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Y E A S T

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

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EDITORIAL

I am happy to report that my first year as editor of the Yeast Newsletter has been most enjoyable, and that there is yet no need to increase the subscription rate beyond its current level of $4.00 U.S. ($8.00 U.S. for airmail). Readers who wish to keep their cost to a minimum should be aware that some banks are charging a substantial amount to deliver international money orders. In some cases, the service charge has even exceeded the subscription fee! Those readers may wish to subscribe for two or more years at a time.

The change in editorship has been facilitated by the continued help of Dr. Herman J. Phaff and various staff members at the University of California, Davis, for which I am most grateful. The kind cooperation of University of Western Ontario staff who helped with accounting, printing, and mailing is valued greatly. In particular, I thank Ms. Stefani Tichbourne for her skillful typing contribution.

I wish the readers a prosperous and scientifically rewarding new year!

M.A. Lachance
Editor

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I. Centraalbureau voor Schimmelcultures, Yeast Division, Julianalaan 67a, 2628 BC, Delft, The Netherlands. Communicated by M.Th. Smith.

a. Recent acquisitions

Candida glucosophila Tokuoka et al.: CBS 7349, T, ex Taiwanese brown sugar, K. Yamasato

Candida ishiwadae Sugiyama & Goto: CBS 7348, ex faeces, Finland, atypical strain, J. Issakainen

Candida populi Hagler et al.: CBS 7351 = UCD 68-675B, T, ex exudate of Populus tremuloides, CBS 7352 = UCD 68-775A, ex exudate of Betula sp., CBS 7353 = UCD 68-791B, ex exudate of Populus trichocarpa, H.J. Phaff

Fellomyces penicillatus (Rodrigues de Miranda) Yamada & Banno: CBS 7337, ex spider, R.A. Samson

Pichia anomala (Hansen) Kurtzman: CBS 7338, killer strain (Stewart et al., Appl. Environ. Microbiol. 54:1099-1103, 1988), D.G. Ahearn

Rhodosporidium fluviale Fell et al.: CBS 6568, T, ex brackish water near mouth of Miami River, J.W. Fell

Saccharomyces cerevisiae Meyen ex Hansen: CBS 7336, respiratory studies (Barford & Hall, J. Gen. Microbiol. 114:267-175, 179; Rieger et al., J. Gen. Microbiol. 129:653-661, 1983; Sonnleitnert & Kppeli, Biotechnol. Bioeng. 28:927-951, 1986), E. Postma.

Schizosaccharomyces pombe Lindner var. pombe: CBS 7335, ex alpechin, utilizes melibiose, J. Santa Maria

Sporobolomyces falcatus Nakase & Suzuki: CBS 7368, T, ex dead leaf of Miscanthus sinensis, T. Nakase

Sporobolomyces yuccicola Nakase & Suzuki: CBS 7331, T, T. Nakase

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b. Publications

1. Gams, W., Hennebert, G.L., Stalpers, J.A., Janssen, D., Schipper, M.A.A., Smith, J., Yarrow, D. and Hawksworth, D.L. 1988. Structuring strain data for storage and retrieval of information on fungi and yeasts in MINE, the Microbial Information Network Europe. J. Gen. Microbiol. 134:1667-1689.

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2. Golubev, W.I., Smith, M.Th., Poot, G.A. and Kock, J.L.F. 1988. Species delineation in the genus Nadsonia Sydow. Antonie van Leeuwenhoek (accepted for publication).

The genus Nadsonia Sydow is revised on the basis of morphology, physiology, amino acid and fatty acid composition, electrophoretic patterns of some enzymes and DNA relatedness. Two species, N. commutata (type CBS 6640) and N. fulvescens, with two varieties, N. fulvescens var. fulvescens (type CBS 2596) and N. fulvescens var. elongata (type CBS 2594) nov. comb. are recognized. A modified diagnosis of the genus and a key are given.

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3. A guide to culture collections has been prepared under the new series "Living Resources for Biotechnology," an international initiative by the World Federation for Culture Collections with financial support from UNESCO. The following will be of interest to yeast researchers:

Kirsop, B.E. and Kurtzman, C.P., Editors, in collaboration with T. Nakase and D. Yarrow. 1988. Yeasts. Cambridge University Press, Cambridge. 256 pp.

This volume enables scientists to locate centres supplying both yeasts and specialist services relating to their use; it is a guide to the preservation and identification of yeasts and their deposit for patent purposes; it describes the data centres and cultural collection organisations from which information and expert help may be obtained. The international panel of authors have combined with the microbial resource centres themselves to provide a unique source book.

This book is available from good booksellers. In case of difficulty, please send £15 to Customer Services Department, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, England. United States or Canadian residents should contact Clay Gordon, Cambridge University Press, 32 East 57th Street, New York, NY 10022, U.S.A., for information on dollar prices and ordering procedures.

* * *

II. Laboratoire d'Enzymologie, Centre National de la Recherche Scientifique, 91198 Gif-sur-Yvette Cedex, France. Communicated by J. Schwencke.

The following is the summary of a paper published recently.

Gozalbo, D.[1], Dubon, F.[1], Schwencke, J., and Sentandreu, R.[1] 1987. Characterization of chitosomes in Candida albicans protoplasts. Exptl. Mycol. 11:331-338. [1]Departamento de Microbiologia, Fac. de Farmacia, Universidad de Valencia, Av. Blasco Ibanez 13, 46010 Valencia, Spain.

A significant amount of highly zymogenic chitin synthetase of Candida albicans was found to be associated with cytoplasmic particles (chitosomes). These cellular particles were isolated from metabolically activated C. albicans protoplasts after disruption by a mild method that minimizes vacuole rupture and consequent contamination of cellular fractions by vacuolar proteinases. Contamination of chitosomes by soluble cytosolic enzymes, vacuolar proteinases, vacuolar membranes, or other endomembranous structures was minimal, as indicated by the virtual absence of the following marker enzymes: α-glucosidase, carboxypeptidase Y, α-mannosidase, mannosyltransferase, and NADPH-cytochrome c reductase. Secretory enzymes such as acid phosphatase and other membrane-bound enzymes such as X-prolyl-dipeptyl-aminopeptidase and leucine aminopeptidase did not sediment with the chitosomal chitin synthetase. These results support the idea that, in C. albicans as well as in other fungi, chitosomes are well-defined secretory organelles containing zymogenic chitin synthetase and not artifactual vesicles derived from plasma membranes and other membranous systems during cell breakage.

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III. Laboratories of Applied Microbiology, Research Center, Suntory Ltd., 1-1-1 Wakayama-dai, Shimamoto-cho, Mishima-gun, Osaka, Japan. Communicated by H. Yoshizumi.

The following is the abstract of a paper published recently.

Yoshizumi, H. and Ashikari, T. 1987. Expression, glycosylation and secretion of fungal hydrolases in yeast. Trends in Biotechnology 5:277-280.

Although there are now some systems for transfer and expression of fungal genes, none gives expression at a level useful for production. There are useful expression systems in yeast, however, and these have been used to express genes coding for fungal extracellular hydrolases. This review examines how properties of the genes and gene product affect production and secretion of the enzyme in yeast. Similar considerations apply to expression of other heterologous genes in yeast and in other hosts.

* * *

IV. Department of Biochemistry, University of California, Berkeley, California 94720, U.S.A. Communicated by J. Rine.

The following simple method may be useful to many readers.

Axelrod, A. and Rine, J. Use of Photocopying Machines for Preservation of Data on Mating Properties of Yeast Strains.

In studies of yeast mating type, the mating behavior of strains is typically measured by prototrophic selection on lawns of opposite mating types, and the data is recorded on a +/- scale. However, recording data in this matter results in loss of much information of the qualitative aspects of mating. Polaroid photographs of the mating plates offer one solution, but the price of film makes this solution rather expensive. We have found that photocopy machine provide an ideal solution to storing mating data with little loss of resolution. The plates are placed upright on the photocopy machine with the lids on and a sheet of black paper on top of the plates to enhance contrast. The setting on the machine should be adjusted to be lighter than the optimum setting for text copying. Six plates per page can be copied, and duplexing of the copies still allows clear recording of the data. If the plates are labelled on the bottoms, the labelling is easily visible on the photocopy. Photocopies of plates are approximately two orders of magnitude less expensive than Polaroid photographs. With the relatively low price of personal copier machines, and the reasonably high resolution of the data recorded in this way, this method may have wide application in many types of experiments involving growth of microbes on petri plates.

* * *

V. A.U. Ziraat Fakültesi, Fermentasyon Teknolojisi, Ankara, Turkey. Communicated by M.H. Pamir.

The following is the summary of a Master's thesis completed recently.

Anli, E. and Pamir, M.H. 1988. Increasing the biological value of wheat straw through solid state fermentation system. 33 pp.

The biological value of wheat straw, which is used to a great extent as feed for livestock in Turkey, is very low. For this reason, it is necessary to consider biological or chemical delignification of straw in our country. From this point of view, we have studied biodegradation using a mixed culture of Sporotrichum pulverulentum and Candida utilis through a solid fermentation system. Cellulose was biodegraded from 38.52% to 31.52% and protein was enhanced and from 2.57% to 9.44% in a period of 21 days, when NH_4NO_3 and Malt Sprout Extract were used in combination as supplements to the substrate. The in vitro digestibility of the novel feed was enhanced from 24.29% to 33.65% in organic matter, and from 24.18% to 34.82% in dry matter. Extending the fermentation time from 7 days to 21 days resulted in an increase of the in vitro digestibility up to 38.53% in organic matter and up to 44.00% in dry matter. Compared to results obtained with chemical processes, our results do not appear to be in favour of biodegradation processes under the conditions tested up to now, but biodegradation is thought to be superior to chemical treatment with respect to enhancement of protein as well as vitamin biosynthesis. Moreover, biodegradation is a cleaner technique in terms of pollution control. For this reason optimization studies will continue in our laboratory.

* * *

VI. The Upjohn Company, Kalamazoo, Michigan 49001, U.S.A. Communicated by R.D. Klein.

We have developed an efficient transformation system for the yeast Schwanniomyces occidentalis. We have cloned the S. occidentalis ADE2 gene by complementation of an ade2 strain of S. cerevisiae. We have used this gene to generate a series of plasmids for transforming ade2 mutants of S. occidentalis using a modification of the spheroplasting procedure of Beggs (J.D. Beggs, Nature (London) 275:104-108, 1978). Both the ADE2 gene and an ARS, functional in S. occidentalis, have been localized to a 2.7 kbp region. A larger fragment containing this region, when circularized, is maintained as an extrachromosomal element following transformation. Transformation efficiencies for this ARS based system are consistently in the range of 10^3 transformants per µg of DNA. Manuscripts describing this work are as follows:

1. Klein, R.D. and Favreau, M.A. 1988. Transformation of Schwanniomyces occidentalis with an ADE2 gene cloned from S. occidentalis. J. Bacteriol. 170(12).

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2. Klein, R.D. and Favreau, M.A. A fragment of DNA containing the ADE2 gene from Schwanniomyces occidentalis, can be maintained as an extrachromosomal element in S. occidentalis (in preparation).

* * *

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

The following 8 contributions mistakenly were not included in the previous issue of the Yeast Newsletter (Editor).

1. Naumov, G.I. 1986. Genetic problems in the classification yeast species. In: E. Parmasto (ed.) Problems of species and genus in fungi. pp. 119-128, Tallin (in Russian).

The concept of biological species of yeast is elaborated by genetics and molecular biology nowadays. The concept of "biological species" means not only the reality of existing taxa, but also allows to identify them experimentally. The taxonomy of yeast genotypes is based on mating ability and viability of meiotic products of hybrids (ascospores). For objective estimation of species relationships we proposed to use special inbred strains with high spore viability obtained from natural or industrial yeasts, and not the initial strains. The hybrid fertility must be compared with the fertility of inbred parental strains. Another innovation is the recombination of controlling markers. Genetic evidence of the reality of biological species was obtained by studies in several yeast genera: Saccharomyces, Williopsis, Zygowilliopsis, and Arthroascus. The comparative study of intraspecific and interspecific hybrids of Williopsis, Zygowilliopsis, and Arthroascus enables us to ascertain several regularities. Correlation between viability of ascospores and meiotic segregation of heterozygous auxotrophic hybrid markers was detected. Sterility is always accompanied by absolute predominance of prototrophic segregants. Normal meiosis is absent in ascogenesis of hybrids between different biological species. Our data indicate that the use of double prototrophic recombinants for estimation of gene exchange between yeast species is incorrect. The application of double auxotrophic recombinants is expedient for this purpose. Thus, the viability of ascospores and segregation of controlling markers allow to evaluate gene exchange, and consequently the relationship and taxonomic status of yeasts.

* * *

2. Naumov, G.I. 1987. Developments of genosystematics for yeast genera Williopsis and Zygowilliopsis Kudriavzev. Molek. Genet. Mikrobiol. Virusol. 2:3-7.

Data on the genomic divergence obtained in genetic and molecular biological studies were compared for the yeast genera Williopsis and Zygowilliopsis taken as examples. Hybridization analysis, enzyme electrophoresis, and DNA reassociation led to the noncontradictory estimation of the yeasts relationships. Different methods demonstrated a convincing species discreteness among the genomes of those yeasts. The reproductive isolation of the yeast taxa was defined more invariably by the genetic methods. The new combination Williopsis sargentensis (Wickerham et Kurtzman) Naumov comb. nov. has been formed.

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3. Naumov, G.I. and Shchurov, M.N. 1987. Hansenula polymorpha de Morais et Maia as an independent yeast species. Mikrobiologiya 56(1):114-116 (in Russian).

The species Pichia angusta (Teunisson et al.) is genetically heterogeneous as was shown by hybridological analysis. The phenotypically similar strains CBS 1976 (identified originally as Hansenula angusta) and CBS 4732 (H. polymorpha type culture) are found to be independent biological species. The species H. polymorpha should again be established.

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4. Naumov, G.I. 1987. Genosystematics of yeast ascomycetes (Review of book "The Yeasts. A taxonomic study, 1984"). Mikrobiologiya 56(3):521-524 (in Russian).

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5. Naumov, G.I., and Nikonenko, T.A. 1987. Divergence of genomes of industrial and wild yeasts of Saccharomyces sensu stricto: four sibling-species. Dokl. Acad. Nauk SSSR 294(2):476-479 (in Russian).

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6. Naumov, G.I. 1987. Nomenclature of a yeast genus Zygofabospora Kudriavzev emend. G. Naumov. Mikol., Fitopat. 21(2):134-140 (in Russian).

* * *

7. Naumov, G.I. 1987. Refutation of the report on the production of ascospores by yeasts Candida salmanticensis (Santa Maria) van Uden et Buckley. Mikol. Fitopat. 21(4):307-309 (in Russian).

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8. Naumov, G.I. and Shchurov, M.N. 1987. Autopolyploidization of paedogamic yeast Pichia silvicola (Wicherham) Kurtzman. Dokl. Acad. Nauk SSSR 296(2):460-464.

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TWENTY YEARS OF STUDIES ON COMPARATIVE GENETICS AND GENOSYSTEMATICS OF YEAST IN THE USSR.

The article by V.I. Kudriavzev and K.V. Kosikov "Inheritance of fermentation properties in some interspecies hybrids of genus Saccharomyces" published in the Soviet journal "Mikrobiologiya" 1947, v. 16, No. 6, pp. 477-482 is the first publication on comparative yeast genetics and, in general, on genetics of microorganisms in USSR. This was an advanced article in those days: studies on genetics of microorganisms were only commenced all over the world. Unfortunately, one year later the two authors changed their scientific views under the influence of T. Lysenko. Some aspects of comparative yeast genetics were elucidated in early articles (1961) by I.A. Zacharov and S.G. Inge-Vechtomov. In 1968 the study of comparative genetics and genosystematics of yeasts was started at the Department of Plant Biochemistry (Molecular Biology) of Moscow State University. This work has been pursued subsequently at the Institute for Genetics and Selection of Industrial Microorganisms (Moscow). This scientific field had been initiated by O. Winge and C. Roberts at the Carlsberg laboratory (Denmark). From 1968 to 1988 we have made a series of investigations resulting in 10 theses for the degree of "candidate of biological sciences" (Ph.D..) and in one for degree of "doctor of biological sciences". The theses were as follows:

1. Naumov, G.I. Instability of biochemical properties used in the taxonomy of yeasts. 1969.

2. Tolstorukov, I.I. Genetical control of sexual differentiation of cells in Saccharomyces. 1973.

3. Naumova, T.I. Genetics and ecology of killer phenomenon in Saccharomyces. 1974.

4. Kondratieva, V.I. Comparative genetic study of homo-heterothallism in Saccharomyces. 1979.

5. Gudkova, N.K. Comparative genetics of galactose-negative Saccharomyces. 1979.

6. Zharova, V.P. Taxonomic and genetic study of the hydrocarbon assimilating yeast Pichia guilliermondii Wickerham. 1980.

7. Vustin, M.M. Taxonomic study of soil yeasts with Saturn-like spores. 1981.

8. Shchurov, M.N. Comparative genetic and physiological study of yeasts in the genus Pichia. 1988.

9. Bashkirova, E.V. Genetics of fermentation of α-methylglucoside in Saccharomyces cerevisiae. 1986.

10. Nikonenko, T.A. Genetic divergence in Saccharomyces sensu stricto. (Ph.D. Thesis to be defended).

11. Naumov, G.I. Comparative genetics of properties used in the taxonomy of yeasts. 1977.

About 150 papers have been published in the Soviet journals "Genetika", "Doklady of Biological Sciences" (Proceedings of the Academy of Sciences of the USSR), "Mikrobiologiya", "Mikologiya i phytopathologiya", "Biological sciences", "Bioteknologiya" and in others. A list of papers is available upon request.

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The following articles have been published recently:

1. Naumov, G.I. 1987. Commemoration of the outstanding zymologist O. Winge (1886-1964). Mikologiya i phytopathologiya. 21:(6).

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2. Naumov, G.I. 1987. Genetic basis for classification and identification of the ascomycetous yeasts. In: The expanding realm of yeast-like fungi, Elsevier Science Publ. Amsterdam, pp. 469-475.

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VIII. Institut für Mikrobiologie und Weinforschung, Johannes Gutenberg, Universität Mainz, Becherweg 15, 6500 Mainz, W.Germany. Communicated by K. Wolf.

The following are titles of papers which have appeared recently.

1. Weber, S. and Wolf, K. 1988. Two changes of the same nucleotide confer resistance to diuron and antimycin in the mitochondrial cytochrome b gene of Schizosaccharomyces pombe. FEBS Letters 237:31-34.

* * *

2. Ahne, A., Müller-Derlich, J., Merlos-Lange, A.M., Kanbay, F., Wolf, K., Lang, B.F. 1988. Two distinct mechanisms for deletion in mitochondrial DNA of Schizosaccharomyces pombe mutator strains. Slipped mispairing mediated by direct repeats and erroneous intron splicing. J. Mol. Biol. 202:725-734.

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IX. Department of Biochemistry, State University of New York at Stony Brook, Stony Brook, New York 11794-5215. Communicated by V.P. Cirillo.

The following is a summary of the activities in my laboratory during the past year.

Dr. Jose Ramos of the Department of Microbiology of The University of Cordoba spent a very productive year in my laboratory from October 1987 to October 1988. During his stay, we studied three aspects of sugar transport and its regulation. The following are summaries of the results which will be reported in two short communications and in a full length paper.

In our first study we examined the relationships between the high and low affinity glucose transport processes in Saccharomyces cerevisiae. In most strains there is a reciprocal relationship between the expression of the high and low affinity processes. In our study we found that although the activity of the low affinity transport processes decreases in proportion to the derepression of the high affinity activity, the number of low affinity transporters, assayed by reconstitution in lipid vesicles, remains constant. Thus, the derepression of the high affinity activity somehow "masks" the activity of the low affinity transporters. One interpretation of these results is that the high and low affinity processes share a common, limiting component, however, this is only one of a number of possibilities.

In our second study we showed that in induced cells, galactose is also transported by both high and low affinity processes. By comparing the characteristics of galactose transport in kinaseless (gal1) and permeaseless (gal2) mutants with wild type cells and in gal2 cells transformed with plasmids containing the cloned, GAL2 gene, we showed that the GAL2 gene is required for both the high and low affinity processes. Finally, by measuring transport activity in whole cells and in reconstituted lipid vesicles, we showed that the catabolite inactivation of galactose transport involves inactivation of both the high and low affinity components of galactose transport.

In our third study, we examined the role of cyclic AMP dependent, protein kinase (cAPK) activity in the catabolite inactivation of glucose and galactose transport. By using mutants which affect cAPK activity, we showed that the catabolite inactivation of the high affinity glucose and both high and low affinity galactose transport depends on cAPK activity. However, in the absence of antibodies against the transport proteins we cannot say whether the target(s) of catabolite inactivation are the transporters themselves or other components. We are now in the process of trying to prepare such antibodies against the purified GAL2 protein produced by expression of the GAL2 gene in bacteria.

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X. The Institute of Ecology and Viticulture, Yamanashi University, Kofu, Japan. Communicated by S. Goto.

The following is an abstract of a recently published paper.

Goto, S., Horiguchi, S., Kaneko, H., Itoh, T. 1988. J. Gen. Appl. Microbiol. 34:165-182.

The presence of pyrophosphatidic acid [P,P-bis-(1,2-diacyl-sn-glycerol-3-)pyrophosphate](Pyro-PA) was investigated in the lipid extracts of yeasts (241 strains belonging to 167 species of 43 genera). Pyro-PA can be clearly separated from other polar lipids by two-dimensional thin layer chromatography, and it can be distinguished from other phospholipids by its specific staining (purple blue) with Dittmer reagent. Pyro-PA was found exclusively in basidiomycetous species (127 strains belonging to 78 species of 14 genera). In contrast, no detectable amount of pyro-PA was found in the cellular lipids of ascomycetous species (114 strains belonging to 89 species of 31 genera). These results demonstrate that the determination of the presence of pyro-PA in the cellular lipids is useful in distinguishing ascomycetous from basidiomycetous yeasts.

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

The following is an abstract of a recently published paper.

Minárik, E., Jungová, O. 1988. Possibilities to enhance and intensify alcoholic fermentation of grape must at low temperatures. Vinohrad (Bratislava) 26(10):233-235 (in Slovak).

Biosorbents such as yeast ghosts or microcrystalline cellulose contribute to the intensification of the fermentation process of grape must at low fermentation temperatures, even at high sugar concentrations. A higher alcohol content and a lower residual sugar content may be achieved in young wines.

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XII. Biochemisches Institute, Albert-Ludwigs-Universität, Hermann-Herder-Str. 7, D-7800 Freiburg, West Germany. Communicated by U. Plankert.

The following is an abstract of a recently published paper.

Plankert, U., Purwin, C.[1] and Holzer, H.[2]. 1988. Characterization of Yeast Fructose-2,6-Bisphosphate 6-Phosphatase. FEBS Letters 239:69-72. [1]Medizinische Universitätsklinik, Hugstetter Str. 55, 7800 Freiburg, [2]Gesellschaft fur Strahlen und Umweltforschung, Ingolstädter, Landstr. 1, 8042 Neuherberg, West Germany.

To obtain information on the biological significance of yeast fructose-2,6-bisphosphate 6-phosphatase, kinetic data of the purified enzyme (Purwin, C., Laux, M. and Holzer, H. (1987) Eur. J. Biochem. 164, 27-30) have been measured. Maximal activity was found between pH 6 and 7, the apparent Michaelis constant with fructose-2,6-bisphosphate was 7.2 µM at pH 6.0 and 79 µM at pH 7.0. Concentrations required for 50% inhibition of the enzyme of pH 6.0 were 8 µM Fru2P, 45 µM G1c6P, 80 µM Fru6P and 200 µM inorganic phosphate. The known intracellular steady state level of about 10 µM fructose-2,6-bisphosphate in the presence of glucose is likely to be the result of a balance between the rapid synthesis of fructose-2,6-bisphosphate catalyzed by 6-phosphofructose 2-kinase and a fructose-2,6-bisphosphate degrading activity. The biological function of fructose-2,6-bisphosphate 6-phosphatase with an apparent Michaelis constant between 7 and 79 µM fructose-2,6-bisphosphate at pH 6-7 is therefore suggested to be a participation in the maintenance of a steady state level of fructose-2,6-bisphosphate in a concentration range that fits well with the Michaelis constant of the enzyme.

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XIII. Department of Microbiology, Alko Research Laboratories, P.O.B. 350, SF-00101 Helsinki, Finland. Communicated by M. Korhola.

The following papers were presented at the 14th International Conference on Yeast Genetics and Molecular Biology, Espoo, Finland, 1988.

1. Korhola, M. 1988. Yeast research in Finland. Yeast 4 (Spec. Iss.).

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2. Aho, S., Paloheimo, M. and Korhola, M. 1988. Expression of cellulase cDNAs in Yeast. Studies with monoclonal Antibodies. Yeast 4 (Spec. Iss.) S138.

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3. Vainio, A, Kopu, H., Aho, S., Fagerström, R., Torkkeli, T. and Korhola, M. 1988. Cloning of fungal glucoamylase cDNA in Saccharomyces cerevisiae. Yeast 4 (Spec. Iss.) E36.

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4. Turakainen, H., Aho, S. and Korhola, M. 1988. MEL2 Gene from Saccharomyces cerevisiae var. carlsbergensis. Yeast 4 (Spec. Iss.) L58.

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The following symposium paper has appeared recently.

5. Suominen, P. and Aho, S. 1988. Studies on the construction of cellulolytic yeasts. In: Advances in Gene Technology: Protein Engineering and Production: Proceedings of the 1988 Miami Bio/Technology Winter Symposium. Oxford: IRL Press Limited, p. 230.

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XIV. Department of Biology, University of Ulster, Coleraine Co. Londonderry BT52 ISA, Northern Ireland. Communicated by R.T. Moore.

The following paper transfers 15 basidiomycetous species of Candida to the genus and provides a key to the 27 recognized species.

1. Moore, R. T. 1987. Additions to the genus Vanrija. Bibliotheca Mycologica 108:167-172.

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The following paper is in press.

2. Moore, R. T. 1988. A reconnaissance of the Division Ustomycota (Basidiomycotera). In C. Moriarty (ed.). Taxonomy --Putting Plants and Animals in their Place. Royal Irish Academy: Dublin.

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XV. Department of Food Microbiology and Toxicology, University of Wisconsin, 1925 Willow Drive, Madison, Wisconsin 53706. Communicated by E.A. Johnson.

The following paper is in press.

Gil-Hwan, A., Schuman, D. and Johnson, E.A. 1989. Isolation of mutants in Phaffia rhodozyma with increased quantities of astaxanthin. J. Appl. Environ. Microbiol.

Plating of the astaxanthin-producing yeast, Phaffia rhodozyma, to yeast-malt agar containing 50 μM antimycin A gave rise to colonies of unusual morphology, characterized by a nonpigmented lower smooth surface that developed highly pigmented vertical papillae after 1 to 2 months. Isolation and purification of the pigmented papillae, followed by testing for pigment production in shake flasks, demonstrated that several antimycin-isolates were increased 2 to 5-fold in astaxanthin content compared to the parental natural isolated (UCD-FST-67-385). One of the antimycin strains (ant-1), and a nitrosoguanidine derivative of ant-1 (ant-1-4), produced considerably more astaxanthin than the parent [ant-1 had 800-900 μg/g; ant-1-4 had 900-1300 μg/g; and 67-385 had 300-450 μg/g]. The mutant strains were compared physiologically to the parent. The antimycin-mutants grew slower on ammonia, glutamate or glutamine as nitrogen sources compared to the natural isolate and also had lower cell yields on several carbon sources. Although isolated on antimycin plates, they were found to be more sensitive to antimycin A, apparently due to the spatial separation of the papillae from the agar. They were also more sensitive than the parent to the respiratory inhibitor thenoyltrifluoroacetone, were slightly more susceptible to cyanide, but did not differ from the natural isolate in sensitivity to azide. The antimycin-derived strains were also killed faster than the parent by hydrogen peroxide. The carotenoid compositions of the parent and the antimycin-derived strains were similar to those previously determined in the type strain (UCD-FST-67-210) except that two carotenoids not previously found in the type strain were present in increased quantities in the antimycin-mutants and phoenicoxanthin was a minor component. The chemical properties of the unknown carotenoids suggested that the strains isolated on antimycin agar tended to oxygenate and desaturate carotene precursors to a greater extent than the parent. The physiology of the antimycin isolates and the known specificity of antimycin for cytochrome b in the respiratory chain suggests that alteration of cytochrome b or cytochrome P-450 components involved in oxygenation and desaturation of carotenes in mitochondria may be affected which results in increased astaxanthin production. These astaxanthin-overproducing mutants and more highly pigmented derivative strains could be useful in providing a natural source of astaxanthin for the pen-reared salmon industry or for other farmed animals that contain astaxanthin as their principal carotenoid.

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XVI. Dipartimento di Biologia Vegetale, Università degli Studi di Perugia, Borgo XX Giugno, 74, Perugia, Italy 06100. Communicated by A. Martini.

The Industrial Yeast Collection of the Dipartimento di Biologia Vegetale, DBV (formally IMAT) has recently become a member of the Microbial Information Network Europe, (MINE), established through the support of the Commission of the European Community with the objective of facilitating a fast and reliable on-line exchange of information among culture collections of participating European countries on one side, and of potential users on the other. We are currently compiling a third edition of our catalogue following the MINE minimum database format. Publication is projected for the end of 1989. The DBV collection has also recently become a member of ECCO (European Culture Collections Organization).

The following are recent publications from our department.

1. Rosini, G. and Cantini, M. 1987. Killer character in Kluyveromyces yeasts: activity on Kloeckera apiculata. FEMS. 44:81-84.

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2. Laluce, C., Bertolini, M.C., Hernandes, J., Vaughan-Martini, A. and Martini, A. 1987. Screening survey for yeasts that ferment sucrose at relatively high temperatures. Ann. Microbiol. (Milano) 37:151-159.

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3. Vaughan-Martini, A. and Kurtzman, C.P. 1988. Deoxyribonucleic acid relatedness among species of Saccharomyces sensu lato. Mycologia 80:241-243.

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4. Vaughan-Martini, A. and Martini, A. 1988. The International Commission on yeast and yeast-like microorganisms of the International Union of Microbiological Societies: its conferences and activities. Microbiol. Sci. 5:215-218.

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5. Vaughan-Martini, A. and Martini, A. 1988. Killer sensitivity patterns as a tool for the fingerprinting of strains within the yeast species Kluyveromyces lactis and K. marxianus. Biotech. Letters (in press).

A simple procedure based on differential sensitivity to a given panel of "killer yeasts" allows the discrimination of strains within the species K. lactis and K. marxianus. The proposed method was found to be reproducible, readily discriminatory and easy to perform without specialized equipment. All strains within the species are characterized by a specific, individual sensitivity pattern (killer formula).

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XVII. Department of Microbiology and Biochemistry, University of the Orange Free State, Bloemfontein, 9300 South Africa. Communicated by J.C. du Preez.

a. The following papers have recently appeared or are in press:

Yeast Genetics

1. Pretorius, I.S., Laing, E., Pretorius, G.H.J. and Marmur, J. 1988. Expression of a Bacillus α-amylase gene in yeast. Curr. Genet. 13:1-8.

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Yeast physiology and general

2. Kilian, S.G. and van Uden, N. 1988. Transport of xylose and glucose in the xylose-fermenting yeast Pichia stipitis. Appl. Microbiol. Biotechnol. 27:545-548.

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3. Prior, B.A., Holder, N.H.M., Kilian, S.G. and du Preez, J. C. 1988. Measurement of Candida utilis growth using the adenosine triphosphate bioluminescent assay. System. Appl. Microbiol. 10:191-194.

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4. Ligthelm, M.E., Prior, B.A., du Preez, J.C. and Brandt, V. 1988. An investigation of D-(1-^{13}C) xylose metabolism in Pichia stipitis under aerobic and anaerobic conditions. Appl. Microbiol. Biotechnol. 28:293-296.

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5. Ligthelm, M.E., Prior, B.A. and du Preez, J.C. 1988. The effect of respiratory inhibitors on the fermentative ability of Pichia stipitis, Pachysolen tannophilus and Saccharomyces cerevisiae under various conditions of aerobiosis. App. Microbiol. Biotechnol. 29:67-71.

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6. Ligthelm, M.E., Prior, B.A. and du Preez, J. C. 1988. The induction of D-xylose catabolizing enzymes in Pachysolen tannophilus and the relationship to anaerobic D-xylose fermentation. Biotechnol. Lett. 10:207-212.

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7. Prior, B.A., Alexander, M.A., Yang, Y. and Jefferies, T.W. 1988. The role of alcohol dehydrogenase in the fermentation of D-xylose by Candida shehatae ATCC 22984. Biotechnol. Lett. 10:37-42.

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8. Ligthelm, M.E., Prior, B.A. and du Preez, J.C. 1989. Effect of hydrogen acceptors on D-xylose fermentation by anaerobic culture of immobilized Pachysolen tannophilus cells. Biotechnol. Bioeng. 32 (in press).

The effect of hydrogen acceptors on the kinetic parameters of D-xylose fermentation under anaerobic conditions was studied in a transient culture of immobilized Pachysolen tannophilus cells. Addition of oxygen to a steady-state culture resulted in a rapid increase (up to fivefold) in the rates of ethanol production and D-xylose uptake, but the rate of xylitol production was unaffected. Furthermore, the molar ethanol yield increased from 0.97 to 1.43 in the presence of oxygen. The moles of ethanol produced per moles of oxygen utilized were considerably greater than would be predicted from the stoichiometry of D-xylose fermentation, which suggests that the organism required oxygen for other functions in addition to its role as a hydrogen acceptor in D-xylose metabolism. When the artifical hydrogen acceptors acetone, acetaldehyde, and acetoin were added to the culture, the rate of ethanol production increased while the xylitol production rate decreased but the rate of xylose uptake was unaffected. The molar ethanol yields increased from 1.03 to 1.63, 1.43, and 1.24 upon addition of acetaldehyde, acetone, and acetoin, respectively, at the expense of the molar xylitol yields. The hydrogen acceptors sodium acetate, methylene blue, benzyl viologen, phenazine methosulfate, indigo carmine, and tetrazolium chloride had no effect on ethanol production.

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9. Holder, N.H.M., Kilian, S.G. and du Preez, J.C. Yeast biomass from bagasse hydrolysates. Biol. Wastes (in press).

Several yeasts isolated in acetate media utilized xylose in addition to acetate. A strain of Geotrichum candidum as well as Candida utilis ATCC 9256 were selected for further investigation. Both yeasts completely utilized xylose, acetic acid and glucose in bagasses hemicellulose and cellulose hydrolysates. G. candidum yielded more biomass (19.5 $g.l^{-1}$) in the hemicellulose hydrolysate, but G. candidum required a longer cultivation period (100 h) to reach the maximal biomass concentration than C. utilis (58 h). Similar parameters of growth and substrate utilization were recorded for both yeasts in hemicellulose hydrolysate and simulated hydrolysate media, respectively. Likewise, C. utilis utilized bagasse cellulose hydrolysate and simulated cellulose hydrolysate at the same rate and with the same biomass yield coefficient. In combined cellulose and hemicellulose hydrolysates, G. candidum and C. utilis produced 19.5 $g.l^{-1}$ biomass within 24 h and 16.5 $g.l^{-1}$ biomass within 27 h, respectively. The results showed that both hemicellulose and cellulose hydrolysates were non-inhibitory to these yeasts and could serve as substrates for yeast biomass production. The growth of G. candidum compared favorably with that of C. utilis.

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10. du Preez, J.C., van Driessel, B. and Prior, B.A. 1988. Ethanol tolerance of Pichia stipitis and Candida shehatae strains in fed-batch cultures at controlled low dissolved oxygen levels. Appl. Microbiol. Biotechnol. (in press).

Fed-batch cultivations of Pichia stipitis and strains of Candida shehatae with D-xylose or D-glucose were conducted at controlled low dissolved oxygen tension (DOT) levels. There were some marked differences between the strains. In general growth was inhibited at lower ethanol concentrations than fermentation, and ethanol levels of up to 47 $g.l^{-1}$ were produced at 30 C. Ethanol production was mainly growth associated. The yeast strains formed small amounts of monocarboxylic acids and higher alcohols, which apparently did not enhance the ethanol toxicity. The maximum ethanol concentration obtained on D-xylose could not be increased by using a high cell density culture, nor by using D-glucose as substrate. The latter observation suggested that the low ethanol tolerance of these xylose-fermenting yeast strains was not a consequence of the metabolic pathway used during pentose fermentation. In contrast with the C. shehatae strains, it was apparent with P. stipitis CSIR-Y633 that when the ethanol concentration reached about 28 $g.l^{-1}$, ethanol assimilation exceeded ethanol production, despite cultivation at a low DOT of 0.2% of air saturation. Discontinuing the aeration enabled ethanol accumulation to proceed, but with concomitant xylitol production and cessation of growth.

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Yeast Taxonomy

11. Viljoen, B.C., Kock, J.L.F., Muller, H.B. and Lategan, P.M. 1987. Long-chain fatty acid compositions of some asporogenous yeasts and their respective ascosporogenous states. J. Gen. Microbiol. 133:1019-1022.

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12. Viljoen, B.C., Kock, J.L.F. and Britz, T.J. 1988. The significance of long-chain fatty acid composition and other phenotypic characteristics in determining relationships among some Pichia and Candida species. J. Gen. Microbiol. 134:1893-899.

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13. Viljoen, B.C., Kock, J.L.F. and Britz, T.J. 1988. The significance of long-chain fatty acid composition and other phenotypic characteristics in determining relationships among some Candida, Kluyveromyces and Saccharomyces species. System. Appl. Microbiol. 10:116-120.

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14. Viljoen, B.C., Kock, J.L.F. and Coetzee, D.J. 1988. Orthogonal-field-alternation gel electrophoresis banding patterns of some asporogenous yeasts and their respective ascosporogenous states. System. Appl. Microbiol. 10: 228-230.

The relationship of seven Candida species and their corresponding ascogenous perfect states was studied by orthogonal-field-alternation gel electrophoresis (OFAGE). The following pairs produced similar OFAGE-patterns: C. lipolytica and Yarrowia lipolytica, C. pelliculosa and Hansenula anomala, C. pseudotropicalis and Kluyveromyces marxianus var. marxianus, C. utilis and Hansenula jadinii and C. shehatae and Pichia stipitis. There was no apparent relationship between C. parapsilosis and Lodderomyces elongisporus as well as C. kefyr and Kluyveromyces marxianus var. marxianus. The close correlations found between the OFAGE patterns of these yeasts indicate that electrophoretic karyotyping may be useful for studying relationships between perfect and imperfect states.

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b. Yeast Division of the SASM

A Yeast Division of the South African Society for Microbiology was founded on 2 July 1986 with the aim of coordinating and stimulating yeast research, training and dissemination of information. Current membership now stands at 60, and efforts are being made to attract more scientists with an interest in yeasts. A short course in Techniques in Molecular Taxonomy was held in July 1988 at the Dept. of Microbiology and Biochemistry, U.O.F.S., with Dr. C. P. Kurtzman as one of the course leaders.

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

The following papers have been presented at conferences.

1. Bogle, G.T. and Lachance, M.A. 1988. The preparation of an unstable extrachromosomal element in a Candida oleophila-like yeast. Yeast 4 (Spec. Iss.) S73 (14th International Conference on Yeast Genetics and Molecular Biology).

A high-copy number, unstable extrachromosomal element (ECE) has been found in a cactophilic yeast resembling Candida oleophila. The ECE was uncovered as an intense band on agarose gels of whole, undigested DNA from the organism. It has a very high A-T content based on the results of CsCl ultracentrifugation with the A-T specific dye bisbenzimide. The same method was used to separate the ECE from the mitochondrial and nuclear DNA. The buoyant density of ECE DNA in the presence of bisbenzimide was slightly less than that of mitochondrial DNA, suggesting the ECE has a slightly higher A-T content. Based on the same criterion the chromosomal DNA has a much lower A-T content. The element was determined to be linear by digestion with exonuclease III, which removes single nucleotides from the 3' end of double stranded linear DNA. The ECE was completely digested by exonuclease III. Restriction endonuclease digestion and agarose gel electrophoresis of the isolated element showed it to be approximately 16 kb in length. The enzymes BglII, EcoRI, HindIII, EcoRV and ScaI all cut the ECE, but ApaI, BamHI, KpnI, PstI, SalI, SacI, and XhoI did not. The ECE has proven to be very unstable when the yeast is cultured on laboratory media. The instability is defined by the inability to observe the ECE as an electrophoretic band staining intensely enough to be seen with the naked eye. Whether this instability is due to loss of the element, a reduction in copy number, or insertion of the ECE into either the nuclear or mitochondrial genomes has yet to be determined. The role and subcellular location of the ECE in the cell have yet to be uncovered.

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2. Bogle, G.T. and Lachance, M.A. 1988. The isolation and characterization of an extrachromosomal element in a Candida oleophila-like yeast. The XVIth International Congress of Genetics, Toronto.

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The following paper has appeared since the last issue of the Yeast Newsletter.

3. Lachance, M.A., Starmer, W.T.,[1], and Phaff, H.J.[2] Identification of yeasts found in decaying cactus tissue. Can. J. Microbiol. 34. [1]Department of Biology, Syracuse University, Syracuse, New York 13244, and [2]Department of Food Science and Technology, University of California, Davis, California 95616.

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XIX. Czechoslovak Collection of Yeasts, Institute of Chemistry, Slovak Academy of Sciences, Dúbravská cesta 9, 842 38 Bratislava, Czechoslovakia. Communicated by A. Kocková-Kratochvílová and E. Slávíková.

The following papers were published during the last two years:

1. Kocková-Kratochvílová, A., Ladzianská, K. and Bučko, S. 1987. Malassezia pachydermatis in small animals. Mykosen 30:541-543.

Sixty two small animals suspected of fungal diseases were examined in the capital of Slovakia, Bratislava, during the years 1978 to 1985. The yeast-like organism, Malassezia pachydermatis, was cultivated from 11 cases. The change of the generic name Pityrosporum to Malassezia by Dutch taxonomists has prompted the present discussion of the historical development of the nomenclature of the species.

2. Kocková-Kratochvílová, A., Šimordová, M. and Šternberský, S. 1987. Moniliella suaveolens var. nigra. Mykosen 30:544-547.

Moniliella suaveolens (Lindner ex Lindner) von Arx var. nigra (Burri et Staub) de Hoog was isolated for the first time from a hyperkeratose lesion on the hand palm of a patient hospitalized in Gottwaldov, Czechoslovakia. This black yeast-like organism occurred in company with pathogenic yeasts Candida albicans, C. krusei and Trichosporon cutaneum. In this paper, Moniliella suaveolens var. nigra is described morphologically and physiologically.

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3. Kovačovská, R., Kocková-Kratochvílová, A., Chvátalová, M. and Švorcová, L. 1988. The occurrence of yeast-like organisms in human bile. Mycoses 31:356-362.

The influence of the drinking cure on yeast-like species and their number in the bile of patients suffering by gall-bladder diseases was followed up. The majority of identified species was Candida albicans in 76% and C. parapsilosis in 13%; some individual strains of C. langeronii, C. viswanathii, C. iberica, C. pseudotropicalis, C. lusitaniae and Geotrichum candidum were found. Only one species of the genus Candida occurred in the majority of bile samples, but in five cases two different species appeared and in one case also three species of yeasts. The number of vital cells did not surpass 10 in 1 ml of bile, only in 5 cases was the number of vital cells in 1 ml of the bile higher than 100.

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4. Kocková-Kratochvílová, A., Sláviková, E. and Kovačovská, R. 1988. Yeasts isolated from fruit bodies of mushrooms of the Lowland of Zahorie (Slovakia). Ceská mykologie 42:114-121.

In 1984 yeasts were isolated from the surface of mushroom fruit bodies collected on the Lowland of Zahorie as continuation in previous papers. Thirty-nine strains of yeasts were isolated from 95 collected samples of mushrooms, 24 from fruit bodies and 15 from their environment. Similarities in physiological properties of repeatedly isolated strains from certain genera of forestal fungi were studied. The variety range of yeast species had unequal size and in some cases identical species were found on one mushroom species.

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5. Kocková-Kratochvílová, A., Sláviková, E., Kovačovská, R. and Mok, Wai Yin. 1988. Unusually occurring yeast-like organisms isolated from the equatorial locality in the basin of the river Amazon. Ceská mykologie 42: 170-175.

The paper shows the results of the identification of unusually occurred yeast-like organisms isolated from samples collected in the basin of the river Amazon in the vicinity of equator. Beside of usually occurring species of the genus Candida (e.g. Candida albicans, C. tropicalis, C. guilliermondii, C. parapsilosis, etc.) those species were found which could not be easily identified by taxonomic keys. The isolates originated from soil, human saliva, scalp, interdigital areas and from various examined organs of amphibia (frogs), which found excellent conditions in the humid and warm climate for the rapid spreading of their populations and species. Species of the genus Candida were isolated in 75% those of the genus Trichosporon in 19.5% and only 5.5% sporogenic yeasts. Although, the pathogenicity of isolated species could not be excluded, the saprophytic species predominated. It cannot be excluded that under the respective climatic conditions and in the presence of predisposing factors, some of the species may cause some organ disease.

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6. Kocková-Kratochvílová, A. and Sláviková, E. 1988. Candida mucifera n. sp. J. Basic Microbiol. 28, No. 8.

A new yeast, Candida mucifera, isolated of anurans in the forest of Amazonia is described. This species differs from all recently accepted Candida species in its morphological and physiological properties and in the fact that in sugar liquid media it produced a large quantity of extracellular polysaccharide that is of a gelatinous consistency. The type culture is deposited in Czechoslovak Collection of Yeasts under CCY 29-170-1.

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7. Sláviková, E. and Grabińska-Łonievská, A. 1988. The yeasts and yeast-like microorganisms in the denitrification unit biocenosis. Acta mycologica 22:177-184.

Taxonomic studies of the yeast-like organisms in the denitrification unit biocenosis were carried out. A set of 13 strains of these microorganisms were examined for their morphological and physiological characters. Considering their special features and some relation to the known species, the isolated microorganisms were classified to three genera: Candida, Geotrichum and Hansenula.

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8. Breierová, E., Kovačovská, R. and Kocková-Kratochvílová, A. 1987. Cryoprotection and freeze-drying of yeasts. Biologia (Bratislava) 42:230-245.

Two different kinds of preservation of yeast cultures were compared: the cryopreservation in liquid nitrogen and the freeze-drying (lyophilization). The main interest was focussed on the procedure following the opening of preserved cultures. This is the thawing of cryopreserved cultures and the rehydration of freeze-dried ones. The survival of preserved cultures was smaller in cultures kept in liquid nitrogen for two days at 4°C (freeze-thawing) and 3 days at 28°C (freeze-drying). During prolonged storage cultures can be adapted to new conditions and they are able to restore the budding process. In some cases the survival of cryoprotected cultures was higher than that of freezing-dried ones.

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9. Breierová, E. and Kocková-Kratochvílová, A. 1987. Storage of Candida albicans, C. tropicalis and related species in liquid nitrogen. Folia microbiol. 32:426-480.

Storage in liquid nitrogen of a collection of Candida albicans, C. tropicalis and related species checked by numerical and classical taxonomy is described. Strains stored for 3 years in liquid nitrogen were thawed and their survival was tested. After adaptation and regeneration, their fermentation and assimilation ability, production of chlamydospores and pseudomycelium appearance and radial growth rate of giant colonies were investigated and compared with the properties of cultures stored under paraffin oil. It follows from the results obtained that two different media - with an increased content of a nitrogen source and with an increased carbon source content - should be used for the post-heating adaptation and regeneration of yeast cells. In some strains it is useful to store them at 4°C for additional time intervals in order to increase survival of the cells. The above strains can be successfully stored in liquid nitrogen.

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XX. Cutter Biologicals Division, Miles Laboratories, Inc., 4th and Parker Sts., Berkeley, CA 94710, U.S.A. Communicated by R. Hector.

The following paper was published recently.

Hector, R.F. and Braun, P.C.[1] 1987. The effects of bifonazole on chitin synthesis in Candida albicans. Recent Trends in the Discovery, Development and Evaluation of Antifungal Agents. Fromtling, R. A. (ed.) J. R. Prous Science Publishers, S.A. pp. 369-382. [1]Department of Biology, Fairfield University, Fairfield CT 06430, U.S.A.

The effects of bifonazole on chitin synthesis in Candida albicans was assessed by in vitro and in vivo techniques. Results of a chitin synthase assay using isolated membranes from cells treated with 10 µg/ml of bifonazole showed no direct inhibition of enzyme activity. Inhibition of chitin synthesis was shown to be concentration dependent as measured using the fluorochrome calcofluor white when untreated yeasts were converted to protoplasts and allowed to regenerate their cell wall in the presence of varying concentrations of the azole. Maximal effect was seen at ≥ 10 µg/ml. Incorporation assays using (^{3}H)-N-acetylglucosamine in cells pretreated with 10 µg/ml of bifonazole demonstrated reduced incorporation; however, data suggested that the chitin content of the treated cells was still proportional to the total cell mass when measured turbidometrically. Broth dilutions showed an MIC endpoint of 10 µg/ml. When wells were stained with calcofluor white and examined by epifluorescent microscopy, multiple aberrations in morphology and deposition of chitin were apparent at low concentrations of azole. The data suggest that bifonazole has an effect on chitin synthesis and is stimulatory at low concentrations; however, the mechanisms are unclear.

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XXI. Division of Biology, 147-75, California Institute of Technology, Pasadena, California 91125. Communicated by M.I. Simon.

The following are excerpts of a review paper published recently.

Lochrie, M.A. and Simon, M.I. 1988. G protein multiplicity in eukaryotic signal transduction systems. Biochemistry 27:4957-4965.

G proteins comprise a specific family of guanine nucleotide binding regulatory proteins that serve as intermediaries in a variety of transmembrane signaling processes in eukaryotic cells. They are located on the cytoplasmic surface of membranes, where they physically couple ligand-bound receptors to the regulation of effector proteins which produce changes in intracellular metabolism. (...) This review focuses on information that has been obtained as a result of the recent isolation and characterization of several cDNAs and genes encoding different G protein subunits. The emphasis will be on discussing α subunits since much of the knowledge that has emerged about G protein similarity and diversity is a result of analyzing their sequences.

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XXII. Faculty of Chemical Technology and Materials Science, Delft University of Technology, Julianalaan 67, 2628 BC Delft, The Netherlands. Communicated by W.A. Scheffers.

The following papers have appeared since the previous issue of the Yeast Newsletter (see abstracts in June 1988 issue).

1. Postma, E., Scheffers, W.A. and van Dijken, J.P. 1988. Adaptation of the kinetics of glucose transport to environmental conditions in the yeast Candida utilis CBS 621: a continuous-culture study. J. Gen. Microbiol. 134:1109-1116.

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2. Pronk, J.T., Bakker, A.W., van Dam, H.E., Straathof, A.J.J., Scheffers, W.A. and van Dijken, J.P. Preparation of D-xylulose from D-xylose. Enzyme Microb. Technol. 10:537-542.

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3. Rouwenhorst, R.J., Visser, L.E., van der Baan, A.A., Scheffers, W.A. and van Dijken, J.P. 1988. Production, distribution, and kinetics properties of inulinase in continuous cultures of Kluyveromyces marxianus CBS 6556. Appl. Environ. Microbiol. 54:1131-1137.

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4. Verduyn, C., Breedveld, G.J., Scheffers, W.A. and van Dijken, J.P. 1988. Metabolism of 2,3-butanediol in yeasts. Yeast 4:135-142.

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5. Verduyn, C., Breedveld, G.J., Scheffers, W.A. and van Dijken, J.P. 1988. Substrate specificity of alcohol dehydrogenase from the yeast Hansenula polymorpha CBS 4732 and Candida utilis CBS 621. Yeast 4:143-148.

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6. Verduyn, C., Breedveld, G.J., Schreuder, H., Scheffers, W.A. and van Dijken, J.P. 1988. Properties of enzymes which reduce dihydroxyacetone and related compounds in Hansenula polymorpha. Yeast 4:117-126.

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7. Verduyn, C., Breedveld, G.J., Scheffers, W.A. and van Dijken, J.P. 1988. Purification and properties of dihydroxyacetone reductase and 2,3-butanediol dehydrogenase from Candida utilis CBS 621. Yeast 4:127-133.

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Also the following paper was published:

8. Verduyn, C., Giuseppin, M.L.F., Scheffers, W.A. and van Dijken, J.P. 1988. Hydrogen peroxide metabolism in yeasts. Appl. Environ. Microb. 54:2086-2090.

A catalase-negative mutant of the yeast Hansenula polymorpha consumed methanol in the presence of glucose when the organisms was grown in carbon-limited chemostat cultures. The organism was apparently able to decompose the H_2O_2 generated in the oxidation of methanol by alcohol oxidase. Not only H_2O_2 generated intracellularly but also H_2O_2 added extracellularly was effectively destroyed by the catalase-negative mutant. From the rate of H_2O_2 consumption during growth in chemostat cultures on mixtures of glucose and H_2O_2, it appeared that the mutant was capable of decomposing H_2O_2 at a rate as high as 8 mmol.g of cells^{-1}.h^{-1}. Glutathione peroxidase (EC 1.11.1.9) was absent under all growth conditions. However, cytochrome c peroxidase (CCP; EC 1.11.1.5) increased to very high levels in cells which decomposed H_2O_2. When wild-type H. polymorpha was grown on mixtures of glucose and methanol, the CCP level was independent of the rate of methanol utilization, whereas the level of catalase increased with increasing amounts of methanol in the substrate feed. Also, the wild type decomposed H_2O_2 at a high rate when cells were grown on mixtures of glucose and H_2O_2. In this case, an increase of both CCP and catalase was observed. When Saccharomyces cerevisiae was grown on mixtures of glucose and H_2O_2, the level of catalase remained low, but CCP increased with increasing rates of H_2O_2 utilization. From these observations and an analysis of cell yields under the various conditions, two conclusions can be drawn. (i) CCP is a key enzyme of H_2O_2 detoxification in yeasts. (ii) Catalase can effectively compete with mitochondrial CCP for hydrogen peroxidase only if hydrogen peroxide is generated at the site where catalase is located, namely in the peroxisomes.

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XXIII. Departamento Tecnico, Laboratorio de Microbiologia de Vinos Finos, Juan Carrau S.A., Cesar M. Gutierrez 2556, Montevideo, Uruguay. Communicated by F.M. Carrau.

The following are abstracts of recent published works presented in Latin-American Symposia of Ecology and Viticulture:

1. Carol, H., Carrau, F.M., Carrau, J.L., Pasqual, M.S., Serafini, L.A., and Dillon, A.J.P. 1987. Dominance of killer and neutral yeasts in white wine fermentations. Anais das Bras. Jorn. Latin. Enol. Viticul. p. 72, Garibaldi, Brasil.

Six white wine fermentations were studied for the presence of killer, neutral and sensitive yeasts in a Uruguayan winery. Industrial fermentations were carried out with temperature control (16-18 C), at pH 3.2, and no commercial yeasts were used. Special culture media were used to differentiate yeast strains during wine fermentation. The dominance of killer and neutral yeasts was found in the middle and last-stage of the process. Killer activity of native strains was demonstrated at pH 3.2 in grape juice agar and grape musts.

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2. Carrau, F.M., Gioia, O. and Neirotti, E. 1988. Importance of the killer phenomenon in industrial wine fermentations. Bras. Jorn. Latin. Enol. Viticul., p. 1-10, Mendoza, Argentina.

The evolution of the native yeast flora was studied from the arrival of the grapes to the end of fermentations in 3 Uruguayan wineries. No killer yeasts was found in the grapes and less than 1% were Saccharomyces. Dominance of neutral and killer yeasts type K2 was found in one of the wineries. The completely absence of sensitive yeasts was shown in the middle and last-stage of alcoholic fermentations. Commercial yeasts (sensitive) disappeared in 24 hours from grape musts because they were killed by the native flora. No killer and neutral yeasts were found in the other two wineries. In all the fermentations analysed only sensitive yeasts were isolated. Mixed cultures of killer: sensitive strains were studied in grape juice fermentations at pH 3.2. Differential culture media were used to monitor their growth kinetics. Killer activity was effective at pH 3.2 in the proportions 1:1, 1:5 and 1.10. No killer activity was found at pH 6.0 and the initial proportions of killer: sensitive strains were maintained during fermentations. The winery ecosystem and the technology used had much influence over the type of dominant yeast flora.

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XXIV. Chaire de Génétique et de Microbiologie, Ecole Nationale Supérieure Agronomique de Montpellier, Place Pierre Viala, 34060 Montpellier Cedex, France. Communicated by P. Galzy.

The following papers describe work performed in our laboratory recently.

1. Ratomahenina, R., Galzy, P., Pina, M. and Graille, J. 1988. Utilization of yeasts in fats Biotechnology. 7th International symposium of yeasts, Perugia, Italy.

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2. Louis-Eugene, S., Ratomahenina, R., and Galzy, P. 1988. Enzymic reduction of biacetyl by a strain of Saccharomyces uvarum. Folia Microbiologica 33:38-44.

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3. Aggelis, G., Ratomahenina, R., Arnaud, A., Galzy, P. and Graille, J. 1988. Etude de l'influence des conditions de culture sur la teneur en acide gama linolénique de souche de mucor. Oleagineux 44:(in press).

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4. Leclerc, M. Arnaud, A., Ratomahenina, R., Galzy, P., Gerbaud, C., Raynal, A. and Guérineau, M. 1988. Study of the purified β-glucosidase produced by a yeast strain transformed by genetic engineering. 7th International Symposium of Yeast. Perugia, Italy.

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5. Zaire, R., Moulin, G., Galzy, P., Hérard, J., Deshayes, G., and Gordon, B. 1988. Fermentation of grain wheat by Schwanniomyces castellii. Biomass 15:175-185.

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6. Dubreucq, E., Boze, H., Nicol, D., Moulin, G. and Galzy, P. 1988. Kinetics of the α-amylase of Schwanniomyces castellii. Biotechnol. Bioeng. 33.

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XXV. Istituto di Genetica, Facoltà di Scienze Matematiche, Fisiche e Naturali, Università degli Studi di Parma, 43100 Parma, Italia, Borgo Carissimi, 11. Communicated by P.P. Puglisi.

The following are abstracts of recently published or submitted papers.

1. Viola, A.M., Bortesi, T., Pizzigoni, R., Puglisi, P.P., Goffrini, P., and Ferrero, I. 1986. The respiratory activities of four Hansenula species. Antonie van Leeuwenhoek 52:295-308.

The respiratory activities and the cytochrome spectra from four species belonging to the genus Hansenula have been analysed. The results obtained and described in this paper show that (1) H. glucozyma possesses only the primary, antimycin A-sensitive respiration, (2) H. anomala and H. californica possess primary and secondary (salicylhydroxamate-sensitive) respirations, whereas (3) H. saturnus possesses three respiratory activities (AA-sensitive, SHAM-sensitive, and AA + SHAM-insensitive). The respiratory activity of H. glucozyma is glucose-repressible, whereas the activities of the other species are not. In addition, antimycin A (AA) and erythromycin (ERY) in the culture media differently inhibit the growth of the four species and regulate the respiratory pathways in the species analysed.

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2. Viola, A.M., Goffrini, P., Puglisi, P.P. and Ferrero, I. 1986. The 'in vivo' effect of acriflavine on mitochondrial functions in the 'petite negative' yeast Hansenula saturnus. Curr. Genet. 11:127-129.

In the petite negative yeast Hansenula saturnus, acriflavine determined a decrease of cell yield and of the total QO_2, the disappearance of the cytochromes aa_3 and b and the inhibition of in vivo mitochondrial protein synthesis without affecting the cell survival. The restriction enzymes analysis of mitDNA shows that no specific fragmentation occurred about acriflavine treatment.

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3. Donnini, C., Artoni, N. and Marmiroli, N. 1986. Germination conditions that require mitochondrial function in Saccharomyces cerevisiae: utilization of acetate and galactose. J. Bacteriol. 168:1250-1253.

Ascospores of Saccharomyces cerevisiae inherited at least one functioning mitochondrion as shown by their ability to germinate on nonfermentable carbon sources. After transfer to germination medium, the optical density of the culture of 600 nm decreased (phase-dark), reaching a minimum within 60 min in the presence of glucose and within 180 min after transfer to acetate medium; thereafter, the optical density increased. Budding cells first appeared 90 min after transfer to glucose and 150 min after transfer to acetate. Augmentation of respiratory components, respiratory activity, and macromolecular synthesis (except for DNA synthesis) started at about the same time on glucose and on acetate, although the highest values for all these process were reached in the presence of glucose. Mitochondrial inhibitors which affected germination on acetate did not arrest germination on glucose. However, mitochondrial activity was required for germination on galactose in a strain carrying the mutated allele imp1 of the nucleomitochondrion-connecting gene IMPI.

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4. Bilinski, C.A.,[1] Marmiroli, N. and Miller, J.J.[2] 1987. Cell division age dependency of meiosis in an apomictic variant of Saccharomyces cerevisiae. Yeast 3:1-4. [1]Production Research Department, Labatt Brewing Company, 150 Simcoe Street, London, Ontario, Canada N6A 4M3. [2]Department of Biology, McMaster University, Hamilton, Ontario, Canada L8C 4K1 .

The cell division age dependency of sporulation was investigated in a diploid strain of Saccharomyces cerevisiae (19el) which undergoes a single equational nuclear division during sporulation with consequent formation of asci containing two uninucleate diploid spores (apomictic dyads). Under modified nutritional conditions which partially restore meiosis and hence normal tetrad formation, newly formed (age 0) daughter cells were observed to be capable of formation of apomictic dyads but not of meiotic tetrads. Even under conditions in which only apomictic dyads developed, approximately 20% of the asci resulted from differentiation of newborn 'inexperienced' cells. Thus, the data indicated production of at least one bud to be a prerequisite for meiosis but not for apomixis; however, occurrence of at least one complete mitotic cell division cycle was evidently insufficient for the morphogenetic switch from diploid to haploid spore formation, since older cells bearing several bud scars often underwent apomictic dyad development, and some produced no spores.

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5. Goffrini, R., Algeri, A.A.,[1] Donnini, C., Wesolowski-Louvel, M.,[2] and Ferrero, I. 1989. RAG1 and RAG2: nuclear genes involved in the dependence/independence on mitochondrial respiratory functions for the growth on sugars. Yeast (submitted). [1]Institute of Genetics, University of Bologna, 40100 Bologna, Italy. [2]Institut Curie, Section de Biologie, Bâtiment 110, Centre Universitaire, 9145 Orsay, France.

The analysis of five independent isolates of Kluyveromyces lactis shows that CBS 2359, CBS 683 and CBS 4574 could grow in the presence of mitochondrial inhibitors (antimycin A, oligomycin or erythromycin) and that CBS 2360 and CBS 141 were unable to grow in the presence of drugs. The resistant growth was observed only on glucose and not on other fermentable carbon sources (galactose, lactose). The phenotype "growth on glucose in the presence of mitochondrial inhibitors" was called Rag^+. This phenotype was found to be controlled by two unlinked nuclear genes: RAG1 and RAG2. Either of their recessive alleles, rag1 and rag2, led to the Rag^- phenotype (i.e. the failure of growth on glucose in the presence of antimitochondrial drugs). Rag^- strains represent the case in which the fermentation growth becomes absolutely dependent on the functioning of the normal respiratory chain.

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6. Donnini, C., Puglisi, P.P., Vecli, A.[1] and Marmiroli, N.[2] 1988. Germination of Saccharomyces cerevisiae ascospores without trehalose mobilization as revealed by in vivo ^{13}C NMR. J. Bacteriol. 170(8):3789-3791. [1]Department of Physics, University of Parma. [2]Laboratory of Genetics, Department of Biology, University of Lecce, Italy.

S. cerevisiae ascospores germinate in the presence of acetate without any detectable trehalose degradation, as revealed by the high resolution NMR spectroscopy. The results presented here substantiate the hypothesis that in S. cerevisiae trehalose supplies the energy to the dormant spores rather than to the germination process as found in other fungi.

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7. Wesolowski-Louvel, M.,[1] Goffrini, P. and Ferrero, I. 1988. The RAG2 gene of the yeast Kluyveromyces lactis codes for a putative phosphoglucose isomerase. (submitted) [1]Institut Curie, Section de Biologie, Bâtiment 110, Centre Universitaire, 9145 Orsay, France.

In a strain of K. lactis, the RAG2 gene (1) is found as a recessive allelic form, rag2. The strain cannot grow on glucose if the respiratory pathway is blocked by mitochondrial inhibitors. The RAG2 gene has been cloned and its nucleotide sequence determined. The 557 amino acids long open reading frame has a homology of 55% with mouse neuroleukin (2) which has recently been shown to be identical to phosphoglucose isomerase (3,4). The phenotype of the rag2 strain may be explained by a defect of this enzyme in the glycolytic pathway.

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XXVI. Department of Food Science and Technology, University of California, Davis, CA 95616. Communicated by H.J. Phaff.

The following paper was submitted for publication recently.

Hagler, A. N.,[1] Mendonca-Hagler, L.C.,[1] and Phaff, H.J. Candida populi, a new species of yeast occurring in Exudates of Populus and Betula species. (Submitted). [1]Instituto de Microbiologia da UFRJ, Cidade Universitaria CCS bloco I, Rio de Janeiro, R. J. CEP 21.944, Brazil.

During a survey of yeasts occurring in exudates of various trees species in the Pacific northwest of North America, 24 strains of an imperfect yeast were isolated in a wide geographic area, mainly from species of Populus. The isolates were studied by traditional as well as molecular methods and the results revealed a new species of the genus Candida. The new species is named Candida populi, because its principal habitat is in exudates of species of Populus. C. populi resembles C. molischiana but differs from this species in habitat, guanine-plus-cytosine content of the nuclear deoxyribonucleic acid, maximum growth temperature, and the ability to assimilate several carbon compounds. The type strain of C. populi is UCD-FST 68-675B (= CBS 7351 = ATCC 64933).

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XXVII. Department of Enzyme Engineering, Institute of Microbiology, Czechoslovak Academy of Sciences, Vídeňská 1083, 142 20 Prague 4, Czechoslovakia. Communicated by Č. Novotný.

The following are abstracts of recently published or accepted papers.

1. Novotný, Č. 1988. A study of regulation of sterol synthesis in chemostat culture. In Continuous Culture, FEMS Symposium No. 41., P. Kyslík and E.A. Dawes, Eds. Academic Press, London, pp. 185-198.

Saccharomyces cerevisiae is able to accumulate high levels of sterols. In contrast to many other lower eukaryotes, the differential rate of sterol synthesis continually growing on both fermentable and nonfermentable carbon sources. If abundant assimilable carbon source is available, the actual concentration of nitrogen source in the medium seems to control whether sterols will accumulate during growth or a homeostatic regulatory process similar to that in other lower eukaryotes will take place maintaining sterol synthesis proportional to biomass growth. Two physiological states of the cell were defined by using chemostat, one characterized by a low sterol level (ergosterol, ca. 10 mg per g dry biomass; 24:28-dehydroergosterol, ca. 2 mg per g dry biomass; total sterols, ca. 20 mg per g dry biomass) and the other by a high sterol level (ergosterol, ca. 20 mg per g dry biomass; 24:28-dehydroergosterol, ca. 15 to 25 mg per g dry biomass; total sterols, ca. 60 to 90 mg per g dry biomass). The former state was observed under conditions of the carbon-limited growth, the latter under those of the nitrogen-limited growth at low specific growth rates. At high specific growth rates with the carbon source being in excess, the sterol levels approached those of the low sterol state. The amount of nitrogen source (ammonium) available for the yeast regulated the sterol levels but the proportion of ergosterol to 24:28-dehydroergosterol did not change and remained rather low all the time. Growth limitation by iron markedly decreased the sterol levels obtained. Physiological significance of the regulation of sterol synthesis is discussed.

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2. Novotný, Č., Doležalová, L., Musil, P. and Novák, M. 1988. The production of lipases by some Candida and Yarrowia yeasts. J. Basic Microbiol. 28, in press.

The activities of the free and the cell-bound lipases of Candida rugosa, Candida guilliermondii, Candida curvata, Candida deformans and Yarrowia lipolytica grown on a complex medium with various carbon and nitrogen sources were examined. The highest activities were observed with citrate and succinate as the carbon sources. In some cases, olive oil was used as the efficient inducer of the cell-bound lipases. The cells grown in the presence of the organic nitrogen sources (peptone, urea, soy flour) exhibited higher lipase levels than those cultivated in the medium containing ammonium as the nitrogen source. The extracellular enzyme was detected only in cultures grown with urea, peptone or soy flour as the nitrogen source.

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MEETINGS

Meetings held recently

1. 21st Annual Meeting of the Yeast Genetics and Molecular Biology of Japan, Tokyo, Japan.

The 21st Annual Meeting of the Yeast Genetics and Molecular Biology of Japan was held from July 25th through 27th, 1988 at the Yacult Hall in Tokyo with about 250 registered participants. Seventy nine topics were presented and discussed in the following thirteen sessions: Session I, Cell Structure; II, Meiosis/Sporulation; III, Life cycle; IV, Cell division cycle; V, Plasmid; VI, Organelle; VII, Secretion; VIII, Biosynthesis/Metabolism/Physiology; IX, Chromosome structure/Transformation; X, Regulation of transcription; XI, Recombination/Repair; XII, Calcium/Calmodulin; XIII, Phospholipid. The abstracts of the presentations will be published in Japanese in "Yeast Genetics and Molecular Biology, Japan" (vol. 21) at the end of 1988.

O. Niwa, Department of Biophysics, Faculty of Science, Kyoto University, Sakyo-Ku, Kyoto 606, Japan.

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2. 7th ISY, Perugia, Italy.

We were happy to see many of you at the 7th ISY held here August 1-5, 1988. The Symposium proved to be quite a success and participation was fairly good with 210 delegates from 24 different countries. Scientific as well as social exchange was very good. The Proceedings are now being compiled and publication as a special supplement of Yeast will be sometime in early 1989. For information on the purchase of a copy please notify Prof. A. Martini at the address below.

A. Martini, Dipartimento di Biologia Vegetale, Università degli Studi di Perugia, Borgo XX Giugno, 74, Perugia, Italy 06100.

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3. Minutes of ICY Meeting held in Perugia, August 4th 1988.

A meeting of the commission was held on 4th August 1988 in Perugia. At his request, Dr. Dawes was replaced by Dr. Johnston. Professor Phaff was replaced by Professor Meyer.

The following new members joined the commission:

for Argentina:	Dr. Goldemberg Dr. L. de Figueroa
for Israel:	Professor Ziffer
for South Africa:	Dr. Prior

Dr. van der Walt will remain a member of the commission since he is continuing to be active in research.

The commission decided to co-opt Professor Lachance, Editor of the Yeast Newsletter, as a member. Professor Phaff was made honorary member.

The next specialised meetings will be as follows:

September 1989, in Louvain, on the theme "Production of ethanol and fermented beverages" (Professor Verachter).

September 1990, at Smolenice Castle, Czechoslovakia, on "Evolution and taxonomy of yeast" (Dr. Minárik and Dr. Biely).

September 1990, in Poland, on "Genetics and regulation of the respiratory metabolism" (Professor Lachowitz).
1991, in Riga, on "Metabolic regulation and biotechnology".

The next general meeting will most certainly be organised by Dr. Meyer at Georgia State University, Atlanta, Ga, USA.

P. Galzy, Vice-President, ICY.

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4. 14th International Conference on Yeast Genetics and Molecular Biology, August 7-13, 1988, Espoo, Finland.

The 14th International Conference on Yeast Genetics and Molecular Biology was held on August 7-13, 1988 in Espoo, Finland. The conference was highly successful, with 717 registered participants representing 32 countries. There were 30 plenary lectures, 470 scientific posters, and 17 workshops. On that occasion, Professor Piotr P. Slonimski (CNRS, Gif-sur-Yvette, France) was awarded the E. Chr. Hansen gold medal and prize for his outstanding scientific contributions in yeast genetics and molecular biology.

M. Korhola, Alko Research Laboratories, The Finnish State Alcohol Company, POB 350, SF-00101 Helsinki, Finland.

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Forthcoming meetings

5. Molecular and Cellular Biology of Yeasts and Filamentous Fungi. Organizers: W.E. Timberlake and M.J. Holland, April 3-9, 1989. Steamboat Springs, Colorado.

The yeasts Saccharomyces cerevisiae and Schizosaccharomyces pombe and the filamentous fungi Neurospora crassa and Aspergillus nidulans have been used extensively to advance our understanding of numerous cellular processes such as gene regulation, mitosis, meiosis, and organelle movement. Much of the technology used for analysis of these organisms, most notably traditional and reverse genetics, has begun to be applied to related species that are of particular importance because of their impact on humans. These include both beneficial fungi and fungi pathogenic to humans, animals, and plants. Although work with these humans, animals, and plants. Although work with these other fungal species proceeds more slowly than that with well-studied species, breakthroughs are being made. Major advances continue with the well-studied species because of the sophistication with which their genomes can be manipulated. This meeting will integrate the concerns of individuals doing cutting-edge research in the areas of molecular and cellular biology of the yeasts and filamentous fungi. It will feature the latest and most relevant results from laboratories working with the classical genetic models and also from those working with industrial and pathogenic fungi.

Session topics include: Chromosome Structure and Function, Reproductive Strategies, Control of Cell Proliferation, Transcriptional Control Mechanisms Post-Transcriptional Control Mechanisms, Mechanisms of Pathogenesis of Human and Plant Pathogens.

Contact (note new address):

UCLA Symposia
2032 Armacost Avenue
Los Angeles, CA 90025
U.S.A.

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6. 4e Symposium International d'Oenologie, Actualités Oenologiques 89. June 15-17, 1989.

The meeting is being organized by P. Riberau-Gayon (President of Organizing Committee). For further information contact the General Secretariate: Mme M.G. Maurie, Institut d'Oenologie, 351 Cours de la Libération, 33405 Talence (France).

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7. 14th ISSY.

The 14th International Specialized Symposium on Yeasts entitled "Yeast Taxonomy: Theoretical and Practical Aspects" will be held at Smolenice-Castle near Bratislava, Czechoslovakia, September 3-7, 1990.

The Symposium will be focussed on following topics:

- Traditional and Modern Approaches in Yeast Taxonomy
- New Properties of Yeasts
- Evolution of Yeasts
- Taxonomy in Relation to Biotechnology
- Environment-Induced Changes in Yeasts
- Morphological Properties and Surface Structures
- Preservation of Yeasts

The First Circular will be forwarded in 1989. Information: Dr. E. Minárik, Research Institute for Viticulture and Ecology, 833 11 Bratislava, Matúškova 25, ČSSR and Dr. Peter Biely, Chemical Institute of the Slovak Academy of Sciences, Dúbravská cesta 9, 842 38 Bratislava, ČSSR.

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Brew Info.

Through collaboration between the European Brewery Convention (EBC) and the Brewing Research Foundation (BRF) the BREW-INFO system, specially designed to serve the interests of the international brewing industry, has been established.

The Brew-Info System

The BREW-INFO system is based on the BRF monthly publication "Bulletin of Current Literature" which has been produced for many years. This publication has been developed into the computer database "BREW-INFO DATABASE" and also the monthly publication "CURRENT AWARENESS MONTHLY" which contains the most recent published references on brewing and related topics.

Brew-Info Database

About 35% of the references will be supporting abstracts designed particularly to give fuller information on new developments and matters of current interest. These abstracts will not be printed in CURRENT AWARENESS MONTHLY but can be retrieved by subscribers to the BREW-INFO DATABASE. At present more than 30,000 references are stored in the database. The BREW-INFO DATABASE is available on-line 24 hours a day, all year round. In order to use the DATABASE on-line subscribers will need a personal computer (PC) and printer or a word processor (in many cases this equipment will be available already). In addition an appropriate telephone link (modem and software) will be required. Subscriber's terminals may be connected to the on-line system through the telephone network data handling system. Costs for this are less than for normal telephone calls over the same distance and are less subject to interference. A subscriber's communication with the DATABASE is confidential and at the end of any search session, all enquiries and answers obtained by the user are destroyed. In order to learn how to operate the system, subscribers will be supplied with a Manual and will also receive a starting period of 3 hours free of charge for connection to the DATABASE, beginning at the date the password is used for the first time.

Price List, valid as from 1987

Current Awareness Monthly:	subscription for one year (12 issues)	NLG 350
	ditto, for each supplementary copy	NLG 200
BREW-INFO SYSTEM:	same as above plus access to DATABASE (per hour)	NLG 150

For further information, write to: Secretariat General, European Brewery Convention, P.O. Box 510, NL-2380 BB Zoeterwoude, The Netherlands.

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