate of recombination between markers on chromosome I was > 50% higher than the average found on other yeast chromosomes. Owing to its small size, it had been estimated that ca. 5% of the chromosome I homologues failed to undergo meiotic recombination. New measurements of the zero-crossover class indicated that the enhanced rate of recombination ensures at least one genetic exchange between virtually every pair of chromosome I homologues.

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9. Postma, E., W.A. Scheffers and J.P. van Dijken. 1989. Kinetics of growth and glucose treatment in glucose-limited chemostat cultures of Saccharomyces cerevisiae CBS 8066. Yeast 5:159-165.

The glucose transport capacity of Saccharomyces cerevisiae CBS8066 was studied in aerobic glucose-limited chemostat cultures. Two different transport systems were encountered with affinity constants of 1 and 20 mM, respectively. The capacity of these carriers (V_{max}) was dependent on the dilution rate and the residual glucose concentration in the culture. From the residual glucose concentration in the fermenter and the kinetic constants of glucose transport, their in situ contribution to glucose consumption was determined. The sum of these calculated in situ transport rates correlated well with the observed rate of glucose consumption of the culture. The growth kinetics of S. cerevisiae CBS8066 in glucose-limited cultures were rather peculiar. At low dilution rates, at which glucose was completely respired, the glucose concentration in the fermenter was constant at 110 μM, independent of the glucose concentration in the reservoir. At high dilution rates, characterized by the occurrence of both respiration and alcoholic fermentation, the residual substrate concentration followed Monod kinetics. In this case, however, the overall affinity constant was dependent on the reservoir glucose concentration.

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10. Rouwenhorst, R.J., J.T. Pronk and J.P. van Dijken. 1989. The discovery of β-galactosidase. Trends Biochem. Sci. 14:416-418.

The enzyme β-galactosidase was first mentioned in the literature by Beijerinck exactly a hundred years ago. The Department of Microbiology and Enzymology of the Delft University of Technology keeps the memory of Beijerinck, its first professor, alive by maintaining a 'Beijerinck-room' in the attic of the building. In addition to manuscripts and laboratory notebooks, this room contains some of his chemicals and biological preparations, and it was here that we recently found a 90-year old lactase preparation. Even after storage under suboptimal conditions, the preparation still exhibited measurable enzyme activities.

11. Van Urk, H., P.M. Bruinenberg, M. Veenhuis, W.A. Scheffers and J.P. van Dijken. 1989. Respiratory capacities of mitochondria of Saccharomyces cerevisiae CBS 8066 and Candida utilis CBS 621 grown under glucose limitation. Antonie van Leeuwenhoek 56:211-220.

A comparative study was made of the in vitro respiratory capacity of mitochondria isolated from Saccharomyces cerevisiae and Candida utilis grown in glucose-limited chemostat cultures. An electron-microscopic analysis of whole cells revealed that the volume density of mitochondria was the same in both yeasts. Mitochondria from both organisms exhibited respiratory control with NADH, pyruvate + malate, 2-oxyogutarate + acetate or malate, and ethanol. The rate of oxidation of these compounds by isolated mitochondria was the same in both yeasts. The rate of oxidation of NADPH by mitochondria from S. cerevisiae was 10 times lower than by those of C. utilis. However, this low rate probably has no influence on the overall in vivo respiratory capacity of S. cerevisiae. The results are discussed in relation to the differences in metabolic behaviour between S. cerevisiae and C. utilis upon transition of cultures from glucose limitation to glucose excess. It is concluded that the occurrence of alcoholic fermentation in S. cerevisiae under these conditions does not result from a bottleneck in the respiratory capacity of the mitochondria.

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12. Van Urk, H., E. Postma, W.A. Scheffers and J.P. van Dijken. 1989. Glucose transport in Crabtree-positive and Crabtree-negative yeasts. J. Gen. Microbiol. 135:2399-2406.

The kinetic parameters of glucose transport in four Crabtree-positive and four Crabtree-negative yeasts were determined. The organisms were grown in aerobic glucose-limited chemostats at a dilution rate of 0.1 h^{-1}. The results show a clear correlation between the presence of high-affinity glucose transport systems and the absence of aerobic fermentation upon addition of excess glucose to steady-state cultures. The presence of these H^+-symport systems could be established by determination of intracellular accumulation of 6-deoxy-[^{3}H]glucose and alkalinization of buffered cell suspensions upon addition of glucose. In contrast, the yeasts that did show aerobic alcoholic fermentation during these glucose pulse experiments had low-affinity facilitated-diffusion carriers only. In the yeasts examined the capacity of the glucose transport carriers was highest than the actual glucose consumption rates during the glucose pulse experiments. The relationship between the rate of sugar consumption and the rate of alcoholic fermentation was studied in detail with Saccharomyces cerevisiae. When S. cerevisiae was pulsed with low amounts of glucose or mannose, in order to obtain submaximal sugar consumption rates, fermentation was already occurring at sugar consumption rates just above those which were maintained in the glucose-limited steady-state culture. The results are interpreted in relation with the Crabtree effect. In Crabtree-positive yeasts, an increase in the external glucose concentration may lead to unrestricted glucose uptake by facilitated diffusion and hence, to aerobic fermentation. In contrast, Crabtree-negative yeasts may restrict the entry of glucose by their regulated H^+-symport systems and thus prevent the occurrence of overflow metabolism.

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13. Van Urk, H., D. Schipper, G.J. Breedveld, P.R. Mak, W.A. Scheffers and J.P. van Dijken. 1989. Localization and kinetics of pyruvate-metabolizing enzymes in Saccharomyces cerevisiae and Candida utilis CBS 621. Biochimica et Biophysica Acta 992:78-86.

The role of pyruvate metabolism in the triggering of aerobic, alcoholic fermentation in Saccharomyces cerevisiae has been studied. Since Candida utilis does not exhibit of Crabtree effect, this yeast was used as a reference organism. The localization, activity and kinetic properties of pyruvate carboxylase (EC 6.4.1.1), the pyruvate dehydrogenase complex and pyruvate decarboxylase (EC4.1.1.1) in cells of glucose-limited chemostat cultures of the two yeasts were compared. In contrast to the general situation in fungi, plants and animals, pyruvate carboxylase was found to be a cytosolic enzyme in both yeasts. This implies that for anabolic processes, transport of C_4-dicarboxylic acids into the mitochondria is required. Isolated mitochondria from both yeast exhibited the same kinetics with respect to oxidation of malate. Also, the affinity of isolated mitochondria for pyruvate oxidation and the in situ activity of the pyruvate dehydrogenase complex was similar in both types of mitochondria. The activity of the cytosolic enzyme pyruvate decarboxylase in S. cerevisiae from glucose-limited chemostat cultures was 8-fold that in C. utilis. The enzyme was purified from both organisms, and its kinetic properties were determined. Pyruvate decarboxylase of both yeasts was competitively inhibited by inorganic phosphate. The enzyme of S. cerevisiae was more sensitive to this inhibitor than the enzyme of C. utilis. The in vivo role of phosphate inhibition of pyruvate decarboxylase upon transition of cells from glucose limitation to glucose excess and the associated triggering of alcoholic fermentation was investigated with ^{31}P-NMR. In both yeasts this transition resulted in a rapid drop of the cytosolic inorganic phosphate concentration. It is concluded that the relief from phosphate inhibition does stimulate alcoholic fermentation, but it is not a prerequisite for pyruvate decarboxylase to become active in vivo. Rather, a high glycolytic flux and a high level of this enzyme are decisive for the occurrence of alcoholic fermentation after transfer of cells from glucose limitation to glucose excess.

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XX. École Nationale Supérieure Agronomique de Montpellier, Chaire de Microbiologie Industrielle et de Génétique des Microorganismes, Place Pierre Viala, 34060 Montpellier Cedex, France. Communicated by P. Galzy.

The following papers have recently been published.

1. Laborbe, J.M., C. Dwek, R. Ratomahenina, M. Pina, J. Graille, and P. Galzy. 1989. Production of single-cell protein from palm oil using Candida rugosa. MIRCEN Journal 5: (in press).

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2. Boze, H., J.B. Guyot, G. Moulin, and P. Galzy. 1989. Kinetics of the amyloglucosidase of Schwanniomyces castellii. Yeast 5:S117-S121.

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3. Boze, H., J.B. Guyot, G. Moulin, and P. Galzy. 1989. Isolation and characterization of a derepressed mutant of Schwanniomyces castellii SC-ADH5P. J. Ferment. Bioeng. 68(6): (In press).

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4. Vasserot, Y., H. Christiaens, P. Chemardin, A. Arnaud, and P. Galzy. 1989. Purification and properties of a β-glucosidase of Hanseniaspora vineae van der Walt and Tscheuschner with the view to its utilization in fruit aroma liberation. J. Appl. Bacteriol. 66:271-279.

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5. Guanata, Y., R.E. Bayonove, R. Cordonnier, A. Arnaud, and P. Galzy. Hydrolysis of grape monoterpenyl glycosides by Candida molischiana and Candida wickerhamii β-glucosidases. J. Sci. Food. Agric. (In press).

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6. Vasserot, Y., P. Chemardin, A. Arnaud, and P. Galzy. 1989. Evidence for the β-glucosidase activity and cellobiose fermentation by various Kloeckera strains. Acta Biotechnologica.

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XXI. Department of Plant Sciences, University of Western Ontario, London, Ontario N6A 5B7. Communicated by M.A. Lachance.

The following papers have been recently accepted for publication.

1. Eisikowitch, D., P.G. Kevan and M.A. Lachance. The nectar inhabiting yeast, Metschnikowia reukaufii and the control of pollen germination in common milkweed, Asclepias syriaca. Israel J. Bot. (In press).

(1) In Asclepias, nectar is secreted by the stigmatic chamber and has two functions: it is a carbohydrate reward for cross-pollinating insects which the plants require for sexual reproduction and it is the germination medium for pollen at the onset of the process of pollen tube growth. (2) Nectar from flowers which opened in the laboratory did not inhibit pollen germinating but samples of nectar from older, open flowers from the field almost always were inhibitory (94-98%), and approximately one third of samples from young open flowers from the field were inhibitory. (3) The nectar easily becomes infected by yeasts, mostly Metschnikowia reukaufii (Gruss), which are vectored by the pollinators. (4) When nectar from buds which opened in the laboratory or artificial nectars (solutions of D-glucose and sucrose which normally support vigorous germination of pollen) were contaminated with yeast-infected nectar, they did not support pollen germination. (5) Yeast-infected nectar or sugar solutions which were filtered to remove the yeast cells were also inhibitory. (6) Laboratory cultures of yeast did not inhibit pollen germination, but caused the pollen tubes to burst, as did dilute (5%) sugar solutions and adding yeast contaminated nectar or sugar solutions to preparations with already germinated pollen. (7) We conclude that Metschnikowia is widespread in nature, is vectored from flower to flower by pollinators, produces a substance that inhibits pollen germination in Asclepias syriaca and may be important in limiting fertilization and perhaps fruit-set in Asclepias.

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2. Lachance, M.A. Ribosomal DNA spacer variation in the cactophilic yeast Clavispora opuntiae. Mol. Biol. Evol. (In press).

The rDNAs of 125 isolates of the haploid, heterothallic, cactophilic yeast Clavispora opuntiae collected worldwide were mapped with 12 restriction endonucleases. Thirty distinct repetypes were identified, and, with the exception of a single strain which had a unique restriction site in its large subunit coding region, the variation was confined to the intergenic spacer. The majority of the restriction sites were randomly assorted with respect to the mating type alleles, indicating that sexual exchange within that facultatively outbreeding yeast species has been significant over evolutionary time. The restriction sites were also generally free of associations amongst one another, suggesting that rDNA homogenization has been intense and has favored the

fixation of recombinant repetypes. Occasional associations or exclusions among sites, or between sites and the mating types were attributed either to sampling bias or to recent introductions, in which the effects of random mating are overshadowed by founder effects. One intergenic spacer repetype was broadly dominant in yeasts isolated from cacti with a recent history of deliberate infestation with the moth Cactoblastis cactorum for biological control purposes. Human activity can thus be held accountable for a worldwide redistribution of yeast genotypes in this case.

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3. Eisikowitch, D., M.A. Lachance, P.G. Kevan, S. Willis and D.L. Collins-Thompson. 1990. The role of the natural assemblage of micro-organisms and selected strains of the yeast Metschnikowia reukaufii in controlling the germination of pollen of common milkweed, Asclepias syriaca. Can. J. Bot. (Accepted for publication).

The yeast, Metschnikowia reukaufii is a natural contaminant of nectar and is vectored to the flowers of field milkweed, Asclepias syriaca by insects, some of which are the pollinators of the plants. The yeast, in its natural habitat, inhibits the germination of the milkweed's pollen which normally uses nectar in the stigmatic cavity for germination. This inhibition is irreversible after about 8 hours of exposure to the yeasts. Two selected strains of the yeasts were isolated and investigated for their effects of pollen germination in vitro. The two strains, and their mixture, affected pollen germination adversely by reducing its amount, vigour, and causing any pollen tubes that were produced to burst. One strain was more virulent than the other, and the mixture seemed to have an additive effect. The strains may be more efficacious than the natural assemblage of microbes in disrupting fertilization of milkweed because they cause the immediate death (bursting) of the growing microgametophyte (pollen and tube).

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XXII. Department of Genetics and Microbiology, Charles University, Prague 2, Vinicná 5, Czechoslovakia 12844. Communicated by V. Vondrejs and O. Bendová.

The following paper was presented on the 13th International Spec. Symposium on Yeast: Production of ethanol and fermented beverages, Leuven, Belgium, 18-22 September 1989.

1. Bendová, O., B. Janderová, V. Vondrejs, F. Cvrcková, and V. Stepánek. Improvement of industrial yeast strains by genetic manipulation.

Our experiences on (1) application of zymocin selection technique in construction of brewing killer strains, (2) exploitation of protoplast fusion technique in construction of brewing hybrid strains with dextrin degrading, pof⁻ and/or zymocin producing abilities, and (3) intergeneric protoplast fusion of Schwanniomyces alluvius and brewing strain Saccharomyces uvarum P96 are summarized in this paper.

* * *

The following chapter to a new book tentatively titled "Biotechnology - current progress", ed. Cheremisinoff, P.N., Technomic Publishing Co., New Jersey, U.S.A. has been recently submitted for publication.

2. Vondrejs, V., Z. Palková, and P. Sulo. Applications of killer systems in yeasts to selection techniques.

Several versions of selection techniques based on application of killer toxins, the method of accumulation of auxotrophic mutants by killer toxins and some supplementary methods are described in this paper.

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Practical protocols for the following techniques has been completed for a new volume on methods specific to yeast. I.H. Evans, Thames Polytechnic Co., London, UK:

3. Vondrejs, V., Z. Palková: Assays for estimating the killer toxin activity and relative sensitivity of yeast strains to killer toxins.

* * *

4. Vondrejs, V., Z. Palková: Selection of hybrid clones by application of killer toxins.

* * *

The following paper was presented in Hamburg, Universitäts Augenklinik Eppendorf, 9-12 July 1989, on International Symposium "Drugs from the milk".

5. Palková, Z., V. Vondrejs, and S. Zadrazil. Production of calf-chymosin by yeast. Inst. Mol. Biol. Czechoslov. Acad. Sci.

Construction of recombinant plasmid coding for secretion of chymosin from Saccharomyces cerevisiae or hybrid S. cerevisiae and Kluyveromyces lactis, production of enzyme by immobilized cells or in "liquid cultures" and stability of systems under various conditions were described. (Proceedings of the symposium are in preparation.)

OBITUARY

In memoriam of Professor Dr. Takeshi Tsuchiya.

Takeshi Tsuchiya, M.D., Professor Emeritus in the Department of Bacteriology, Juntendo University, died on 23 September 1989 at his Tokyo home. He was 84 years old.

A distinguished yeast taxonomist, Dr. Tsuchiya is widely recognized for his proposal of a serological classification system of yeasts based on an extensive analytical study of yeast cell surface antigens.

Dr. Tsuchiya was born November 20, 1904, in Iwate, Japan. He earned his medical degree from the Faculty of Medicine, The Imperial University of Tokyo, in 1931, and was shortly after appointed Research Associate of the Institute for Infectious Disease, The Imperial University of Tokyo, studying bacteriology under the direction of Prof. Y. Miyagawa. In 1936-1939, he engaged in research and clinical examination of tropical infectious diseases in Calcutta, India, then visited several countries in Europe for training. During the outbreak of World War II (1939-1945), he was appointed Director at Dojinkai Hospital in Nanjing, China.

At the end of the war, he worked as research associate at the Department of Bacteriology, Faculty of Medicine, The Imperial University of Tokyo - a position he held for several years. In 1950, he was appointed Professor of Bacteriology at Juntendo University School of Medicine, engaging in teaching and research until his retirement in 1970.

His studies on the serological classification of yeasts was started from the antigenic analysis of seven medically important Candida species, thereafter expanding to a wide variety of yeasts. In 1965, he proposed a serological classification system of yeasts based on the antigenic analysis of almost all the species included in "The Yeasts, a Taxonomic Study" (1952). Further, he clarified the immunochemical and chemical nature of several important antigens. His seminal works on the serology of yeasts based on the chemical structures of its cellular polysaccharides paved the way towards the chemotaxonomy of today's yeasts. Dr. Tsuchiya received several awards during his career, including the "Asakawa Prize" of the Bacteriological Society of Japan in 1964 and the International Society of Human and Animal Mycology (ISHAM) Award in 1979 for his contribution to yeast taxonomy and medical mycology. Furthermore, he served as president of the Japanese Society for Medical Mycology (1962-1968) and also as Vice-President of ISHAM (1963-1967).

Although a nonpareil microbiologist, he was unpretentious and enjoyed the company of many friends. He was a consummate teacher and was deeply fond of discussing with young scientists, who in turn learned a lot from his wealth of knowledge. Indeed, we are truly honoured and fortunate to have had Dr. Tsuchiya as our mentor.

Yoshimura Fukazawa
Yamanashi Medical College, Yamanashi, Japan

Takako Shinoda
Meiji College of Pharmacy, Tokyo, Japan

Takashi Nakase
Japan Collection of Microorganisms, RIKEN, Saitama, Japan

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PAST MEETINGS AND COURSES

1. XIXth Annual Conference of the Czechoslovak Commission for Yeasts held in Smolenice Castle, 8th to 10th February 1989. Communicated by A. Kocková-Kratochvílová.

The meeting report given in the June 1989 issue lacked an entire page. The complete report appear here.

Section 1: Cell surfaces and membranes

M. Opekarová: Vesicles from plasma membranes as a tool for the studies of transport processes.
J. Vorísek: Classical and alternative imaginations of yeast secretor pathways.
M. Kopecká: New approaches and knowledges about the cell wall structure of yeasts.
A. Pichová, I. Rupes and E. Streiblová: The expression of protooncogenes in the relation to the yeast cell wall structure.
M. Havelková, I. Pokorná, J. Hasek and E. Streiblová: The influence of antitubular toxin nocodazole on the growing yeast protoplasts.

Section 2: Useful yeast enzymes

D. Smogrovicová and L. Polivka: Starch utilizing yeasts.
J. Gasperík and E. Hostinová: Structural and functional analysis of the amylolytic complex in Saccharomycopsis fibuligera
O. Markovic: Pectolytic enzymes in yeasts
P. Biely: Xylanolytic enzyme systems in yeasts
O. Volfová, J. Dvoracková and E. Kyslíková: Enzymes of methylotrophic yeasts and their application
E. Sturdík and R. Kolár: Autolytic enzymes in yeasts
M. Janderová: Amylolytic yeasts and their construction by gene manipulations
J. Subík and M. Obernauerová: Biochemistry and genetics of the invertase formation
M. Obernauerová and J. Subík: The invertase synthesis in industrial stains of baker's yeast and in products of their meiosis.
R. Kolár, E. Sturdík and P. Janícek: Yielding and application of invertase.
J. Smolík and L. Fasatiová: Immobilization of invertase in situ.

V. Stefuca, V. Báles and P. Gemeiner: The kinetic of the sucrose inversion catalysed by immobilized invertase.
V. Báles, M. Polakovic and V. Stefuce: Sucrose inversion in a reactor with static layer of immobilized cells.
Z. Kurilová, P. Gemeiner, V. Stefuca and V. Báles: Enzyme termistor and kinetical characteristics of immobilized invertase.

Section 3: Ecology and taxonomy of yeasts

R. Kovacovská: The occurrence of yeasts and yeast-like organisms in fresh water lake in Plavecky Stvrtok.
E. Slaviková: Yeasts and yeast-like organisms occurred in the cheese of cammembert type.
E. Breierová: Preservation and characteristics of the pathogenic species Malassezia pachydermatis.
E. Minárik and O. Jungová: Yeast contaminants in bottled and barreled wines.
V. Stollarová: Yeast communities occurring on selected sorts of fruits in the region of the atom electric works in Mochovce.
V. Pavliak, G. Kogan, E. Slaviková, J. Sandula and L. Masler: Immunological and structural basis of taxonomic determination of two strains of Candida parapsilosis.

Posters:

Briestianská, J. and Svoboda, A.: Microtubuli in secreting mutants of Saccharomyces cerevisiae
Kotyk, A. and Knotková, A.: The transport of glucosamine into the cells of Saccharomyces cerevisiae
Sigler, K. and Höfer, M.: H^+ and K^+ flows induced by hydrogen peroxide in yeasts
Fabianová, M., Janderová, B., Lopatníková, J. and Bendová, O.: Distillery yeasts with the ability to produce glucamylase
Cvrcková, F., Janderová, B. and Bendová, O.: Construction of brewing yeast strain DEX^+ pof^-
Janderová, B., Smardová, I. and Cvrcková, F.: The preparation of a strain S. diastaticus without POF gene
Palková, Z. and Vondrejs, V.: Characterization of hybrids Kluyveromyces lactis x Saccharomyces cerevisiae
Stepánek, V. and Janderová, B.: Induced fusion of protoplasts of Schwanniomyces alluvius with brewing yeast
Puta, F. and Wambutt, R.: Construction of double plasmids S. cerevisiae - E. coli prepared for positive selection of recombinants
Ruttkay-Nedecky, B. and Subík, J.: Study of a common interaction of the mutant pdr3-1 and mutant ogd1 and cyh^R in yeast S. cerevisiae
Sulo, P., and Michalcáková, S.: Construction of vine yeasts with the killer feature.
Zigová, M., Lichnerová, Z., Kaclíková, E. and Subík, J.: Partial supression ogd1 mutation by cloned fragment of DNA of standard strain S. cerevisiae
Pasková, J., Behalová, B. and Spacek, S.: Production of ergosterol and yeast autolysate after the cell plasmolysis of S. cerevisiae
Demová, E.: Trigonopsis variabilis - the possibility of its utilization in enzymic preparation of the precursor of cephalosporine antibiotics
Kossaczká, Z., Machová, M. and Vojtková-Lepsíková, A.: Xylose reductase and xylitol dehydrogenase in yeasts.
Omelková, J.: The influence of saponins on the β-glucosidase activity in yeast cell free extract
Breierová, E., Sajbidor, J. and Kocková-Kratochvílová, A.: Resistance against freezing and the composition of fatty acids in yeasts
Michalcaková, S., Sulo, I. and Slávíková, E.: Killer yeasts in the genera Hansenula and Kluyveromyces
Pecková, M. and Másová, I.: Yeast-like organisms in Czech peloids

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2. Kluyveromyces Workshop. Communicated by H. Fukuhara.

European laboratories working on Kluyveromyces had recently two informal meetings in the framework of ELWW (European Laboratories without Wall, partially supported by the Commission of the European Communities). The first meeting was held in May 1988 at Institut Curie, Orsay, France (H. Fukuhara) and the second in October 1989 at the University of Rome (L. Frontali). Each time about fifteen laboratories have participated, including a few industries. The discussion covered free topics on genetics, physiology, taxonomy, plasmids, gene regulation, biotechnology, etc.. The meetings will be held on annual basis. It is hoped to gradually extend the circle.

* * *

3. Third International Course on Taxonomy, Preservation, and Genetics of Yeasts and their Application in Biotechnology. U.N.A.M. Cuernavaca, Mexico, October 1989. Communicated by J. Martinez-Cruz.

The course was held in collaboration between the Culture Collection of the Centro de Investigacion y Estudios Avanzados del IPN, the Centro de Investigacion sobre Ingenieria Genetica y Biotechnologica U.N.A.M., and the Biotechnology Department of the Universidad Autonoma Metropolitana Iztapalapa. Organizers were J. Martinez-Cruz, E. Galindo, and M. Garcia Garibay from these institutions, respectively. The course was aimed at advanced students working in various areas of yeast biotechnology, and covered various aspects of yeast ecology, taxonomy, preservation, genetics, and biotechnology. Mexican lecturers were A. Brunner and P. Lappe (UNAM, Mexico DF), C. Casas Campillo, J. Martinez Cruz and M. de la Torre (CIEA del IPN, Mexico DF), M. Cedeño Cruz (Dest. González González, Guadalajara), M. Garcia Garibay and J. Gomez (UAM Iztapalapa), and P. Vallée (Saf-Mex, Mexico DF). Foreign lecturers were J. Delgado (CIIGB, Habana, Cuba), C.P. Kurtzman (USDA NRRL, Peoria, Il. USA), M.A. Lachance (UWO, London, Ont. Canada), G. Reed (Universal Food, Wi., USA), and G.G. Stewart (Labatt Brewing Co., London, Ont., Canada).

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FORTHCOMING MEETINGS AND COURSES

1. Candida and Candidiasis Biology Pathogenicity and Management (2nd conference), Philadelphia, Pa, USA.

Sponsored by the Eastern Branch of the American Society for Microbiology. Contact:

Dr. Helen Buckley
Department of Microbiology and Immunology
Temple University School of Medicine
3400 N. Broad St.
Philadelphia Pa 19140 USA

Tel. (215) 221-3209

* * *

2. 6th International Symposium on Genetics of Industrial Microorganisms (GIM 90), Strasbourg, France, 12-18 August 1990. Communicated by H. Heslot.

The 6th International Symposium of Genetics of Industrial Microorganisms (GIM 90) will be held at the Palais des Congrès, Strasbourg (France), 12-18 August, 1990 under the auspices of the GIM-International Committee. The GIM 90 is organized by the SOCIÉTÉ FRANÇAISE DE MICROBIOLOGIE (SFM) with the support of the French Ministries of Agriculture, Education, Industry, Research, the Institut National de la Recherche Agronomique, the Centre National de la Recherche Scientifique.

ORGANIZING COMMITTEE:

Chairman: H. Heslot; Co-chairman, J. Davies; Members: L. Bobichon, J. Davies, P. Dupuy, G. Durand, J. Florent, H. Heslot, L. Penasse, A. Rambach, M. Wegbescher.

SCIENTIFIC PROGRAMME:

The scientific programme, of international scope, will include lectures by renowned scientists and industrialists. Poster sessions will play a key role in the scientific programme. Lectures and posters will be arranged in sessions covering the following themes: protein engineering, genetic instability heterologous expression, secretion, extrachromosomal elements - transposons, metabolic pathways - manipulation, corynebacteria -production of aminoacids, streptomycetes - antibiotics - resistance mechanisms, lactic and bacteria, industrial yeasts, filamentous fungi, methylotrophs -methanogens, genetics of bacillus, clostridia, plant-bacterial interactions, alcoholic and malolactic fermentations -aroma, biomass degradation, toxins of microorganisms, bioconversions.

English will be the official language of the Symposium.

Contact:

Symposium Secretariat, GIM 90
Société Française de Microbiologie
28, rue du Docteur Roux
75724 Paris Cedex 15
France

Phone: (1) 45.68.81.79 - Telecopy: (1) 45.67.46.98 - Telex 214 403 F

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3. Intensive International Course on YEAST TAXONOMY: IDENTIFICATION, MOLECULAR METHODS AND DATA BASE MANAGEMENT.

1. Teaching Staff:

J.P. van der Walt
South African Council for Scientific and Industrial Research
Pretoria, R.S.A.

W.I. Golubev
All-Union Collection of Microorganisms
USSR Academy of Sciences
Pushchino, USSR

M.Th. Smith
T. Boekhout
Centraalblureau voor Schimmelcultures, Yeast Division
Delft, Netherlands

N. van Uden
Portuguese Yeast Culture Collection
Gulbenkian Institute of Science
Oeiras, Portugal

2. Date: 6-24 August 1990

3. Location: The Gulbenkian Institute of Science which is located in Oeiras, Portugal, about 20 km west of Lisbon at walking distance from the Atlantic Ocean.

4. Participants: The number will be limited to twenty. The course is primarily of interest to research workers in yeast taxonomy, yeast ecology, yeast population genetics, yeast science related to food and fermentation technology, medical and veterinary mycology, culture collections and related fields.

5. Financial aspects: The course is sponsored by the Calouste Gulbenkian Foundation and the Commission of the European Communities. No fees are charged to the participants. Lunch may be taken at the Gulbenkian Institute of Science (Monday through Friday) at a subsidized price.

6. Housing: Successful applicants should make their own hotel reservations through a travel agency or otherwise. Many hotels are located at a convenient distance from the institute (Estoril, Cascais, Carcavelos or Lisbon). A number of single rooms with shower in a student hostel near the institute is available free of charge. Applicants interested in such a room should indicate this on their application-for-admission form.

7. Synopsis:

7.1 Introduction, principles of classification and nomenclature; life cycles of the ascogenous yeasts; families of the Endomycetales; review of the genera of the Endomycetales.

Life cycles of the basidiomycetous yeasts; mating systems; systematics of the basidiomycetous yeasts; systematics of the basidiomycetous anamorphs; ultrastructure.

Systematics of ascomycetous anamorphs; cell wall; pores; DBB, coenzyme Q; % G + C content; DNA-DNA hybridization; ultrastructure.

Biochemical background of fermentation and assimilation tests, carbohydrate patterns, non-conventional substrates, yeast growth, temperature relations, isolation techniques, DNA probes, killer phenomenon.

Computer-aided culture collection administration, computer-aided identification, on-line consultations of yeast data banks.

7.2 Practicals

Execution of a vast array of tests for the identification of yeast strains supplied to each participant.
Purification of DNA. Determinations of % G + C contents. DNA-DNA reassociations.
Co-enzyme Q determinations.
Computer-aided identification.

8. Deadline for application: May 31, 1990

9. Information and application-for-admission forms:

Prof. N. van Uden
Department of Teaching
Gulbenkian Institute of Science
Apartado 14
2781 OEIRAS Codex
Portugal

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4. Fourth International Mycological Congress, Regensburg, Fed. Rep. of Germany, August 28 - September 3 1990).

Topics of general mycological interest will be covered. A symposium on the systematics ans evolution of yeasts will be convened by Dr. J.P. van der Walt. Deadline for abstracts of contributions (including posters) will be June 15 1990. To receive the final Circular (not later than March 1st, 1990), contact:

Prof. Dr. Andreas Bresinsky,
Botanisches Institut der Universitat, D-8400 Regensburg,
Federal Republic of Germany

Tel: 941 9433108

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5. 14th International Specialized Symposium on Yeasts, Yeast Taxonomy, Theoretical and Practical Aspects, September 3-7 1990, Smolenice, Czechoslovakia.

Organized by the Commission for Yeasts of the Czechoslovak Microbiological Society; Institute of Chemistry, Centre for Chemical Research, Slovak Academy of Sciences, Bratislava, in accordance with resolution of the meeting of the International Yeast Commission held in Perugia in 1988, the 14th International Specialized Symposium on Yeasts, YEAST TAXONOMY, THEORETICAL AND PRACTICAL ASPECTS will be held in the Smolenice Castle near Bratislava on September 3-7, 1990. The Symposium will cover the following topics:

1. Traditional and modern approaches in yeast taxonomy
2. New properties of yeasts
3. Evolution of yeasts
4. Taxonomy in relation to biotechnology
5. Environment-induced changes in yeasts
6. Morphological properties and surface structures
7. Preservation of yeasts

Those interested in attending the meeting are kindly requested to write before September 30, 1989 to:

Secretariat of the 14th ISSY
Institute of Chemistry
Dubravska cesta 9
842 38 Bratislava
Czechoslovakia

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6. XIth Congress of the International Society for Human and Animal Mycology, Montréal, Québec, Canada, June 24-28, 1991.

To receive the second announcement, contact:

XIth Congress of the International Society for Human and Animal Mycology
c/o JPdl Multi-Management Inc.
1410 Stanley, Suite 609
Montréal, Québec, Canada
H3A 1P8

Tel: (514) 287-1070

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BRIEF NEWS ITEMS

1. Proceedings of 7th ISY - IMPORTANT CORRECTION

The Proceedings of the 7th ISY held in Perugia, Italy in 1988 (Yeast 5, Special Issue) may be obtained from A. Martini, at the price of Italian Lit. 50,000, payable to:

The 7th International Symposium on Yeasts

Account #015146/01 - - - - - - - - - - **PLEASE NOTE CORRECT NUMBER!**

Cassa di Risparmio di Perugia
Piazza Universita
06100 Perugia, Italy

The account number given in the June 1989 issue was incorrect.

Anyone interested in purchasing the volume may do so by writing to:

Dr. A. Martini
Dipartimento di Biologia Vegetale
Universita degli Studi
Borgo 20 Guigno 74
I-06100 Perugia, Italy

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2. POSTDOCTORAL POSITION

A POSTDOCTORAL POSITION is currently available (9/89), to investigate the structure, function and regulation of eukaryotic ribosomes. Characterization of functionally important proteins by chemical modification and site specific mutagenesis. Salary negotiable. Experience in protein chemistry, molecular biology, monoclonal antibodies. Send CV and references to: Dr. Robert R. Traut, Dept. of Biological Chemistry, University of California, Davis, CA 95616 (916)752-3354.

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3. FACULTY POSITION IN FOOD SCIENCE

Head, Department of Food Science and Technology. Oregon State University seeks an outstanding individual to provide leadership in teaching, research, and extension. Located in the heart of the Willamette Valley, Oregon State University ranks among the top Land Grant/Sea Grant universities in the country in research support. Qualifications include a Ph.D. in food science or closely related field, experience in budget and personnel management, an established reputation for excellence in teaching, research and/or extension, and an appreciation of the Land Grant/Sea Grant System. The department currently has 19 full-time faculty, 28 technical and support staff, 47 undergraduate and 42 graduate students. Applicants should submit a letter of interest, resume, the names, addresses and telephone numbers of three to five references (references will not be contacted before conferral with the candidate) to: Dr. Mina R. McDaniel, Chair, Search Committee, Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331-6602. To assure consideration, please submit application by December 30, 1989. OSU is an Equal Opportunity/Affirmative Action Employer and complies with Section 504 of the Rehabilitation Act of 1973.

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4. Change of Address

I moved at the beginning of October 1989 from the Department of Genetics, University of Glasgow, Church Street, Glasgow, G11 5JS, U.K. to:

Dr. Alistair J. P. Brown
Department of Genetics and Microbiology
University of Aberdeen
Marischal College
Aberdeen AB9 1AS
U.K.

* * *

5. Vetro-Gen Corp.

I am now President (and co-founder) of Vetro-Gen Corp., which offers rapid services in synthesis of DNA primers, linkers, or oligonucleotides, as well as synthesis and purification of peptides. Research and development services are also provided in the areas of yeast technology, animal vaccines, diagnostic tests, and novel microbial products.

Dr. Chandra Panchal
Vetro-Gen Corp.
1200 Wonderland Road S.
Bld. 7/2
London, Ontario
Canada N6L 1A8

Tel or Fax: (519) 652-3758

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TITLES OF INTEREST

"Research Communications" No. 14 (1989) may be obtained by purchase order from The Institute for Fermentation, Osaka, 17-85 Juso-honmachi 2-chome, Yodogawa-ku, Osaka 532, Japan. Of particular interest to our readers will be the following items:

1. Mikata, K., and I. Banno. Preservation of yeast cultures by L-drying: viability after 5 years of storage at 5°C.

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2. Kaneko, Y., and I. Banno. Isolation and genetic characterization of auxotrophic mutants in Saccharomyces bayanus.

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3. Kaneko, Y, K. Mikata, and I. Banno. Karyotyping of Saccharomyces bayanus by pulsed-field gel electrophoresis.

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4. Descriptive catalogue of IFO yeast collection VI.

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