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Y E A S T

A Newsletter for Persons Interested in Yeast

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Editorials

Seventieth Birthday - Doc. Ing. Erich Minárik, DrSc.

A long-year member of the International Commission on Yeasts, a co-founder of this scientific body in 1966 with Dr. A. Kocková-Kratochvílová, and a frequent contributor to the Yeast Newsletter, Doc. Ing. Erich Minárik, DrSc., will celebrate his seventieth birthday on September 17, 1994. His position in the community of yeast researchers in his home country and all over the world is so well established that this anniversary deserves our attention.

He has been recognized mainly on the basis of his extensive contribution in microbiology and technology of wine production. His main contributions are concerned with selection and development of strains for discontinuous and continuous fermentation of natural and sparkling wines and for production of wines with reduced content of ethanol. The results of his research have been published in almost 200 papers and several books. His most successful work is the three volume book on Winemaking (chemistry, microbiology and analysis) which won prizes of the "Office International de la Vigne et du Vin" in Paris in 1967 and 1971.

For almost 25 years he was in charge of the Czechoslovak Commission for Yeasts, its annual conferences, and international yeast symposia, first as secretary (1963-1983), and later as chairman (1983-1989). Other international activities of Prof. Minárik include the organization of international wine contests. He functioned as secretary of 6 such events held in Bratislava.

Prof. Minárik cared all his life to pass his experience to young people. For many years he was a guest lecturer at the Slovak Technical University and he supervised 20 graduate and 6 doctorate students. As a founder of wine microbiology in Slovakia he has been always employed at one place, namely the Research Institute for Viticulture and Enology in Bratislava, Slovakia, where he still can be reached. His attitude to life, high self-discipline and well organized style of work may serve as an example for many younger scientists.

On behalf of all his colleagues, friends, and students, and on behalf of the editorial board and the readers of the Yeast Newsletter, we wish him good health, happiness in family and professional life, and joy from the science and art of winemaking in many years to come.

Peter Biely
Associate Editor

Format of communications

Our thanks are extended to the many readers who have sent communications taking into account the recommendations listed in the December 1993 issue. Your help makes our task much easier.

Prof. Graham G. Stewart, Heriot-Watt University, Edinburgh, Scotland

Congratulations to Dr. Graham G. Stewart for his new appointment as Professor and Director of the International Centre for Brewing and Distilling at Heriot-Watt University (see Brief News Item). Dr. Stewart spent many years at the Research Department of Labatt Brewing, in London, Ontario, and served in various capacities as an Honourary Lecturer at the University of Western Ontario. He will continue to serve on the Editorial Board of the Yeast Newsletter. On behalf of all readers, I wish him every success in his new career.

M. A. Lachance
Editor

Letter to the Editor

It is rumoured that some important yeast taxonomists are abandoning the methods of nutritional testing, pioneered by L.J. Wickerham and, instead, propose using a commercially produced kit, of which the chemical components are not all known to the researcher. If this is true, it is a retrograde step for the following reason.

In addition to their work on classification and identification, taxonomists make a major contribution to comparative biology. Despite the limitations of the techniques, the taxonomists' established nutritional tests give valuable information about the abilities of nearly all yeast species to utilize different compounds. However, as is generally true in science, the validity of this information depends partly on having maximum knowledge about the methods used.

If yeast taxonomists are proposing to switch from using media of known composition to those of unknown composition (for administrative or financial convenience), it is to be hoped they will reconsider such a decision, because this would destroy the value of an important aspect of their work.

April 27 1994

James A Barnett
School of Biological Sciences
University of East Anglia
Norwich NR4 7TJ, England.

Editor's response

Although I am not aware of the change to which Prof. Barnett is referring, I agree that the use of a commercial kit containing unknown reactions is not in our science's best interest. The physiological characteristics of yeasts are of capital significance in understanding their ecology, and the adoption of a "black-box" typification system would overlook such important attributes. Readers are invited to contribute to this discussion by communicating their opinions for inclusion in subsequent issues of the Yeast Newsletter.

M. A. Lachance

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

Complete information of the following strains may be obtained upon request from the Mycology and Botany Department at the ATCC.

NAME	ATCC#	DEPOSITOR/STRAIN	SIGNIFICANCE/REFERENCE
Candida boidinii	90439	W. Babel, MH7	Produces NAD-dependent alcohol dehydrogenase (Acta Biotechnol. **11**:57-62, 1991)
Candida fragi	90505	M. Suzuki, JCM 1791	Type culture (J. Gen. Appl. Microbiol. **37**:423-429, 1991)
Candida glabrata	90525	W. Starmer & V. Aberdeen, Y55	Ecology (Appl. Environ. Microbiol. **58**:990-997, 1992)
Candida maltosa	90625	M. Takagi, CHA 1	Transformation host (Curr. Genet. **23**:205-210, 1993)
Candida maltosa	90677	M. Takagi, CHAU 1	Transformation host (Curr. Genet. **23**:205-210, 1993)
Candida methylica	90441	W. Babel, MH29	Produces alcohol dehydrogenase (Acta Biotechnol. **11**:57-62, 1991)
Candida mucilagina	90526	W. Starmer & V. Aberdeen 84-201.7	Ecology (Appl. Environ. Microbiol. **58**:990-997,1992)
Candida utilis	90440	W. Babel, H92	Utilizes formaldehyde (Zentralbl. Mikrobiol. **146**:25-33, 1991)
Candida utilis	90530	T. Quickenden, M523	Emits luminescence (J. Bioluminesc. Chemiluminesc. **7**:245-253, 1992)
Cryptococcus cereanus	90524	W. Starmer & V. Aberdeen, 83-1112.2	Ecology (Appl. Environ. Microbiol. **58**:990-997, 1992)
Hansenula polymorpha	90438	W. Babel, MH 20	Produces alcohol dehydrogenase (Acta Biotechnol. 11: 59-62, 1991) Utilizes formaldehyde (Zentralbl. Mikrobiol. **146**:25-33, 1991)
Kluyveromyces lactis	90609	J. Heinisch, KMP 1	Transformation host (Microbiol. **8**:559-570, 1993)
Pichia amethionina var. *pachycereana*	90523	W. Starmer & V. Aberdeen 80-314.1	Ecology (Appl. Environ. Microbiol. **58**:990-997, 1992)
Pichia kluyveri		W. Starmer & V. Aberdeen	Ecology (Appl. Environ. Microbiol. **58**:990-997,

	90527	84-670.2C	1992)
	90528	88-370.2F	
	90529	DX	
Rhodotorula glutinis var. *glutinis*	90392	H. Martelli	Produces ß-carotene on sugar cane juice (Biotechnol. Letts. **9**:373-375, 1987; **12**:207-208, 1990)
Rhodotorula lactosa	90391	H. Martelli	Produces ß-carotene (World J. Microbiol. Biotechnol. **8**:635-637, 1993)
Rhodotorula minuta	90295	E. Slaviková, CCY 20-11-2	Produces D-mannitol and D-arabinitol (Folia Microbiol. **34**:511-514, 1989)
Saccharomyces cerevisiae	90395	B. Ono, NA12-3C	Produces cystathionine r-lyase (Yeast **9**:389-397, 1993)
	90396	KT22-1C	
	90397	DARK1	
Saccharomyces cerevisiae	90506	F. Vesinhet, B93	Laboratory haploid strain; flocculation (J. Inst. Brew. **98**:315-319, 1992)
Saccharomyces cerevisiae		DuPont Merck Pharm.,	Carry plasmids pBS39 and pBS44 (ATCC 53254);
20772	BSY90		U.S. Patent 4,959,317 (mate with each other)
	20773	BSY23	
Saccharomyces cerevisiae	90607	T. Huerta, T 73	Transformation host (Appl. Environ. Microbiol. **59**:2801-2806, 1993)
Saccharomyces cerevisiae	90627	D. Porro, X4004-3A	Transformation host Appl. Microbiol. Biotechnol. **36**:655-658, 1992)
Saccharomyces cerevisiae		J. Šubík,	Transformation host (Curr. Genet. **24**:377-284, 1993)
	90671	JSS-2C	
	90672	JS10-3C	
Saccharomyces cerevisiae	90679	F. Sherman, B-7467	Transformation host (Mol. Cell. Biol. **13**:7836-7849, 1993)
Schizosaccharomyces pombe		O. Nielsen,	Mating-type switching (Curr. Genet. **23**:1902-1905, 1993)
	90719	LK42	
	90720	EG328	
	90721	EG325	
Torulaspora pretoriensis	90676	Y. Oda, YK-1	Produces α-glucosidase (Biosci. Biotech. Biochem. **57**: 1902-1905, 1993)
Yarrowia lipolytica	90716	M. Wojtatowicz, A-101-1.14	Produces citric and isocitric acid from glucose and glucose hydrol (Appl. Biochem. Biotechnol. **31**:165-174, 1991)

I. Department of Food Science and Technology, Wiegand Hall, Oregon State University, Corvallis, OR 97331-6602. Communicated by A.T. Bakalinsky. <bakalina@bcc.orst.edu>

The following publication has appeared recently.

1. Xu, X., Wightman, J.D., Geller, B.L., Avram, D. & Bakalinsky, A.T. 1994. Isolation and characterization of sulfite mutants of *Saccharomyces cerevisiae.* Current Genetics **25**:488-496.

II. Molecular and Population Genetics Group, Research School of Biological Sciences, The Australian National University, P.O. Box 475, Canberra, ACT 2601, Australia. Communicated by R. Maleszka.

ranes3ya@rsbs.anu.edu.au>

Manuscript in press:

1. R. Maleszka. The in vivo effects of ethidium bromide on mitochondrial and ribosomal DNA in *Candida parapsilosis*.

The ability of *C. parapsilosis* to grow in the presence of high levels of ethidium bromide (EB) has been explored to study the effects of this intercalating dye on DNA in vivo. By employing confocal microcopy we have determined that EB penetrates the cellular membranes and binds rapidly to the nucleolus whereas mitochondrial DNA (mtDNA) becomes stained after a longer exposure to this dye. No detectable staining of the nucleus has been detected under these conditions. Electrophoretic studies of both undigested and restricted DNAs confirm that the nuclear DNA is unaffected by high levels of ethidium with the exception of the rDNA-bearing chromosome that undergoes significant structural alterations in the presence of EB. Moreover, the hybridization signal with the rDNA probe is proportionally reduced in samples obtained from cultures grown in the presence of EB suggesting that the average copy number of rRNA genes in these cultures may be affected. Furthermore, the stability of *C. parapsilosis* chromosomes in the presence of EB suggests that this dye does not interfere with the maintenance and replication of telomeres in vivo. In striking contrast to other fungal species the linear organelle genome in *C. parapsilosis* retains its structural and functional integrity in the presence of high concentrations of EB.

III. Laboratorium voor Microbiologie, Universiteit Gent, K. L. Ledeganckstraat 35, B-9000 Gent, Belgium. Communicated by M. Vancanneyt.

<marc.vancanneyt@rug.ac.be>

The following publication was accepted recently.

1. M. Vancanneyt, R. Coopman, R. Tytgat, G. L. Hennebert & K. Kersters. 1994. Whole-cell protein patterns, DNA base compositions and coenzyme Q types in the yeast genus *Cryptococcus* Kützing and related taxa. Syst. Appl. Microbiol. (in press).

A numerical analysis was performed on one-dimensional whole-cell protein electrophoretic fingerprints of 90 strains belonging to the basidiomycetous anamorphic genus *Cryptococcus* and presumably related taxa in the genera *Filobasidium* and *Tremella.* A significant protein electrophoretic heterogeneity was observed within the species *Cryptococcus albidus, C. humicola, C. laurentii* and *C. luteolus.* This heterogeneity in protein profiles was confirmed by considerable variations in DNA base composition. A high similarity in protein profiles was confirmed by identical DNA base compositions and coenzyme Q types for some strains of *C. albidus* var. *albidus* and the strains studied of *C. kuetzingii*. Synonymy was also suggested for the type strain of *C. elinovii* and the strains studied of *C. terreus.* A close relatedness was demonstrated for one strain of *C. luteolus* and two strains of *C. laurentii.* Strains of *Filobasidium floriforme* and *Cryptococcus ater,* showing highly similar protein patterns, were characterized by an analogous range of mol % G+C content and an identical ubiquinone type. For the reference strains studied of the genus *Tremella* the data suggest close relationships between respectively *Tremella coalescens* and *T. mesenterica, T. fuciformis* and *T. samoensis,* and *T. encephala* and *T. subanomala.* There were no indications for a close phylogenetic relatedness between species of the genera *Tremella* and *Cryptococcus.*

IV. Instituto de Investigaciones Biomédicas del CSIC, Arturo Duperier 4, 28029 Madrid, Spain. Communicated by C. Gancedo.

<cgancedo@biomed.iib.uam.es>

The following are summaries of articles accepted for publication or recently published.

1. F.J. Gamo, M. A.Navas, M.A. Blazquez, C. Gancedo & J.M. Gancedo. In press. Catabolite inactivation of heterologous fructose-1,6-bisphosphatases and fructose-1,6-bisphosphatase-β-galactosidase fusion proteins in *Saccharomyces cerevisiae.* Eur. J. Biochem.

Fructose-1,6-bisphosphatase (FruP2ase) from *Saccharomyces cerevisiae* is rapidly inactivated upon addition of glucose to a culture growing on non-sugar carbon sources. In the same conditions the FruP2ases from *Schizosaccharomyces pombe* or *Escherichia coli* expressed in *S. cerevisiae* were not affected. A chimeric protein containing the first 178 aminoacids from the N-terminal half of *S. cerevisiae* FruP2ase fused to *E. coli* β-galactosidase was susceptible to catabolite inactivation. Elimination of a putative destruction box, RAELVNLVG...KK....K., beginning at aminoacid 60 did not prevent catabolite inactivation. Similarly a change of the vacuole targeting sequence QKKLD, aminoacids 80-84, to QKNSD did not affect significantly the course of inactivation of β-galactosidase. A fusion protein carrying only the first 138 aminoacids from FruP2ase was inactivated at a higher rate than the one carrying the first 178, suggesting the existence of a protective region between aminoacids 138 and 178. A fusion carrying the first 81 aminoacids from FruP2ase was inactivated by glucose at a similar rate to the one carrying 178, but one with only the first 18 aminoacids was resistant to catabolite inactivation. Inactivation of FruP2ase in mutants *ubr1* that lack a protein required for ubiquitin-dependent proteolysis, or *pra1* that lack vacuolar protease A, proceeded as in a wild type. Our results suggest that at least two domains of FruP2ase may

earmark β-galactosidase for catabolite inactivation and that FruP2ase can be inactivated by a mechanism independent of transfer to the vacuole.

2. M.A. Blazquez, R. Stucka, H. Feldmann & C. Gancedo. In press. Trehalose-6-phosphate synthase is dispensable for growth on glucose but not for spore germination in *Schizosaccharomyces pombe.* J. Bacteriol. **176**.

Trehalose-6-P (T6P) inhibits hexokinases in *Saccharomyces cerevisiae* (Blazquez et al., FEBS Letters,329, 51-54,1993) and disruption of the gene *TPS1* (formerly named *CIF* or *FDP*) encoding T6P synthase prevents growth in glucose. We have found that the hexokinase from *Schizosaccharomyces pombe* was not inhibited by T6P even at concentrations of 3 mM. The highest internal concentration of T6P that we measured in *Sch. pombe* was 0.75 mM after heat shock. We have isolated the gene *tps1+* from *Sch. pombe* that is homologous to the *TPS1* gene from *S. cerevisiae*. The DNA sequence from *tps1+* predicts a protein of 479 aa with 65% identity with the protein of *S. cerevisiae*. The *tps1+* gene expressed from its own promoter could complement the lack of trehalose-6-P synthase in *S. cerevisiae tps1* mutants. The *TPS1* gene from *S. cerevisiae* could also restore trehalose synthesis in *Sch. pombe tps1* mutants. A chromosomal disruption of the *tps1+* gene in *Sch. pombe* did not have a noticeable effect on the growth in glucose, in contrast with the disruption of *TPS1* in *S. cerevisiae*. However the disruption prevented germination of spores carrying it. The level of an RNA hybridizing with an internal probe of the *tps1+* gene reached a maximum after 20 minutes of heat shock treatment. The results presented support the idea that trehalose-6-P plays a role in the control of glycolysis in *S. cerevisiae* but not in *Sch. pombe* and show that the role of the trehalose pathway is different in the two yeast species.

3. P. Lucero, M. Herweijer & R. Lagunas. 1993. Catabolite inactivation of the yeast maltose transporter is due to proteolysis. FEBS Letters **333**:165-168.

The maltose transport capacity of fermenting *Saccharomyces cerevisiae* rapidly decreases when protein synthesis is impaired. Using polyclonal antibodies against a recombinant maltose transporter-protein we measured the cellular content of the transporter along this inactivation process. Loss of transport capacity was paralleled by a decrease of cross-reacting material which suggest degradation of the transporter. We also show that in ammonium-starved cells the half-life of the maltose transporter is 1.3 h during catabolism of glucose and >15 h during catabolism of ethanol.

4. R. Lagunas & J.C. Dmez-Masa. 1994. Separation and analysis of 44 epimeric UDP-sugars by ion-pair reversed-phase HPLC. Anal. Biochem. **216**:188-194.

A simple and sensitive method for determination of 44-epimeric UDP-sugars using ion-pair reversed-phase HPLC has been developed. The method presents advantages over existing ion-exchange HPLC procedures mainly concerning sensitivity and rapidity of analysis as well as efficiency and stability of the column. It is based on the ability of borate ions to react with *cis*-diols resulting in the formation of UDP-sugar-borate complexes with different charges. Good resolution and rapid separation (5-25 min) of all 44-epimeric UDP-sugars tested was achieved with this method that was suitable for concentrations over 20 pmol. The applicability to biochemical analysis was demonstrated by the quantitative determination of the UDP-2deoxyglucose and UDP-2-deoxygalactose formed in yeast cells upon incubation in the presence of 2-deoxygalactose.

V. School of Biological Sciences, University of East Anglia, Norwich NR4 7TJ, England. Communicated by J.A. Barnett.

Recent publication

1. J A Barnett, R W Payne & D Yarrow. 1994. Yeast Identification PC Program - Version 3. For IBM PC & compatibles with MS/PC-DOS & 512 Kb of free RAM.

Updated and Improved version for 625 species, 36 varieties, based on updated data from their book, Yeasts: Characteristics and Identification, second edition, Cambridge University Press (1990). For use in industry, medical mycology & research, this personal-computer program simplifies the process of identifying yeasts and reduces time-consuming searches through identification keys or descriptions of species. After entering the results of tests and observations into the computer, lists can be obtained of (a) all species with a matching set of characteristics (with probabilities), (b) yeasts with characteristics most nearly matching the entered set, with probabilities and details of the characteristics that differ, (c) further tests necessary to complete the identification. The program can also allow for mistakes in the test-results, display and compare descriptions of species, and select any yeasts with particular characteristics. Results can be either entered from the keyboard or read from a file. Version 3 provides a redesigned interface allowing the use of pop-up menus and the mouse. The data base has also been completely updated, to include 51 new species and to take account of new information available since the book was published. Price about £150 or US$225, depending on method of payment. **Enquiries to:** J.A. Barnett, 36 Le Strange Close, Norwich NR2 3PW, England.

VI. Department of Applied Microbiology, Lund Institute of Technology/Lund University, P.O.Box 124, S-221 00 Lund, Sweden. Communicated by B. Hahn-Hägerdal.

<barbel.hahn-hagerdal@tmb.lth.se>

The following publications have recently been prepared:

1. Carlsen H, Hallborn J, Gorwa M-F, & Hahn-Hägerdal B. 1993. Bioconversion of xylose to xylitol with recombinant *Saccharomyces cerevisiae* harbouring genes for xylose metabolism from *Pichia stipitis.* ECB 6: Proceedings of the 6th European Congress on Biotechnology (Eds Alberghina L, Frontali L, Sensi P), pp 313-316.
2. Meinander N, Hallborn J, Keränen S, Ojamo H, Penttilä M, Walfridsson M, & Hahn-Hägerdal B. 1993. Utilisation of xylose with recombinant *Saccharomyces cerevisiae* harbouring genes for xylose metabolism from *Pichia stipitis.* ECB 6: Proceedings of the 6th European Congress on Biotechnology (Eds Alberghina L, Frontali L, Sensi P), pp. 1143-1146.
3. Buttler T, Gorton L, Jarskog H, Marko-Varga G, Hahn-Hägerdal B, Meinander N & Olsson L. 1994. Monitoring of ethanol during fermentation of a lignocellulose hydrolysate by on-line microdialysis sampling, column liquid chromatography and an alcohol biosensor. Biotechnol Bioeng 44 (in press).
4. Olsson L, Lindén T, & Hahn-Hägerdal B. In press. A rapid chromatographic method for the production of preparative amounts of xylulose. Enzyme Microb Technol.
5. Hahn-Hägerdal B, Jeppsson H, Olsson L, & Mohagheghi A. 1994. An interlaboratory comparison of the performance of ethanol-producing microorganisms in a xylose-rich acid hydrolysate. Appl Microbiol Biotechnol **41**:62-72.
6. Jeppsson H, Alexander N J, & Hahn-Hägerdal B. Cyanide insensitive respiration in the xylose fermenting yeast *Pichia stipitis* CBS 6054. Biosource Technol (accepted for publication).
7. Hahn-Hägerdal B, Jeppsson H, Skoog K, & Prior BA. Biochemistry and physiology of xylose fermenting yeasts. Enzyme Microb Technol (accepted for publication).
8. Dominguez E, Marko-Varga G, Hahn-Hägerdal B, & Gorton L. 1994. Optimization of enzyme ratios in a co-immobilized enzyme reactor for the analysis of D-xylose and D-xylulose in a flow system. Enzyme Microb Technol **16**:216-222.
9. Meinander N, Linko M, Ojamo H, Linko P, & Hahn-Hägerdal B. Fed batch xylitol production with recombinant, XYL-1-expressing *Saccharomyces cerevisiae* using ethanol as a co-substrate. Appl Microbiol Biotechnol (accepted for publication).
10. Olsson L. 1994. Ethanol production from lignocellulosic materials. Fermentation and on-line analysis. PhD Thesis. Lund University.

VII. Centraalbureau voor Schimmelcultures, P.O.Box 273, 3740 Ag Baarn, The Netherlands. Communicated by J.M.J. Uijthof.

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1. De Hoog G.S. 1994. Ecology and pathogenicity of Black Yeasts. Progress report of Chiba University, Japan.
2. De Hoog G.S. & N.A. Yurlova. 1994. Conidiogenesis, nutritional physiology and taxonomy of *Aureobasidium* and *Hormonema*. Antonie van Leeuwenhoek (in press).
3. De Hoog G.S. & G. Haase. 1993. Nutritional physiology and selective isolation of *Exophiala dermatitidis*. Antonie van Leeuwenhoek **64**:17-26
4. De Hoog G.S., K. Takeo, S. Yoshida, E. Göttlich, K. Nishimura & M. Miyaji. 1994. Pleoanamorphic life cycle of the black yeast *Exophiala (Wangiella) dermatitidis*. Antonie van Leeuwenhoek (in press).
5. Uijthof J.M.J., G.S. de Hoog, A.W.A.M. de Cock & K. Takeo. 1994. PCR-based evaluation on differences in pathology of strains of the black yeast *Exophiala (Wangiella) dermatitidis*. Mycoses (in press).

6. De Hoog G.S. & A.H.G. Gerrits van den Ende. 1992. Nutritional pattern and ecophysiology of *Hortaea werneckii*, agent of human tinea nigra. Antonie van Leeuwenhoek **62**:321-329.

7. De Cock A.W.A.M. 1994. Population biology of *Hortaea werneckii* based on restriction patterns of mitochondrial DNA. Antonie van Leeuwenhoek (in press).

8. Uijthof J.M.J., de Cock A.W.A.M., de Hoog G.S., W. Quint & A. van Belkum. 1994. PCR mediated genotyping of *Hortaea werneckii*, causative agent of human tinea nigra. Mycoses (in press).

VIII. Dipartimento di Protezione e Valorizzazione Agroalimentare, Sezione di Chimica e Tecnologia degli Alimenti, Università di Bologna, Via San Giacomo 7, 40126 Bologna, Italy. Communicated by P. Romano and G. Suzzi.

The following papers were recently published or are in press.

1. Romano, P. & Suzzi, G. 1993. Higher alcohol and acetoin production by *Zygosaccharomyces* wine yeasts. J. Appl. Bacteriol. **75**: 541-545.

Seventy strains of *Zygosaccharomyces* isolated from grape musts were investigated for their ability to produce higher alcohols and acetoin in synthetic medium and grape must. The *Zygosaccharomyces* strains produced generally low amounts of higher alcohols. Within this genus, *Z. fermentati* behaved differently from *Z. bailii* producing less isobutanol in synthetic medium and more amyl alcohols and isobutanol in grape must. *Zygosaccharomyces fermentati* did not form detectable amounts of acetoin in any conditions whereas *Z. bailii* produced it both in synthetic medium and in grape must. These strains were found to contribute to aroma and taste of wine.

2. Romano, P., Suzzi, G., Polsinelli M. & Turbanti L. 1993. Effect of glucose concentration on fermentation products by *Saccharomyces cerevisiae.* Proceedings of ISSY 16 "Metabolic Compartmentation in Yeasts", August 23-26, 1993 Arnhem, The Netherlands, pp. 254-256.

The influence of glucose concentration on the formation of secondary products of fermentation by 77 *Saccharomyces cerevisiae* wine yeasts was studied. Glucose addition in Trebbiano must brought about a general increase of acetaldehyde, acetic acid, acetoin, n-propanol and d-amyl alcohol and a general decrease of isobutanol and isoamyl alcohol. Some strains produced amounts of sulphite increased by 2 to 5-fold or by 5 to 15 fold and other ones the same sulfite amount.

3. Suzzi, G., Romano, P. & Vannini, L. 1993. Hydrophobicity of the cell wall in cell-cell interaction of *Saccharomyces cerevisiae.* Proceedings of ISSY 16 "Metabolic Compartmentation in Yeasts", August 23-26, Arnhem, The Netherlands, pp. 272-274.

The cell surface hydrophobicity (CSH) of 20 flocculent and 6 foaming strains of *Saccharomyces* wine yeasts in comparison with 3 strains both non-flocculent and non-foaming was studied. The cells involved in foaming and in flocculation resulted highly hydrophobic, with differing degrees of CSH in the flocculent-ones. Treatment of flocculent and foaming cells with proteases and CSH determination during growth lead us to suppose that CSH is not a determining factor in the flocculation of wine yeasts. Hydrophobicity is related to flocculence but independent from it. In the same way, foaming is not related to flocculence even if CSH of both phenomena involves surface proteins.

4. Zironi, R., Giomo, A., Romano, P. & Suzzi G. 1993. Influence of different treatments of grape juice on growth of selected yeast strain of *Saccharomyces cerevisiae.* Proceedings of 7th European Conference on Food Chemistry, Valencia, September 20-22, Vol.2, pp. 467-472.

An analysis of yeast-must system analyzing the effects of the must treatments on the growth of selected yeast strains during fermentation. We tested 132 *Saccharomyces cerevisiae* in three different must conditions, determining fermentation vigor, wine color stability and formation of some secondary products. Clarification affected yeast growth more drastically than the cold-settle treatment, causing a significant increase in acetic acid produced by all the strains. Some strains induced wine colour stability which is not related to the amount of sulphite produced by yeast strain.

5. Romano, P., Suzzi, G. & Vannini L. 1994. Relationship between foaming and flocculence in *Saccharomyces cerevisiae* wine yeasts. Colloids and Surfaces, in press.

The cell surface hydrophobicity (CSH) was studied in foaming and flocculent strains of *Saccharomyces cerevisiae.* Microbial adhesion to hydrocarbons showed a high CSH both in foaming and flocculent strains. When treated with EDTA the foaming strains responded differently from flocculent ones, with the CSH decreasing in the former and increasing in the latter. The treatment of cells with pronase, proteinase K trypsin and chymotrypsin abolished the CSH activity in all the strains When sugars (glucose, fructose, galactose, mannose) were present, the strain hydrophobicity did not vary the results indicate that foaming and flocculation are independent phenomena.

6. Suzzi, G., Romano, P. & Vannini, L. 1994. Cell surface hydrophobicity and flocculence in *Saccharomyces cerevisiae* wine yeasts. Colloids and Surfaces, in press.

Cell surface hydrophobicity (CSH) of 18 flocculent strains of *Saccharomyces cerevisiae* was studied. The CSH was estimated by hydrophobic microsphere attachment assay (HMA) and by microbial adhesion to hydrocarbons assay (MATH). The MATH showed that all the different flocculent strains were hydrophobic, changing only in the degree of CSH. Conversely, some strains resulted hydrophillic with HMA. Treatment of flocculent cells with proteolytic enzymes caused a dramatic

decrease of CSH in all the strains, changing their affinity from that of hydrocarbons to that of water. Such treatment did not abolished the flocculation ability of several strains. Reversible change of flocculation-dispersion by EDTA caused an increase in CSH. These data led to the conclusion that the character CSH is not always closely related to flocculation ability, demonstrating once more that flocculation is mediated by different mechanisms.

IX. National Collection of Yeast Cultures, AFRC Institute of Food Research, Norwich Laboratory, Norwich Research Park, Colney, Norwich NR4 7UA, United Kingdom. Communicated by I.N. Roberts.

The following are recent papers published by NCYC:

1. James, S.A., Collins, M.D. & Roberts, I.N. 1994. Genetic interrelationship among species of the genus *Zygosaccharomyces* as revealed by small-subunit rRNA gene sequences. Yeast (in press).
2. James, S.A., Collins, M.D. & Roberts, I.N. 1994. The genetic relationship of *Lodderomyces elongisporus* to other ascomycete yeast species as revealed by small-subunit rRNA gene sequences. Lett. Appl. Microbiol. (in press).
3. Bond, C.J. 1993. Cryopreservation of yeasts. In "Methods in Molecular Biology: Cryopreservation and freeze-drying protocols" J.G. Day & M.R. McLellan (Eds) Humana Press, New Jersey.

X. Department of Plant Biology, University of California, Berkeley, California 94720. Communicated by H. Koshinsky.

The following Ph.D. thesis, completed at the University of Saskatchewan, Saskatoon, Saskatchewan under the supervision of Dr. G.G. Khachatourians.

1. H. Koshinsky. The mitochondrion as a primary target of T-2 toxin cytotoxicity: Effects of T-2 toxin on *Saccharomyces cerevisiae* and of trichothecene mixtures on *Kluyveromyces marxianus*.

Trichothecenes are the group of mycotoxins to which humans are most often exposed. Despite years of research, the molecular mechanism of action of the trichothecene, T-2 toxin, and the interaction of this toxin with other trichothecenes have not been fully elucidated. The purposes of this work were to investigate: 1) whether the mitochondrion of *Saccharomyces cerevisiae* is a primary target of T-2 toxin; and 2) the types of interactions that mixtures of trichothecenes have in a *Kluyveromyces marxianus* model system.

To test the hypothesis that T-2 toxin directly inhibits mitochondrial function, the effects of T-2 toxin on various parameters of energy metabolism in *S. cerevisiae* were examined. T-2 toxin inhibited both oxygen consumption and succinate dehydrogenase activity of isolated mitochondria, indicating that the mitochondrion is a primary target of T-2 toxin action. The specific action most likely leads to a perturbation of the mitochondrial inner membrane. A mutant of *S. cerevisiae* was resistant to T-2 toxin due to alterations in the mitochondrion. The mutation causing resistance was named *ttt1* and was mapped to the right arm of chromosome X, 16.6 cM from the centromere. This establishes a second locus responsible for trichothecene resistance in *S. cerevisiae*.

To elucidate the types of interactions occurring between trichothecenes, growth inhibition of *K. marxianus* was examined. Interactions were antagonistic when the percent inhibition was low, and synergistic when the percent inhibition was high. Binary mixtures of trichothecenes containing deoxynivalenol tended to have an antagonistic interaction; those with diacetoxyscirpenol, a synergistic interaction; and all other trichothecene mixtures, a zero interaction. Hidden within these interactions a remarkable pattern was observed. Any two trichothecenes tested were found to have a unique ratio at which the least change occurred in the type and intensity of the interaction. This is the first record of this concept and the ratio was named the **m**aximally **q**uiescent **r**atio (MQR). The MQR should become an important principle for environmental sciences, molecular biology, pharmacology, and toxicology.

XI. Yeast Division of the All-Russian Collection of Microorganisms (BKM, VKM), Institute for Biochemistry and Physiology of Microorganisms, Russian Academy of Sciences, Pushchino, 142292, Russia. Communicated by W.I. Golubev.

1. Kononova, S.V., Tsiomenko, A.B. & Golubev, W.I. 1993. Extracellular glycoprotein specific for *Saccharomyces sensu stricto*. FEMS Microbiol. Lett. **113**:77-80.

Using affinity-purified rabbit polyclonal antibodies against an extracellular mannoprotein (gp400) of *Saccharomyces cerevisiae,* the presence of immunohomologic proteins with similar electrophoretic mobility was shown in the culture medium of *S. bayanus, S. paradoxus,* and *S. pastorianus*. Cross-reactive bands with different electrophoretic behaviour were observed for *S. dairensis, S. exiguus, S. kluyveri, S. unisporus* and also for the species moved from *Saccharomyces* to *Arxiozyma, Kluyvero-myces, Pachytichospora, Torulaspora* and *Zygosaccharomyces,* in contrast to ascosporous yeasts of other genera in which these proteins were not found.

2. Golubev, W.I. 1993. *Rhodosporidium babjevae,* a new heterothallic yeast species (Ustilaginales). System Appl. Microbiol. **16**:445-449.

A description of a new red-pigmented nonballistosporogenous teliospore-forming yeast is given. The yeast does not mate with other species of the genus *Rhodosporidium* and differs from them by teliospore or metabasidium morphology, by physiological properties and by sensitivity to *Rhodotorula mucilaginosa* mycocins (killer toxins). The type strain of *Rhodosporidium babjevae* is VKM (BKM) Y-2275, and the allotype is VKM Y-2276.

3. Golubev, W.I. 1993. Grouping of *Cryptococcus* species and related teleomorphs by sensitivity patterns to mycocins produced by tremellaceous yeasts. Abstr. 2nd Int: Conf. on Cryptococcus and cryptococcosis (Milano, Italy, Sept. 19-23, 1993), pp. 110-111.

4. Golubev, W.I. 1994. Taxonomic characterization of the yeasts used in wood hydrolysate based SCP facilities. Prikladnaya biochimiya i mikrobiologiya **30**:132-136.

Based on their morphological, ultrastructural, physiological and biochemical characteristics the industrial yeast strains used in the production of SCP from wood hydrolysates and labelled as *Hansenula anomala, Trichosporon cutaneum* and *Tr. pullulans* were identified as *Arxula adeninovorans.*

XII. Research Institute for Viticulture and Enology, Matuškova 25, 833 11 Bratislava, Slovakia, Communicated by E. Minárik.

The following papers were recently published or are in press:

1. Minárik, E. & Jungová, O. 1994. Spontaneous acid decomposition in grape wines, Vinohrad **32**:16-17 (in Slovak).

Basic knowledge on spontaneous acid degradation is described and suppositions and outlooks for regulated L-malic acid degradation in grape must and wines by lactic acid bacteria & *Schizosaccharomyces* yeasts.

2. Jungová, O. & Minárik, E. 1994. Further experience with the regulated bacterial acid degradation in wine. Vinohrad **32** (in press; in Slovak).

Top active lyophilized preparations of *Leuconostoc oenos (Viniflora oenos)* show under favourable fermentation conditions deep and quick L-malic acid degradation in wine provided the inoculation of the non-revitalized bacterial culture is added to the wine just after alcoholic fermentation by *Saccharomyces cerevisiae* has stopped and while the wine remains on yeasts. Acid degradation may achieve over 90% of the initial L-malic acid content of the grape must. Not all *Lc. oenos* preparations display the same high activity. Yeast ghost preparations added to the wine prior to acid degradation had only slight stimulative effect in L-malic acid degradation. The selection of suitable strain of *Lc. oenos* as well as favourable fermentation conditions (temperature, pH, S02-content etc.) are of vital importance for an efficient acid degradation.

XIII. Instituto de Microbiologia, CCS, Bloco I, Universidade Federal do Rio de Janeiro, Ilha do Fundão, Rio de Janeiro, 21941, Brasil. Communicated by A.N. Hagler and L.C. Mendonça-Hagler.

The following papers have recently been published or are in press.

1. Hagler, A.N., C.A. Rosa, P.B. Morais, L.C. Mendonça-Hagler, G.M.O. Franco, F.V. Araujo, & C.A. Soares. 1993. Yeasts and coliform bacteria of water accumulated in bromeliads of mangrove and sand dune ecosystems of Southeast Brazil. Can. J. Microbiol. **39**:973-977.

2. Rosa, C.A., P.B. Morais, L.C. Mendonça-Hagler, R. Monteiro & A.N. Hagler. 1993. Yeast communities of the cactus *Pilosocereus arrabidae* and associated insects in the sandy coastal plains of Southeastern Brazil. Antonie van Leeuwenhoek, **65**:55-62.

3. Smalla, K., Cresswell N., Mendonça-Hagler L.C., Wolters A., van Elsas J.D. 1993. Rapid DNA extraction protocol from soil for polymerase chain reaction mediated amplification. J. Appl. Bacteriol. **74**:78-85.

The following Doctoral thesis was recently defended.

4. C.A. Rosa. D.Sc. 1993. Comunidades de leveduras associadas a plantas e insetos em ecossistemas de restinga. 108 + VII pp., Inst. Microbiol. UFRJ.
   This thesis contains data from the following papers noted in the yeast newsletter: Rosa et al. 1992, 1993, Hagler et al 1993, and the following paper submitted for publication:

5. Rosa, C.A., P.B. Morais, S. P. Reis, L.C. Mendonça-Hagler, & A.N. Hagler. 1994. Yeast communities associated with different plant substrates in sandy coastal plains of Southeastern Brazil.

The following undergraduate monographs have recently been defended.

6. J. Abranches, B.Sc. 1991. Leveduras "killer" e produtoras de proteinases extracelular em ecossistemas tropicais. Relatorio e seminario, Dept. Ecologia, Instituto de Biologia UFRJ. 30 pp.

7. P. Valente da Silva, B.Sc. 1993. Caracterização de leveduras atipicas marinhas tropicais dos generos *Candida* e *Pichia.* Monografia Inst. Biologia UFRJ.

8. D. de Souza Pimentel, B.Sc. 1993. Caracterização de leveduras dos generos *Candida, Clavispora, Issatchenkia, Kluyveromyces, Metchnikowia* e *Pichia* isoladas em ambientes aquaticos tropicais. Monografia Dept Biol. Marinha, Inst. Biologia UFRJ.

9. P.M. Barroso Carvalho, B.Sc. 1993. Sobrevivencia "in vitro" de microrganismos indicadores de poluição de patogenicos em agua de ambientes estuarinos. Monografia, Dept. Biologia Marinha, Inst. Biologia UFRJ.

The following communications have been presented in recent Brazilian or international meetings.

10. Naumov, G.I., A.N. Hagler, E.S. Naumova, & E.J. Louis. 1993. Genetic identification of Brazilian *Saccharomyces.* 17th International Cong. of Genetics, Birmingham, U.K.

11. Silva, P.V., D. Pimentel, A.M.K. Costa, M.L.S. Nunez, & A.N. Hagler. 1993. Avaliação de metodos e caracterização de culturas atipicas de leveduras. XVII Cong. Bras. Microbiol., SBM, Santos, SP, B4.027, p. 37

12. Abaranches, J., P.B. Morais, C.A. Rosa, L.C. Mendonça-Hagler, & A.N. Hagler. 1993. Leveduras "Killer" em habitats tropicais. XVII Cong. Bras. Microbiol., SBM, Santos, SP, B4.030, p. 38.

13. Viestel, D.M.A., & L.C. Mendonça-Hagler. 1993. Analeiação de metodos para extração de DNA total de solos tropicais. XVII Cong. Bras. Microbiol., SBM, Santos, SP, B4.055, p. 44.

14. Hagler, A.N. 1993. Biodiversidade de leveduras em ecosistemas brasileiros. XVII Congresso Brasileiro de Microbiologia, SBM, Santos, SP, Biodiversity Mesa Redonda.

15. Mendonça-Hagler, L.C. 1993. Uso de tecnicas moleculars na taxonomia microbiana. XVII Congresso Brasileiro de Microbiologia, SBM, Santos, SP. Palestra.

XIV. Laboratory of Research & Development, Bodegas Castel Pujol, Cesar M. Gutierrez 2556, 12400 Montevideo, Uruguay. Communicated by F. M. Carrau.

The following paper, whose abstract was given in the previous issue, has now appeared.

1. F.M. Carrau, E. Neirotti,[1] & O. Giola. 1993. Stuck wine fermentations: effect of killer/sensitive yeast interactions. J. Ferment. Bioeng. **76**:67-69.

XV. Laboratoire de Biotechnologie de I'Environnement des Industries Agroalimentaires, INRA, Boulevard du Général de Gaulle, 11100 Narbonne, France. Communicated by J.P. Delgenes.

The following are recent papers published by our group.

1. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1992. Biotransformation des lignocelluloses en éthanol: potentialités et limitations. Industries AgroAlimentaires, **7/8**:489-494.

2. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1992. Alcoholic glucose and xylose fermentations by co-culture process: compatibility and typing of associate strains. Can. J. Microbiol. **38**:654-658.

3. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1992. Fermentation of lignocellulosic sugars to ethanol: selection of mutant of *Pichia stipitis* affected for D-glucose utilization. Enz. Microb. Technol. **14**:644-648.

4. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1993. Cofermentation of glucose and xylose to ethanol by a respiratory deficient mutant of *Saccharomyces cerevisiae* co-cultivated with a xylose fermenting yeast. J. Ferment. Bioeng. **75**:207-212.

5. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1993. Effects of culture conditions on the co-fermentation of a glucose and xylose mixture to ethanol by a mutant of *Saccharomyces diastacticus* associated with *Pichia stipitis*. Appl. Microbiol. Biotechnol. **39**:760-763.

6. Laplace J.M., Delgenes J.P., Moletta R., & Navarro J.M. 1993. Ethanol production from glucose and xylose by separated and co-culture processes using high cell density systems. Process Biochem. **28**:519-525.

7. Nolleau V, Preziosi Belloy L, Delgenes J.P., & Navarro J.M. 1993. Xylitol production from xylose by two strains: sugar tolerance. Curr. Microbiol. **27**:191-197.

XVI. Central Food Research Institute, Budapest, 1536 P.O.Box 396, Hungary.

<h6929tot@huella.bitnet>

The following is the abstract of an poster which was accepted for publication recently at the IUMS Congresses '94, Prague, July 3-8.

1. L. Dencso, T.S. El. Din,[1] J. Rezessy-Szab[1] & G. Vereczkey. Investigation of *Saccharomyces cerevisiae ADH I* promoter structure by deletion analysis and study of its regulation *in vivo*
[1]University of Agriculture and Food Industry.

The *ADH I* gene encodes a glycolytic enzyme which converts acetaldehyde to ethanol. To characterize the regulation mechanism of *ADH I* expression in yeast, the complete promoter and its various deleted derivatives was fused to the Lac-Z reporter gene of *E. coli* in a YEp-type plasmid. The transcription activity of different constructions was calculated from the β-galactoside enzyme activity measurements in yeast during growth on fermentable and nonfermentable carbon sources. The analysis of these putative regulatory regions revealed the presence of additional sequences above the well-known UASRPG box and CTTCC pentamer which have to associate with the UASRPG box for maximal transcription activity of the *ADH I* promoter. We also studied the effect of different carbon source concentrations on the expression of the entire promoter for optimization of the high rate fermentation system. The results have indicated that the effect of increasing concentrations on the expression were significant and that the reporter gene was repressed completely by high concentrations of glucose.

XVII. Institute for Molecular Cell Biology, BioCentrum Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands. Communicated by F.M. Klis.

The following paper has been published recently.

1. A.F.J. Ram, A. Wolters, R. ten Hoopen & F.M. Klis. 1994. A new approach for isolating cell wall mutants in *Saccharomyces cerevisiae* by screening for hypersensitivity to Calcofluor White. Yeast (in press).

To study cell wall assembly, a simple screening method was devised for isolating cell wall mutants. Mutagenized cells were screened for hypersensitivity to Calcofluor White, which interferes with cell wall assembly. The rationale is that Calcofluor White amplifies the effect of cell wall mutations. As a result, the cells stop growing at lower concentrations of Calcofluor White than cells with a normal cell wall. In this way, 63 Calcofluor White-hypersensitive *(cwh),* monogenic mutants were obtained, and ordered into 53 complementation groups. The mannose/glucose ratios of the mutant cell walls varied from 0-15 to 3-95, while wild-type cell walls contained about equal amounts of mannose and glucose. This indicates that both low-mannose and low-glucose cell wall mutants had been obtained. Further characterization showed the presence of three low-mannose cell wall mutants with a *mnn9*-like phenotype, affected, however, in different genes. In addition, four new killer-resistant *(kre)* mutants were found, which are presumably affected in the synthesis of ß1,6-glucan. Most low-glucose cell wall mutants were not killer resistant, indicating that they might be defective

in the synthesis of ß1,3-glucan. Eleven *cwh* mutants were found to be hypersensitive to papulacandin B, which is known to interfere with ß1,3-glucan synthesis, and four *cwh* mutants were temperature-sensitive and lysed at the restrictive temperature. Finally, nine *cwh* mutants were hypersensitive to caffeine, suggesting that these were affected in signal transduction related to cell wall assembly.

XVIII. VTT Biotechnology and Food Research, Microbiology, P.O. Box 1504, FIN-02044 VTT, Finland. Communicated by M.-L. Suihko.

<maija-liisa.suihko@vtt.fi>

The Technical Research Centre of Finland (VTT) was reorganized as from January 1, 1994. Instead of 34 laboratories, 9 research units were established. The Biotechnical Laboratory was joined with the Food Research Laboratory. The new unit is called VTT Biotechnology and Food Research and the address is P.O.Box 1500 (Biologinkuja 1, Espoo), FIN-02044 VTT, Finland. The new address of the research area of Microbiology is P.O. Box 1504 (Tietotie 2, Espoo), FIN-02044 VTT, Finland.

The following publications have appeared since my last report.

1. Aalto, M.K., Ronne, H. & Keränen, S. 1993. Yeast syntaxins *Sso1p* and *Sso2p* belong to a family of related membrane proteins that function in vesicular transport. EMBO J. **12**:4095-4104.

2. Kronlöf, J. 1994. Immobilized yeast in continuous fermentation in beer. Ph.D. thesis. VTT Publications 167. Espoo 1994. 96 pp. + app. 47 pp.

3. Linko, M., Suihko, M.-L., Kronlöf, J. & Home, S. 1993. Use of brewer's yeast expressing S-acetolactate decarboxylase in conventional and immobilized fermentations. Techn. Quart., Master Brew. Ass. Amer. **30**:93-97.

4. Saloheimo, A., Henrissat, B. & Penttilä, M. 1993. Small endoglucanase from *Trichoderma reesei,* cloned by expression in yeast. In: Suominen, P. & Reinikainen, T. (eds.) Proc. 2nd Tricel Symp. *Trichoderma reesei* cellulases and other hydrolases, Espoo 1993. Foundation for Biotechnical and Industrial Fermentation Research **8**:139-146.

5. Watari, J., Keränen, S., Nomura, M., Sahara, H. & Koshino, S. 1994. Construction of flocculent brewers' yeast by chromosomal integration of the yeast flocculation gene *FLO1*. J. Inst. Brew. **100**:73-77.

6. Watari, J., Takata, Y., Ogawa, M., Sahara, H., Koshino, S., Onnela, M.-L., Airaksinen, U., Jaatinen, R., Penttilä, M. & Keränen, S. 1994. Molecular cloning and analysis of the yeast flocculation gene *FLO1*. Yeast **10**:211-225.

XIX. Department of General and Marine Microbiology, University of Göteborg, Medicinariegatan 9C, S-413 90, Göteborg Sweden. Communicated by R. Vazquez-Juárez.

<andlid@gmm.gu.se>

The following are summaries of papers recently published.

1. Vazquez-Juarez, R.,[1] , Vargas-Albores, F.,[1] & Ochoa J.L. 1993. A computer program to calculate superoxide dismutase activity in crude extracts. J. Microbial Meth. **17**:239-244.

[1]Centro de Investigaciones Biologicas de Baja California Sur, México.

By virtue of the instability of O_2 (superoxide radical), most of the methods used for measuring superoxide dismutase (SOD) activity are indirect and produce a non-linear response with respect to the amount of SOD enzyme. For this reason a linearization procedure must be used to estimate enzyme activity. A computer program written in Turbo Pascal for IBM-PC or compatibles is presented which simplified calculations. The program applied to methods using different O_2 generation systems (i.e. fluorescent light, xanthine-xanthine oxidase, etc.) or indicating scavengers (cytochrome c or Nitro Blue Tetrazolium). It could also be used for crude extracts or samples at different steps of purification.

2. Vazquez-Juarez R, Ascencio, F., Andlid, T., Gustafsson and Wadström, T. 1993. The expression of potential colonization factors of yeasts isolated from fish during different growth conditions. Can. J. Microbiol. **39**:1135-1141.

Three strains, *Rhodotorula rubra, Rhodotorula glutinis* and *Candida zeylanoides,* isolated from fish, were tested for the expression of putative tissue colonization factors. All strains were able to bind collagen type I, fibronectin and laminin to various degrees after growing the cells on various solid and broth media, while the binding to collagen type IV was sparse under all conditions tested. For the three strains tested, a very low cell surface hydrophobicity was shown, whether grown on different solid or broth media. Mostly, they also expressed a negatively charged surface. Extracellular protease activity using different substrates was shown for all three strains. Furthermore, two properties related to iron scavenging *i.e.* binding of lactoferrin and production of siderophores were also tested. For the three

strains a capacity to bind lactoferrin as well as a capacity to excrete siderophores were demonstrated. Since these different properties have been correlated to virulence and to the capacity of colonization in other organisms, we address the question whether the expression of these properties in yeasts could contribute to the colonization in fish.

3. Vazquez-Juarez R., T. Andlid & L. Gustafsson. 1993. Cell surface hydrophobicity and its relation to adhesion of yeasts isolated from fish gut. Colloids and Surf. B: Interfaces. **2**:199-208.

Five different yeast strains isolated from fish, *Saccharomyces cerevisiae* HF1 and F2, Sc182 (unidentified strain), *Rhodotorula rubra* and *Rhodotorula glutinis,* were used in this study. The cell surface hydrophobicity (CSH) was dependent on growth in all cases. Exponential-phase cells were always hydrophobic while stationary-phase cells became hydrophilic. In contrast, two laboratory strains of *Saccharomyces cerevisiae* Y41 and *Debaryomyces hansenii* J26 behaved in the opposite manner as previously reported for *S. cerevisiae* and *Candida albicans.* This fact together with microscopic observations, prompts the suggestion that the cessation of population growth (budding) leads to hydrophilic cell differentiation. Irrespective of the degree of hydrophobicity of the surface examined, exponential-phase cells did adhere, to a greater extent than stationary-phase cells. These results suggest that hydrophobicity plays an important role *in vivo.* Since hydrophobic interactions have been suggested to be the most important forces mediating attachment in aquatic environment, we do believe that these forces mediate the initial events of fish colonization by yeast strains.

The following are summaries of contributions to be presented in symposia.

4. Vazquez Juarez, R., T. Andlid, & L. Gustafsson. Microcalorimetry as a tool in the study of dynamic surface properties of yeast cells. 9th ISCB Conference. Thermodynamics of Biological processes. Berlin, Germany. 27-31 May, 1994.

This contribution will seek to show some experiences in using flow microcalorimetry in ecological studies of yeast colonizing the intestinal tract of fish. We have previously reported on some yeasts strains isolated from fish which are able to successfully colonize the intestine of Rainbow trout. These strains have been identified as *Rhodotorula rubra, Saccharomyces cerevisiae* F2 and *Debaryomyces hansenii* HF1. In order to get a better understanding of the colonization process we have studied cell surface properties of these strains, since we believe that some colonization factors are related to the cell wall of the cells. We have found that surface properties are dynamic depending on the growth status of the cell culture. Particularly cell surface hydrophobicity (CSH) has been found to vary during the growth process. Exponential-phase cells were always very hydrophobic whereas stationary-phase cells became hydrophillic. This behaviour is the opposite to other yeast strains, such as the pathogen *Candida albicans* or laboratory strains of *Saccharomyces cerevisiae.* We propose a model where hydrophobicity play a central role during the early steps of colonization based on the fact that irrespectively of the degree of the hydrophobicity of different surfaces tested exponential-phase (hydrophobic) cells adhere to a higher extent than stationary-phase (hydrophillic) cells. On the other hand, CSH often induce cell aggregation resulting in serious problems to use standard microbiological techniques, for example to follow growth. For that reason we have found the use of flow microcalorimetry as a very convenient tool which allowed us to show, for example, that cessation of growth controls the onset of surface differentiation. Additionally we have been working with the expression of adhesins in the cell wall of the yeasts strains recognizing specifically components of mucus. Such adhesion might be the mediator of a more stable adhesion. In this context, we have initiated some experiments to investigate if the expression of such adhesin molecules is growth an/or nutrient controlled. Beside adhesion, another property that can be considered as a necessary condition for successful colonization of the fish gut, is the ability to grow using mucus components as the sole source of carbon and energy. Again, by using flow microcalorimetry, we have shown that the three strains tested can grow in mucus without any external source of nutrients. Further experiments are planned to investigate how proteins, lipids and carbohydrates are metabolized by the yeast cells. Due to the limitation of mucus availability, we have been using small scale devices fitted to a flow-through cell in the calorimeter with satisfactory results.

5. T. Andlid, R. Vazquez-Juarez & L. Gustafsson. The use of yeasts in aquaculture. International marine Biotechnology Conference '94. Tromso, Norway, 8-12 Aug, 1994.

We have previously shown that certain yeasts may be isolated from fish. If reintroduced to the fish, these yeasts were able to colonize the intestine in a high number, without visible negative effects on the fish. Since yeasts are successfully used as probiotics in animal farming, our aim was to investigate the potential of these yeasts as probiotics for fish. Important colonization factors previously described and here examined are (i) adhesion to components present in the intestinal mucosa and (ii) ability of growth in mucus as the sole source of nutrients. The fish isolated strains showed strong adhesive properties to isolated intestinal mucus, as well as growth to a high cell concentration in mucus. Phospholipids have been described to serve as adhesion receptors for *E. coli, Salmonella* and *Helicobacter pylori* . Among three phospholipids here tested regarding substrate for adhesion, phosphatidylserine (PS) was demonstrated to be a potential receptor for yeast. The adhesion to PS was for Saccharomyces cerevisiae 7764 higher than to all the other tested substrates and was possible to block by adding serine to the adhesion assay, demonstrating specificity. Threonine (close molecular similarity to serine) did not block the adhesion to phosphatidylserine. As part of the adhesive properties it was found that all fish isolated strains posses a high cell surface hydrophobicity during growth and that the degree of CSH to a large extent correlated to the adhesion to mucus during a batch experiment. The CSH of these yeasts is high in growing culture whereas stationary phase cells express a low CSH. A probiotic microorganism is further useful if it act antagonistically against pathogens. The ability of the yeasts to suppress growth of fish pathogens *(Aeromonas salmonicidae* and *Vibrio angiularum)* was studied. Spent culture medium of *S. cerevisiae*

7764 inhibited growth of *A. salmonicidae.* Production of ethanol and decrease in pH are factors involved in this in vitro inhibition. HF1 and 7764 both produced significant amount of ethanol during growth in intestinal mucus and decreased pH in synthetic media to approximately 5. Furthermore, we have examined the lipid content and fatty acid composition in lipid accumulating *Rhodotorula glutinis* and correlated this to energy content of the yeast biomass. The energy content was the highest reported for any microorganism and the fatty acid composition included a high portion of unsaturated C18 fatty acids. This yeast might be used as feed for fish, rather than bakers yeast which have a far lower lipid content.

XX. Department of Food Science and Technology, University of California, Davis, CA 95616, U.S.A. Communicated by H.J. Phaff.

Recent publications.

1. C.F. Lee,[1] F.L. Lee,[1] W.H. Hsu,[1] & H.J. Phaff. 1994. *Arthroascus fermentans,* a new yeast species isolated from soil in Taiwan. Int. J. Syst. Bacteriol. **44**:303-307.
   [1]Food Industry Research and Development Institute, Hsinchu 300, Taiwan Republic of China

Arthroascus fermentans, a new arthrosporous, fermenting, ascogenous yeast species, is described. The three strains of the species included in this study were isolated from soil samples obtained from different orchards in Taiwan. The species is homothallic, and the major ubiquinone isoprenolog is Q-8. DNA hybridization and DNA base composition data indicate that *A. fermentans* is a species that is distinct from previously described Arthroascus species. The type strain of *A. fermentans* is strain 80D2303, which has been deposited in the Culture Collection and Research Center, Food Industry Research and Development Institute, Hsinchu, Taiwan, as strain CCRC 22530.

2. H.J. Phaff, W.T.Starmer, M.A. Lachance, & P.F. Ganter. 1994. *Candida caseionolytica* sp. nov., a new species of yeast occurring in necrotic tissue of *Opuntia* and *Stenocereus* in the Southwestern United States and Baja California, Mexico. Int. J. Syst. Bacteriol. **44**:000-000.

We describe *Candida caseinolytica,* a new species of yeast, occurring in rotting tissue of opuntia and other cacti in the North American Sonoran Desert and a few other localities. This small-celled, slow-growing yeast does not ferment any sugars and assimilates a limited array of carbon compounds, in particular 2- and 5-keto gluconic acid. It exhibits strong extracellular proteolytic activity on casein at pH 6.5, but gelatin is not hydrolyzed or only weakly by a few strains. The type strain of *C. caseinolytica* is strain UCD-FST 83-438.3 (= ATCC 90546 = CBS 7781).

XXI. Rosenstiel School of Marine and Atmospheric Science, University of Miami, Florida 33149, U.S.A. Communicated by J.W. Fell.

The following paper was published recently.

1. J.W. Fell. 1993. Rapid identification of yeast species using three primers in a polymerase chain reaction. Mol. Marine Biol. Biotechnol. **2**:174-180.

Classic methods for identification of yeasts rely on a variety of morphological and physiological tests that often take days to weeks to complete. We have been able to reduce the time to less than one day through the use of multiple segment-specific oligonucleotide priming of a region of the large subunit rDNA in a polymerase chain reaction. The "hot start" reaction was used with two universal external delimiting primers and one internal species-specific primer. Five specific primers were tested: a primer for a biologically similar group of *Rhodotorula* species, a generic (Cystofilobasidium) primer, and 3 species-specific primers *(Leucosporidium scottii, Cryptococcus muscorum,* and *Rhodotorula mucilaginosa).* In the absence of specific target DNA, the universal rDNA segment is amplified; in the presence of target DNA, the specific primer region is amplified. The technique is accurate within two base position differences when a 24 nucleotide-specific primer is used. The technique should be applicable to other marine eukaryotes.

XXII. Department of Applied Microbiology and Food Science, University of Saskatchewan, Saskatoon, Canada S7N 0W0. Communicated by W.M. Ingledew.

The following papers have been published since our last report.

1. P.M. Chin & W.M. Ingledew. 1993. Effect of recycled laboratory backset on fermentation of wheat mashes. J. Agr. Food Chem. **41**:1158-1163.

Distillers' solubles, soluble components and the liquid obtained after distillation of fermented mash and removal of distillers' grains, are often recycled as "backset" to reduce effluent treatment costs and water usage. In this study, recycling of laboratory distillers' solubles was carried out over five successive fermentations. When 50% backset was used in a 30 gallon mash (30 US. gal per 56 lb bushel, a term used by corn distillers) using wheat as the substrate, yeast growth and ethanol production remained unaffected over five successive fermentations. The final cell yields approximated 9 x 107 yeasts/ml. The alcohol yields ranged from 5.7 to 6.0 % w/v. No undesirable substances accumulated in high enough concentrations to inhibit normal yeast metabolism. In fact, calcium, lactic acid and acetic acid were utilized by the yeasts and removed from the mash. Wheat mashes contained low levels of utilizable free amino nitrogen (FAN). Yeast extract added to the mash stimulated the rate (but not the amount) of alcohol produced. Optimal supplementation allowed a 40% reduction in fermentation time compared to unsupplemented controls. Although yeast extract contains unassimilable substances, no compounds in the backset were found to impede yeast fermentation through four cycles of backsetting at 50%.

2. K.C. Thomas, S.H. Hynes & W.M. Ingledew. 1993. Excretion of proline by *Saccharomyces cerevisiae* during fermentation of arginine-supplemented high gravity wheat mash. J. Indust. Microbiol. **12**:93-98.

The rate of ethanolic fermentation of high gravity wheat mashes by *Saccharomyces cerevisiae* was increased by nitrogen sources such as ammonium sulfate or arginine. This stimulation was mediated through increased proliferation of cells. Large quantities of proline, however, were excreted by the yeast into the medium when arginine was added as a nutrient supplement. The amount of proline excreted was proportional to the concentration of arginine supplied. Other added nitrogen sources such as ammonium sulfate or lysine enhanced the production of proline from arginine and its excretion into the medium. Results show that the stimulation of very high gravity fermentation by arginine is not merely through provision of a source of nitrogen but also because it serves as a precursor for the production of proline, a compound which may play a significant role in alleviating the effects of osmotic stress.

3. S.L. Gares, M.S. Whiting, W.M. Ingledew & B. Ziola. 1993. Detection and identification of *Pectinatus cerevisiiphilus* using surface-reactive monoclonal antibodies in a membrane filter-based fluoroimmunoassay. J. Amer. Soc. Brew. Chemists. **51**:158-163.

Pectinatus cerevisiiphilus causes spoilage of beer "in package" by production of end products with noxious off-flavors. Because this bacterium is strictly anaerobic, it is difficult to detect in beer. Isolation using selective media can take a week or longer and more rapid direct or indirect detection methods have not been successfully applied. Believing that an immunoassay approach would facilitate detection and identification of contamination by *P. cerevisiiphilus,* we developed monoclonal antibodies (MAb) for use in such assays. Three of the five MAb described in this study react with the bacterial flagella. None of the MAb reacted with antigens from *P. frisingensis* or other brewing spoilage bacteria. A pool of the three bacterial surface-reactive MAb was used in a fluoroimmunoassay to detect *P. cerevisiiphilus* trapped on black membrane filters. As few as two to four bacteria were detectable in 10 ml of beer in less than 3 hr. This assay represents a substantial improvement in methodology for detection and identification of low levels of *P. cerevisiiphilus.*

4. K.C. Thomas, S.H. Hynes, A.M. Jones & W.M. Ingledew. 1993. Production of fuel alcohol from wheat by VHG technology. Effect of sugar concentration and fermentation temperature. Appl. Biochem. Biotechnol. **43**:211-226.

Very high gravity (VHG) wheat mashes containing more than 300 g of dissolved solids per liter were prepared and fermented with active dry yeast at 20, 25, 30 and 35°C with and without yeast extract as nutrient supplement. At 20°C, mashes with 38% (w/v) dissolved solids end-fermented without any nutrient supplementation and a maximum ethanol yield of 23.8% (v/v) was obtained. With increasing temperatures the sugar consumption decreased. Addition of yeast extract stimulated the rate of fermentation at all temperatures but did not increase the total amount of sugar consumed. The stimulatory effect of yeast extract on cell multiplication decreased with increasing sugar concentration and virtually no difference in cell number was observed between yeast extract-supplemented and unsupplemented mashes at sugar concentrations above 33% (w/v). The fermentative capacity of the yeast (expressed as maximum specific rate of sugar consumption) remained the same at all sugar concentrations in unsupplemented mashes, but decreased in yeast extract-supplemented mashes at sugar concentrations below 33% (w/v). When the sugar concentration was above 33% sugar (w/v) he fermentative capacity in yeast extract-supplemented mashes was greater than that observed in unsupplemented samples.

5. A.M. Jones & W.M. Ingledew. 1994. Fuel alcohol production: optimization of temperature for efficient very high gravity fermentation. Appl. Environ. Microbiol. **60**:1048-1051.

The time required to end-ferment wheat mash decreased as the temperature was increased from 17 to 33°C, but increased as the concentration of dissolved solids was raised from 14.0 to 36.5 g/1 00 ml. Ethanol yield was not appreciably affected. Over the range of fermentation temperatures tested, the addition of urea accelerated the rate of fermentation, decreased the time required to complete fermentation at all dissolved solids concentrations and stimulated the production of slightly more ethanol than the corresponding unsupplemented control mashes. The optimum temperature for maximum ethanol production in urea-supplemented very high gravity wheat mash was 27°C. These data are important for the industrial assessment of VHG fermentation technology.

6. P.M. Chin and W. M. Ingledew. 1994. Effect of lactic acid bacteria on wheat mash fermentations prepared with laboratory backset. Enz. Microb. Technol. **16**:311-317.

Distillers' solubles, the liquid residue obtained after distillation of fermented mash, are often recycled as backset to partially replace process water and to reduce effluent treatment costs. In this study, wheat mashes were artificially infected with lactic acid bacteria. Successive recycling of laboratory distillers' solubles obtained from contaminated mashes was carried out. Parameters were monitored over five successive fermentations in order to study the increasing effects of backset contamination. Contamination of wheat mash with up to 6 x 10^8 lactic acid bacteria per m I did not seriously impede ethanol productivity of the yeast. The alcohol yields ranged from 55 to 56 g/L even though the accumulation of lactic acid in distillers' solubles contaminated with *L. delbrueckii* reached as high as 14 g/L after five recyclings. Although the gradual buildup of the acid over 5 successive fermentations did result in the loss of as much as 60% of the yeast viability, death of the yeast late in the last two fermentations did not affect yeast fermentative ability or the activity of glucoamylase.

7. W.M. Ingledew. 1993. Chapter 7. Yeasts for Production of Fuel Alcohol. In: The Yeasts Vol. 5. 2nd Edition. Edited by: A.H. Rose and J.S. Harrison. Academic Press.

XXXIII. Escola Superior de Agricultura Luiz de Queiroz, Universidade de São Paulo and Fermentec S/C Ltda, Rua Treze de Maio, 768 - Sala 44, Ed. Sisal Center, 13400-900 Piracicaba-SP, Brasil. Communicated by H.V. Amorim.

The following is a recently defended thesis.

1. Alves, D.M.G. 1994. Factors affecting organic acid formation and other parameters of ethanol fermentation. 211 pp.

The present work was carried out to understand better the action of several factors affecting yeast fermentation, including physical (temperature), chemical (pH, potassium, sulfite, sugar concentration and nitrogen sources) and microbiological (yeast strains, yeast concentration and bacterial contamination) factors. The fermentations were performed in semi-synthetic and molasses media, with yeast recycling (3 to 6), using baker's yeast *Saccharomyces cerevisiae. S. cerevisiae* M-300-A (TA) and *S. cerevisiae (uvarum),* IZ-1904 were also used. The fermentation performance was evaluated by means of ethanol efficiency, glycerol and organic acid formation (succinic, lactic, acetic), biomass, residual sugars, and pH at the end of each fermentation cycle. Yeast trehalose was determined at the beginning and at the end of the last cycle of each experiment, in order to evaluate the stress caused by the factors. The data show that succinic acid is produced mainly by yeast metabolism, whereas lactic acid is a result of bacterial activity, suggesting this acid as a convenient indicator of bacterial contamination. Acetic acid is produced by both yeast and bacteria. It is also clearly evident the relationship between trehalose content and yeast resistance towards stress, explaining why strain IZ-1904 cannot survive recycling at laboratory conditions. Stress causing factors, such as high potassium levels, low pH values, high sugar concentrations, the presence of sulfite, and high temperatures are all detrimental to fermentation, but when one of these factors reduces bacterial activity as well, beneficial effects on fermentation were noted. These observations led to the conclusion that bacterial contamination exerts one of the most harmful effects towards yeast fermentation. The results also show that up to 10% of the metabolised sugar is diverted to glycerol and succinic acid formation. Finally some conclusions on the relationship between the analysed parameters were drawn.

XXIV. AG Hefegenetik, Institut für Pflanzengenetik und Kulturpflanzenforshung, Correnstr. 3, D(0)-4325 Gatersleben, Germany. Communicated by G. Kunze.

Recent publications.

1. Kunze, I., Kunze, G. 1994. Comparative study of morphological characteristics and secretory invertase activities of *Arxula adeninivorans* strains. Microbiology Europe **2/2**:24-28. .

Three *Arxula adeninivorans* strains originating from The Netherlands, three strains isolated in South Africa, and one strain from Siberia were compared with regard to some morphological properties and extracellular invertase activities. Two of the Dutch strains formed the largest colonies and produced mycelium during cultivation. The highest enzyme activity in the culture medium of each strain could be detected after approximately 40 hours of fermentation. The enzyme activity of one of the South African strains reached the highest value of approximately 5 nkat/ml which was two to five fold higher than those of the other strains. The optimum temperature values were the same for strains from the same origin and varied between 60 and 70°C. No distinguishable differences in mobility could be detected among corresponding invertase bands by sodium dodecyl sulphate-polyacrylamide gel electrophoresis and activity staining using 10% polyacrylamide gels of total secretory proteins and invertase.

2. Wartmann, T. 1994. Isolation and characterization of polysomes of *Arxula adeninivorans.* Thesis (Diplomarbeit).

Attempts were made to isolate and characterize the total population of free and membrane-bound polysomes of the yeast species *Arxula adeninivorans.* Free and membrane bound polysomes could be almost completely separated by centrifugation steps at 10,000 x g and repeated washing and recentrifugation at higher speed (27,OOO x g). 1.60-2.00 mg of free and 0.26-0.37 mg of membrane-bound RNA could be extracted from about 10^{10} cells. The quality of the extracted RNA types was checked by Northern analysis and in vitro translation experiments.

3. Lehmann, M. 1994. Characterization of heavy-metal resistance of *Saccharomyces cerevisiae* and *Arxula adeninivorans.* Thesis (Diplomarbeit).

The yeasts *Saccharomyces cerevisiae* and *Arxula adeninivorans* are resistant to heavy-metal ions, which is the result of binding to the protein metallothionein. In vivo labelling experiments using ^{35}S-cysteine and subsequently autoradiography of electrophoretically separated intracellular proteins revealed the existence of proteins with molecular weights lower than 15 kDa in both yeast species. Copper induced two and three cysteine-rich polypeptides in *Saccharomyces cerevisiae* and *Arxula adeninivorans,* respectively.

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

<lachance@julian.uwo.ca>

The following papers are in press

1. M.A. Lachance, P. Nair, & P. Lo. 1994. Mating in the heterothallic haploid yeast *Clavispora opuntiae*, with special reference to mating type imbalances in local populations. Yeast **10**:000-000.

Mating was studied in the haploid, heterothallic yeast *Clavispora opuntiae* to assess the importance of nutritional, genetic, and other factors that may favour mating and recombination. Local populations of this yeast generally exhibit dramatic inequalities in mating type distributions, suggesting that mating is rare in nature even though most isolates mate freely in the laboratory. The absence of assimilable nitrogen is prerequisite to mating competence, presumably by causing G_1 arrest. Maximum mating competence is found in cells entering stationary phase in nitrogen-limited media. Unlike the vast majority of mating yeasts, *C. opuntiae* does not appear to produce diffusible mating factors (sex pheromones), and mating competent cells do not undergo sexual agglutination. Pairwise cell contact appears to be the only signal that triggers the sexual process in this case. In order to determine if mating type imbalances in nature are caused by reduced fertility of "consanguine" crosses, meiotic recombination was measured in pairs of strains that varied in their genetic distances as indicated by restriction mapping. That hypothesis was rejected, as recombination efficiency decreased with increasing genetic distance. We conclude that the rarity of mating in local populations is due to the stringent physical (pairwise cell contact) and nutritional (nitrogen depletion) conditions that will allow mating to proceed. Parallels are drawn with mating patterns observed in *Clavispora lusitaniae.*

2. H.J. Phaff, W.T.Starmer, M.A. Lachance, & P.F. Ganter. 1994. *Candida caseionolytica* sp. nov. a new species of yeast occurring in necrotic tissue of *Opuntia* and *Stenocereus* in the Southwestern United States and Baja California, Mexico. Int. J. Syst. Bacteriol. **44**:000-000 (see abstract under H.J. Phaff's communication).

The following Ph.D. thesis was defended recently. Prof. J.W. Fell, University of Miami, served as external examiner.

3. M. Zhan. 1994. The ribosomal RNA phylogeny of *Kluyveromyces*. Department of Plant Sciences, University of Western Ontario, London, Ontario Canada.

The phylogeny of *Kluyveromyces* was studied by partial sequencing the ribosomal RNA gene. The gene coding for the divergent domain II (D2) of nuclear LSU rRNA was amplified by polymerase chain reaction (PCR) for *Kluyveromyces* and other yeasts. The PCR products were cloned and sequenced. The sequence data were analyzed by the neighbour-joining, Fitch-Margoliash, maximum likelihood, parsimony and compatibility methods of phylogenetic inference. The final conclusions of the analyses were drawn from the consensus of the various phylogenies confirmed to be reliable by bootstrap tests. The genus *Kluyveromyces* is polyphyletic. The species of this genus probably evolved from three distinct ancestries: one for *K. lactis* and its relatives, one for *K. phaffii*, and one for the remaining species. The monophyletic and distinctive nature of the group comprising *K. lactis* and its relatives, as revealed by the rRNA phylogeny, is corroborated by information from other sources. This group represents a separate genus, and its proper genus name is *Zygofabospora* Kudriavzev. *K. phaffii* may be a separate genus or a member of another genus not included in this thesis. The rest of *Kluyveromyces* species share a common ancestry with

Saccharomyces, *Torulaspora*, and *Zygosaccharomyces*. A single genus including all descendants of this ancestry is too heterogeneous. In relation to *Saccharomyces*, *Torulaspora*, and *Zygosaccharomyces*, the monophyletic group consisting of *K. thermotolerans*, *K. waltii*, and *S. kluyeri* is distinct and should be considered to represent another genus. The other species, related to either *Saccharomyces*, *Torulaspora*, or *Zygosaccharomyces*, should be retained in *Kluyveromyces* provisionally. This is because the distinction between *Saccharomyces*, *Torulaspora*, or *Zygosaccharomyces* by themselves is ambiguous, and no other evidence has been found to support the re-classification of these *Kluyveromyces* species into the three genera.

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

A. The following papers have been published or are in press:

1. T. Boekhout & R.W. Bosboom. 1994. Karyotyping of *Malassezia* yeasts: Taxonomic and epidemiological implications. System. & Appl. Microbiol. (in press)

Karyotypes of the medically important yeasts *Malassezia furfur*, *M. pachydermatis* and *M. sympodialis* were studied by pulsed field electrophoresis. *Malassezia pachydermatis* revealed uniform banding patterns. Most strains investigated showed five bands of chromosomal DNA. Within *M. furfur* four different karyotypes occurred. The karyotype of *M. sympodialis* was identical to part of strains currently classified as *M. furfur*. The use of electrophoretic karyotyping in epidemiological investigations of *Malassezia* yeasts is discussed.

2. Z. Hryniewiecka-Szyfter, M.T. Smith & A. Kaznowski. 1994. Infection of baltic *Saduria entomon* (Linnaeus, 1758) (Isopoda, Valvifera) with the yeast *Cryptococcus laurentii* (Kufferath) Skinner. Crustaceana **66**:205-211

Light and electron microscopic and microbiological examination of the infected haemolymph of wild *Saduria entomon* (Linnaeus, 1758) revealed the presence of the yeast *Cryptococcus laurentii* (Kufferath) Skinner, 1947. Phagocytosis of *C. laurentii* by granulocytes was observed. This is the first report about the infection of isopods with yeasts.

3. F. Spaaj, G. Weber & M. Th. Smith. 1993. *Myxozyma vanderwaltii* sp. nov. (Candidaceae), a new yeast species isolated from a flower of *Protea repens* (L.)L. Antonie van Leeuwenhoek **63**:17-21.

Three strains of an undescribed species of the genus *Myxozyma* were recovered. The new species differs from other accepted species of the genus in its assimilation patterns of carbon sources, mol% G+C and low DNA-DNA homology. A description of the new species, *Myxozyma vanderwaltii*, and a key to the species accepted in the genus are given.

B. The following symposium will be a contribution to the Fifth International Mycologicall Congress, August 14-21, 1994, Vancouver, British Columbia, Canada:

4. Systematics of heterobasidiomycetous fungi: an integrated approach I + II. Organizers: T. Boekhout & J.W. Fell[1]
[2]Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL 33149, USA

The aim of this symposium is to discuss current trends in the biology, systematics and phylogeny of Heterobasidiomycetes. presentations with focus on both filamentous and yeast-like growing Heterobasidiomycetes. Topics to be discussed are, general biology, systematics, physiology, biotechnology and killer systems (session 1), and medical aspects and molecular phylogeny (session 2).

C. List of cultures 1994.

The 33rd edition of the list of cultures of the Centraalbureau voor Schimmelcultures is now available for the price of Hfl. 35. Prices do not include postage and handling costs. Orders can be sent to: Centraalbureau voor Schimmelcultures, P.O. Box 273, 3740 AG BAARN, The Netherlands. Telefax +31 (0) 2145-16142; Electronic mail Internet: INFO@CBS.NL

XXVII. All-Russian Scientific-Research Institute for Genetics and Selection of Industrial microorganisms, 1 Dorozhnyi 1, Moscow 113545, Russia. Communicated by G.I. Naumov and E.S. Naumova.

Our present address is: Departamento de Microbiologia, Universidad de Cordoba, Escuela Tecnica Superior de Ingenieros Agronomos, Apartado 3048, 14080 Cordoba, España. Fax: (34 57) 218563. The following papers have been published recently or are in press:

1. G.I. Naumov, E. Naumova & C. Gaillardin. 1993. Genetic and karyotypic identification of wine *Saccharomyces bayanus* yeasts isolated in France and Italy. Syst. Appl. Microbiol. **16**:274-279.
2. G.I. Naumov, E.S. Naumova, E.D. Sancho & M. Korhola. 1993. Taxogenetics of the *Saccharomyces sensu stricto* yeasts from Western and South Africa. Cryptogamie Mycol. **11**:263-270.
3. H. Turakainen, G. Naumov, E. Naumova & M. Korhola. 1993. Physical mapping of the *MEL* gene family in *Saccharomyces cerevisiae.* Curr. Genet. **21**:461-464.
4. G.I. Naumov, A.N. Hagler, E.S. Naumova & E.J. Louis. 1993. Genetic identification of Brazilian *Saccharomyces.* Poster d123. Abstracts Supplement. 17th Intern. Congr. Genetics, 15-21 August 1993, Birmingham, U.K.
5. G.I. Naumov, E.S. Naumova, A.D. Panek & V.G. Debabov. 1993. Phenomenon of trehalose accumulation in wild strains of *Saccharomyces cerevisiae* and *S. paradoxus.* Dokl. Akad. Nauk **332**:105-107 (in Russian).

6. G.I. Naumov, T.A. Nikonenko & V.I. Kondrat'eva. 1994. Taxonomic identification of *Saccharomyces* from yeast genetic stock center of University California. Russian Journal of Genetics **30**:45-48.

7. E.J. Louis, E.S. Naumova, A. Lee, G. Naumov & J.E. Haber. 1994. The chromosome end in yeast: its mosaic nature and influence on recombinational dynamics. Genetics **136**:789-802.

8. G.I. Naumov, E.S. Naumova & C.A. Michels. 1994. Genetic variation of the repeated *MAL* loci in natural populations of *Saccharomyces cerevisiae* and *Saccharomyces paradoxus.* Genetics **136**:803-812.

9. E.S. Naumova, G.I. Naumov, C.A. Michels & V.G. Debabov. 1994. Molecular polymorphism of maltose fermentation in natural strains of *Saccharomyces cerevisiae*. Dokl. Akad. Nauk (in press, in Russian).

10. E. Naumova, G. Naumov & A. Panek. 1994. Polymorphism of trehalose accumulation in sibling species of *Saccharomyces sensu stricto.* Revista Brasiliera de Genetica **16** (in press).

11. G.I. Naumov, E.S. Naumova, C. Gaillardin, H. Turakainen & M. Korhola. 1994. Identification of new chromosomes of *Saccharomyces bayanus* using gene probes from *S. cerevisiae.* Hereditas (in press).

XXVIII. Department of Microbiology and Enzymology, Kluyver Laboratory of Biotechnology, Delft University of Technology, Julianalaan 67, 2628 BC, Delft, The Netherlands. Communicated by W.A. Scheffers.

Publications for 1993

1. van Dijken, J.P., R.A. Weusthuis & J.T. Pronk. Kinetics of growth and sugar consumption in yeasts. Antonie van Leeuwenhoek 63: 343-352.

2. den Dunnen, J.T., P.M. Grootscholten, H.Y. Steensma & G.B. van Ommen. YAC breeding to reconstitute large loci. In: D.L. Nelson & B.H. Brownstein (eds.) YAC libraries, A user's guide. W.H. Freeman & Co. New York. pp. 181-202.

3. Heijnen, J.J. & J.P. van Dijken. Response to comments on 'In search of a thermodynamic description of biomass yields for the chemotrophic growth of microorganisms. Biotechnology and Bioengineering 42: 1127-1130.

4. Heus, J.J., B.J.M. Zonneveld, K.S. Bloom, H.Y. Steensma & J.A. van den Berg. The nucleosome repeat length of *Kluyveromyces lactis* is 16 bp longer than that of *Saccharomyces cerevisiae.* Nucleic Acids Research **21**: 2247-2248.

5. Wenzel, T.J., Luttik, M.A.H., J.A. van den Berg & H.Y. Steensma. Regulation of the *PDA1* gene encoding the E1α subunit of the pyruvate dehydrogenase complex from *Saccharomyces cerevisiae.* European Journal of Biochemistry 218: 405-411.

Publications 1994

6. Pronk JT, Wenzel TJ, Luttik MAH, Klaassen CCM, Scheffers WA, Steensma HY, van Dijken JP. Energetic aspects of glucose metabolism in a pyruvate-dehydrogenase-negative mutant of *Saccharomyces cerevisiae*. *Microbiology* 140: 601-610.

7. Pronk JT, van der Linden-Beuman A, Verduyn C, Scheffers WA, van Dijken JP. Propionate metabolism in *Saccharomyces cerevisiae*: implications for the metabolon hypothesis. *Microbiology* 140: 717-722.

8. Weusthuis RA, Visser W, Pronk JT, Scheffers WA, van Dijken JP. Effects of oxygen limitation on sugar metabolism in yeasts: a continuous-culture study of the Kluyver effect. *Microbiology* 140: 703-715

9. Van den Broek PJA, van Leeuwen CCM, Weusthuis RA, Postma E, van Dijken JP, Karssies RH, Amons R. Identification of the maltose transport protein of *Saccharomyces cerevisiae*. *Biochemical and Biophysical Research Communications* 200: 45-51

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

The following publication was mistakenly reported as having appeared in 1992 in the previous issue of the YNL.

1. O.E. Vuorio, N. Kalkkinen[1] & J. Londesborough. 1993. Cloning of two related genes encoding the 565 kDA and 123 kDA subunits of trehalose synthase from the yeast *Saccharomyces cerevisiae.* Eur. J. Biochem. **216**:849-861.

Recent publications.

2. J. Londesborough & O.E. Vuorio. 1993. Purification of trehalose synthase from baker's yeast Its temperature-dependent activation by fructose 6-phosphate and inhibition by phosphate. Eur. J. Biochem. **216**:841-848.

A trehalose synthase purified from baker's yeast contained 56-kDa, 102-kDa and 123-kDa polypeptides as its main components. The 102-kDa polypeptide was isolated and shown to be a specific trehalose-6-phosphatase. The trehalose-6-phosphate synthase (Tre6P synthase) activator described by Londesborough and Vuorio [(1991) J. Gen. Microbiol. **137**,323-330] was shown to be phosphoglucoisomerase and to function entirely by generating fructose 6-phosphate. Below 35°C fructose 6-phosphate is a powerful activator of the Tre6P synthase activity of intact trehalose synthase especially at physiological phosphate concentration, but does not affect its trehalose-6-phosphatase activity nor the Tre6P synthase activity of truncated trehalose synthase containing truncated versions of the 123-kDa polypeptide. At 50°C, activation by fructose 6-phosphate and inhibition by phosphate are greatly decreased, resulting in an unusually high temperature-dependence for the Tre6P synthase activity at a physiological phosphate concentration (2 mM).

3. G.I. Naumov, E.S. Naumova, E.D. Sancho & M. Korhola. 1993. Taxogenetics of the *Saccharomyces sensu stricto* yeasts from Western and South Africa. Cryptogamie, Mycol. **14**:263-270.

Using genetic hybridization analysis, we reidentified *Saccharomyces sensu stricto* strains isolated from soil in South africa (J.P. van der Walt, 1970) as two biological sibling species *S. cerevisiae* Hansen and *S. paradoxus* Batschunskaia. The latter was found for the first time in Africa. *Saccharomyces* strains isolated from different wines in Western Africa (A. Guillermond, 1914) belong to *S. cerevisiae* and harbor each unique set of sucrose fermenting polymeric *SUC1, SUC2* and *SUC3* genes.

4. H. Turakainen, S. Aho, & M. Korhola. 1993. *MEL* gene polymorphism in the genus *Saccharomyces.* Appl. Environ. Microbiol. **59**:2622-2630.

In Saccharomyces spp. the ability to use melibiose depends on the presence of a *MEL* gene encoding α-galactosidase. We used two cloned *MEL* genes as probes to characterize the physical structure and chromosomal location of the *MEL* genes in several industrial and natural Mel^+ strains of *Saccharomyces cerevisiae, Saccharomyces pastorianus,* and *Saccharomyces bayanus*. Electrokaryotyping showed that all of the *S. pastorianus* strains and most of the *S. bayanus* strains studied had one *MEL* locus. The *MEL* gene in *S. bayanus* strains was similar but not identical to the *S. pastorianus MEL* gene. Mel+ *S. cerevisiae* strains had one to seven loci containing *MEL* sequences. The *MEL* genes of these strains could be divided into two categories on the basis of hybridization to *MELI,* one group exhibiting strong hybridization to *MELI* and the other group exhibiting weak hybridization to *MELI*. In S. *pastorianus* and *S. bayanus* strains, the *MEL* gene was expressed as a single 1.5-kb transcript, and the expression was galactose inducible. In some *S. cerevisiae* strains, the *MEL* genes were expressed even without induction at fairly high levels. Expression was usually further induced by galactose. In two strains, CBS 5378 and CBS 4903, expression of the *MEL* genes was at the same level without induction as it was in most other strains with induction. In all *S. cerevisiae* strains, irrespective of the number of *MEL* genes, mRNA of only one size (1.6 kb) was observed.

5. H. Turakainen, G. Naumov, E. Naumova & M. Korhola. 1993. Physical mapping of the MEL gene family in *Saccharomyces cerevisiae.* Curr. Genet. **24**:461-464.

Nine members, *MEL2-MEL10,* of the *MEL* gene family coding for 224-galactosidase were physically mapped to the ends of the chromosomes by chromosome fragmentation. Genetic mapping of the genes supported the location of all the *MEL* genes in the left arm of their resident chromosomes.

6. A.E.I. Vainio, R. Lantto, E.E.M. Parkkinen & H.T. Torkkeli. 1994. Production of *Hormoconis resinae* glucoaaylase P by a stable industrial strain of *Saccharomyces cerevisiae.* Appl. Microbiol. Biotechnol. **41**:53-57.

A stable strain of *Saccharomyces cerevisiae* secreting glucoamylase (EC 3.2.1.3) with high debranching activity was constructed using recombinant DNA technology. An expression cassette without bacterial sequences, containing *Hormoconis resinae* glucoamylase P cDNA and the dominant selection marker *MELI* was integrated into the yeast chromosome using *ARSI* homology. The glucoamylase expression level of the integrant yeast strain was increased by chemical mutagenesis. The yeast strains secreting glucoamylase were able to grow on soluble starch (5%. w/v) and ferment it to ethanol.

Recent meeting

23rd Annual Conference on Yeasts of the Czech and Slovak Commission for Yeasts, Smolenice, Slovakia, March 2-4, 1994

The yeast researchers from the Czech Republic and the Slovak Republic continue in their long-year tradition of annual meetings in Smolenice as if there would not have been any cleavage of the former Czechoslovak Federal Republic. The 23rd Conference, the second one after the 1993 split, was attended by 76 experts from basic and applied research institutions. None of the participants at the Smolenice Castle felt the international, bilateral, character of the meeting. Czech and Slovak languages are so close that no other third language could ensure better communication. The program was divided into three sessions: i) Extracellular enzymes and other yeast products; ii) Membrane systems of yeasts; iii) Fermentation technology. Twenty-two plenary lectures, devoted to the chosen topics, were complemented with 35 poster presentations. Their titles are listed below.

At a meeting of the Committee of the Czech and Slovak Commission for Yeasts held during the conference it was decided that the 24th Annual Conference on Yeasts will be organized at the Smolenice Castle sometimes in May 1995 and its program will be focused on Yeast Cell Biology, Molecular Biology and Genetics, and Ecology and Biotechnology. It is expected that in future years the Conference will be more open to foreign scientists than it was up to now.

Plenary lectures on extracellular enzymes and other yeast products

V. Vondrejs: Secretion of killer proteins.
K. Demnerová: Extracellular lipases of yeasts
B. Janderová: Production of amylolytic enzymes in yeasts
J. Šandula: Utilization of individual components of yeast cell walls.
J. Šimuth: Antistress proteins - from *Drosophila* through *S. cerevisiae* to *A. mellifera* L.

Plenary lectures on yeast membrane systems

M. Höfer & V. Vacata: Ion channels in yeast plasma membrane: a study with patch clamp technique.
H. Sychrová: Amino acid permeases in yeasts and bacteria.
G. Gille & K. Sigler: Effect of the oxidative stress on yeast plasma membrane.
H. Kurweilová & K. Sigler: K1 killer toxin interaction with sensitive yeast cells.
J. Slavík: Fluorescent methods in the study of yeast cell membranes.
I. Kiššová, E. Kutejová, G. Ďurčová, A. Pudzisová & Š. Kužela: Intramitochondrial proteolysis.
J. Kolarov: Family of mitochondrial translocators in yeasts.
T. Drgoň: Translocation of adenine nucleotides through internal mitochondrial membrane in yeast.
Z. Kossaczká, V. Farkaš, B. Podobová & V. Betina: Effect of cyanein (brefeldin A) on structure and biosynthesis of mannan in *Candida albicans.*
J. Haplová: Isolation and properties of β-1,3-glucan synthase from *Saccharomyces cerevisiae.*
G. Gavurníová & L. Šabová: Transcriptional regulation of genes coding for mitochondrial ADP-ATP translocator in *Saccharomyces cerevisiae.*

Plenary lectures in fermentation technology

J. Čepička, J. Vernerová & H. Čižková: Technological factors controlling the production of sulfur dioxide by brewer's yeasts.
K. Melzoch, M. Rychtera & V. Hábová: The effect of immobilization on properties and behaviour of the yeast *Saccharomyces cerevisiae.*
P. Dostálek, D. Pilarek & G. Basařová: Sorbents of heavy metal ions produced from waste biomass.
F. Malík, W. Vollek & S. Krásny: Selected yeasts in the process of sparkling wine production.
D. Šmogrovičová & E. Šturdík: Development of new strains of brewers yeast.
R. Zeman & F. Adamek: Biosynthesis of phenylacetylcarbinol in yeast.

Posters exhibited at the conference

D. Lacková, Y. Gbelská, E. Kaclíková & J. Šubík: Supression of the amber mutation *ogd1* in the yeast *Saccharomyces cerevisiae* by an increased dose of the gene for glutamine tRNA.
G. Georghiou & A. Kotyk: Acidification in the yeast *Saccharomyces cerevisiae* grown on various substrates.
M. Janitor & J. Šubík of nucleus with mitochondria in the yeast *Saccharomyces cerevisiae.*
V. Krivianský, M. Obernauerová, V. Šimanek & J. Šubik: Hereditary changes in biogenesis of mitochondrial membranes induced by the alkaloid chelerytrine.
A. Matějčková: Kinetic properties of a lysin transporter coded by genes on multicopy plasmids.
J. Šubík, T. Delaveau & C. Jacq: Molecular cloning of the gene PDR3 determining the transport properties of the yeast plasma membrane.
A. Bronišová & J. Šandula: Mannan and glucomannan from the cell walls of *Candida lambica.*
M. Fišera, M. Rosenberg & Z. Hladký: Possibilities of determination of biogenic elements in yeasts by methods of atomic spectrometry.
T. Ruml, M. Kliková, D. Bedwell & E. Hunter: Formation of retroviral capsids in yeasts.
J. Kohút, M. Zavřelová, S. Hunčiková & S. Matisová: Production of biologically active compounds from yeast biomass.
Z. Kossaczká, J. Domer & J. Šandula: Mannooligosaccharides isolated from mannan of *C. albicans* exhibit immunosuppressive activity.
E. Machová & J. Šandula: Lytic enzymes from *Aspergillus niger* and their effect on glucan-chitin complex from *A. niger* mycelium.
P. Biely, L. Kremnický, E. Sláviková & D. Mislovičová: Production of extracellular mannanolytic enzymes by yeasts and yeast-like microorganisms.
A. Tomšíková & J. Kotyza: Virulence factors of *Candida albicans.*
B. Janderová, Z. Galková, K. Peterková, G. Svoboda, V. Vondrejs, S. Zadražil, T. Zeman, Z. Zemanová & B. Zikánová: Secretion of calf chymozine by various mutants of *S. cerevisiae* and other yeast species.
L. Valášek & V. Vondrejs: Comparison of various modifications of the rhodamine test with respect to the sensitivity of the detection of zymocine effects on various strains of *Saccharomyces cerevisiae*.
L. Valašek & V. Vondrejs: Comparison of the effect of zymocine K1 on protoplasts and cells of various yeast species.
Y. Storchová & V. Vondrejs: Can the yeast *Saccharomyces cerevisiae* utilize lactose as a carbon and energy source?
M. Briššová, J. Augustin & W. Vollek: Immobilization of yeasts on solid surfaces as a monolayer.
D. Müncnerová & J. Augustin: Biotransformation and biodegradation of nitrosubstituted aromatic compounds in yeasts.

G. Handriková, V. Báleš & V. Štefuca: Immobilization of *Saccharomyces cerevisiae* into alginate and pectate gels.

M. Lamačka, J. Šajbidor, E. Breierová & J. Grego: Effect of stress on composition of yeast lipid fraction.

D. Müncnerová & J. Augustin: Effect of the growth medium composition on the kinetics of benzoate assimilation by yeasts.

V. Sidorová, M. Obernauerová, Z. Gbelska & J. Šubík: Industrial production of yeast with hybrid strain of baker's yeast.

M. Tomáška, M. Stredanský, E. Šturdik & P. Gemeiner: Whole-cell preparations of β-galactosidase of *Kluyveromyces species.*

M. Rosenberg & P. Magdolen: Possibilities of application of yeast in the production of rare saccharides.

R. Vadkertiová & E. Sláviková: Yeasts isolated from soil and sediments of the Jakubov lake.

E. Breierová & J. Šajbidor: Effect of salt stress on the production of extracellular glycoproteins and cellular lipids during growth of the species *Dipodascus australiensis*.

B. Košiková & E. Sláviková: Production of biomass of some yeasts in the presence of lignin preparations modified by oxidation.

V. Vlčková & M. Slaninová: Examination of the potential genetic risk of local anaesthetics on *Saccharomyces cerevisiae* D7.

M. Slaninová, J. Brozmanová, E. Farkašová, J. Duraj, M. Chovánec & V. Vlcková: Expression of the *E. coli recA* gene in reparation-deficient mutants of *Saccharomyces cerevisiae*.

J. Brozmanová, M. Slaninová, E. Farkašová, V. Vlčková & J.A. Henriques: Comparison of the expression of the *E. coli ada* gene in haploid and diploid *pso4-1* mutants of *Saccharomyces cerevisiae.*

A. Ebringerová, E. Sláviková, E. Machová, Z. Hromádková & M. Antal: Degradation of cationized heteroxylans by yeast microorganisms.

M. Havelková, I. Hönes, K. Augsten, E. Unger & G. Svoboda: Inhibition of microtubules and membrane structures.

Peter Biely, Chair <chempbsa@savba.savba.sk>
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Slovak Academy of Sciences
84238 Bratislava, Slovakia

Forthcoming meetings

Seventh International Congress of Bacteriology and Applied Microbiology Division & Seventh International Congress of Mycology Division of IUMS. July 3-8, 1994, Prague

The 7th International Congress of the Bacteriology and Applied Microbiology Division and the 7th International Congress of the Mycology Division of the International Union of Microbiological Societies will be held in Prague, Czech Republic, July 3 to 8, 1994. **To receive additional information including the 2nd circular, contact:**

Secretariat, IUMS Congresses '94
Institute of Microbiology, Vídeňská 1083
CS-142 20 Prague 4, Czech Republic Tel./Fax. (+42 2) 471 32 21

Fifth International Mycological Congress, August 14-21, 1994, Vancouver, B.C. Canada

The Fifth International Mycological Congress (IMC 5) will be held on the campus of the University of British Columbia (UBC), Vancouver, British Columbia, Canada, August 14 through August 21, 1994. **For information, contact:**

IMC5 Congress Secretariat,
c/o Venue West Conference Services
645 - 375 Water Street Telephone: (604) 681-5226
Vancouver, B.C., Canada V6B 5C6 FacSimile: (604) 681-2503

1994 Yeast Genetics and Molecular Biology Meeting, University of Washington, Seattle, Oregon, USA, August 16-21, 1994

All members of the Yeast community are invited to the 1994 Yeast Genetics and Molecular Biology Meeting that will be held at the University of Washington, Seattle. The meeting will be held from Tuesday, August 16 through Sunday, August 21. session. The last platform session will be on Sunday morning.

The University of Washington is located in Seattle on the shore of Lake Washington. The Husky Union Building (HUB) where the meeting will be held is situated in the center of campus. **For further information, contact:**

The Genetics Society of America Administrative Office
9650 Rockville Pike, Bethesda, Maryland 20814-3998

Telephone: (301)571-1825
Fax: (301)530-7079

Second International Congress on Vitamins and Biofactors in Life Science (ICVB), February 16-19, 1995, San Diego, California

A principal aim of this Congress is to encourage transfer of basic information concerning the chemistry, biochemistry, and function of vitamins and biofactors to health-oriented professionals and clinicians. The co-organizers, B. Babior and F.C. Stadtman, are arranging a scientific program covering the following topics: Biological oxidants and antioxidants; Lipoprotein oxidation and atherogenesis; Copper oxidases and their cofactors (PRR and TOPA); Iron responsive elements and iron-sulfur proteins; Oxygen radicals in phagocytosis; Nitric oxide; Prostaglandin D2 and sleep; Enzyme mechanisms involving radical intermediates; Vitamin B12; Vitamin D functions; Retinoic acid responsive transcription elements; Vitamin K dependent carboxylations; Vitamin C; Mammalian selenoproteins. **To receive additional information and the 2nd circular contact:**

Susan J. Buntjer, C.M.P., Conference Coordinator
The Scripps Research Institute
10666 North Torrey Pines Road
La Jolla, CA 92037, USA

Fax: (619)554-6310

Seventeenth International Conference on Yeast Genetics and Molecular Biology, June 10-16, 1995, Lisbon, Portugal

Provisional outline of the scientific program: Nuclear dynamics. Regulation of gene expression. Post-transcriptional processes. Signal transduction pathways. Membrane transport. Metabolic regulation. Yeast in biotechnology. Satellite symposium: it is planned to hold a satellite Workshop on Yeast Genome Sequencing after the Conference. The conference Centre is a modern building, overlooking the river Tagus in a famous area of the city of Lisbon, in the Junqueira/Belem-Jerónimos Monastery, historical quarter. The registration fee includes participation in all scientific sessions, congress documentation, free buffet lunches and dinner, tea/coffee between sessions and official social program. Special fees for students will be considered. Hotels of different categories have been reserved. Lisbon has frequent flight connections with all major cities. **Contact**:

Dr. Claudina Rodrigues Pousada, XVII CYGMB
Laboratorio de Genetica Molecular
Instituto Gulbenkian de Ciencia
Ap. 14 - 2781 Oeiras Codex, Portugal

Fax: 351 1 443 16 31

17th ISSY. Yeast Growth and Differentiation: Biotechnological, Biochemical, and Genetic Aspects. 27 August - 1st September 1995, Heriot-Watt University, Edinburgh, Scotland

Topics: Physiology and technology of aerobic and anaerobic growth. Growth on non-carbohydrate substrates. Product formation. Growth of genetically modified yeasts. Dimorphism. Cell wall formation. Autolysis. **For further information, contact:**

Prof. D.R. Berry
Department of Bioscience and Biotechnology
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Scotland, U.K.

Tel. 041 552 4400 ext 2092
Fax. 041 552 6524

Dr. Colin Slaughter
Department of Biological Sciences
Heriot-Watt University
Riccarton, Edinburgh EH14 4AS
Scotland, U.K.

Tel. 031 449 5111 ext 3465
Fax. 031 451 3009

6th International Symposium on the Microbiology of Aerial Plant Surfaces, 11-15 September 1995, Island of Bendor, Bandol, France

Since 1970 scientists from diverse disciplines have met every five years to discuss issues related to the biology and ecology of microorganisms associated with aerial surfaces of plants. These symposia have helped advance our understanding of a habitat that harbors plant pathogens as well as microorganisms beneficial for plant health. Furthermore, this tremendously complex habitat harbors microorganisms that may influence global weather, that have an impact on food technology, and that may be noxious to animals or a part of their normal intestinal flora. The Symposium in 1995 will strive to bring together researchers in the areas of microbiology, plant pathology, physiology, biochemistry, ecology, micrometeorology, microscopy, statistics, food science and genetics. It will provide a forum to explore recent research on the nature of the environment at plant surfaces, biotic and abiotic factors that influence colonization of plant surfaces by microorganisms, the response of plants to microorganisms associated with their aerial surfaces, and the impact of these microorganisms on agricultural practices and food quality. The major topics will include: the physical and chemical environment of aerial plant surfaces; interactions between microbial epiphytes and plants; interactions among microorganisms in epiphytic communities; quantification and prediction of spatial and temporal dynamics of epiphytic microorganisms; the impact of epiphytic microorganisms on agricultural practices and food quality. The Symposium will be held on the magnificent Island of Bendor, in the Mediterranean Sea just off the coast of Bandol, France. This island is a 5-minute ferry ride from the city of Bandol and is equipped with an auditorium and several hotels with multiple conference rooms and diverse recreational facilities. The site, which is readily accessible through domestic and international means of transportation, was chosen for its ambiance. It will be extremely conducive to informal discussion among participants during leisure time. The date of the conference, 11 - 15 September 1995, was chosen to avoid the high tourist season on the French Riviera while maximizing the probability of excellent weather. **For additional information please contact:**

Cindy E. Morris
INRA - Station de Pathologie Végétale
B.P. 94
84143 Montfavet Cedex, France

Phone: (33)-90-31-63-84
Fax: (33)-90-31-63-35
E-mail: <cornic@jouy.inra.fr>
Telex: INRAAVI 432.870 F

10th International Biotechnology Symposium, August 25-30, 1996, Sydney, Australia

In recognition of biotechnology's growth and its impact on the country, the Australian Biotechnology Association is proud to be hosting the 10th International Biotechnology Symposium in Sydney between August 25-30, 1996. The Symposium will be held right in the heart of Sydney at the Sydney Convention and Exhibition Centre, Darling Harbour. Not only will it be a showcase for Australian biotechnology but also your opportunity to come and see the industry firsthand. Professor Peter Gray is Chairman of the Organising Committee. **To join the mailing list for the Symposium, contact:**

Australian Biotechnology Association,
PO Box 4, Gardenvale Victoria 3185,
Australia.

Telephone: 61 3 596 8879
Facsimile: 61 3 596 8874

Ninth International Symposium on Yeasts 1996

As decided by the Commissioners of the ICY at their meeting during the 8th International Symposium on Yeasts, Atlanta, the 9th International Symposium on Yeasts will be held in Sydney, Australia, 1996 in conjunction with the International Biotechnology Congress. Planning of the meeting is in progress.

Contact:

Prof. Graham Fleet
Department of Food Science and Technology
University of New South Wales
P.0. Box 1, Kensington NSW 2033, Australia.

Brief News Item

Change of address: Graham G. Stewart

Since May 1st 1994, I have been in the process of moving to Heriot-Watt University to become Director and Professor of the International Centre for Brewing and Distilling in the Department of Biological Sciences. I expect the move to be completely effective towards the end of the summer.

Prof. Graham G. Stewart, Director
International Centre for Brewing and Distilling
Department of Biological Sciences
Heriot-Watt University — Tel. (44)031-449-5111
Riccarton, Edinburgh EH14 4AS, Scotland — Fax. (44)031-451-3009

Publications of interest

Brew Info Monthly Industry Review and Brew Info Database

Brew Info Monthly Industry Review

A monthly publication which contains the most recent published references on brewing and related topics.

Subscription for one year (12 issues) . . . . . NLG 400.
ditto, for each supplementary copy . . . . . NLG 225.

Brew Info Database

A subscription to the above publication BREW INFO MONTHLY INDUSTRY REVIEW enables you to obtain a login and password for the BREW INFO DATABASE.

The BREW INFO DATABASE is the only major database in the world providing specific information for the brewing industry. It has been developed through collaboration between the European Brewery Convention (EBC) and the Brewing Research Foundation International (BRFI).

Databases currently available to EBC subscribers are:

BREW, in which at present almost 50.000 bibliographic references are stored from 1969 to date. One third of the entries have an abstract. These abstracts eliminate to a great extent the need to refer back to the original source material and help the user by providing the specific data required on-line. Approximately 200 new references can be added monthly.

MEET, providing up-to-date details of conferences and meetings relevant to the alcoholic beverage industries.

EBCM, in which all EBC Recommended Methods of Analysis are stored. It contains at present 164 methods for chemical and physical analysis.

The Brew Info Database is available on-line 24 hours a day, all year round.

Online access to Database, rate per hour . . . . . NLG 170.

For further information and subscriptions please contact:

Secretariat General of EBC.
P.O. Box 510
NL-2380 BB Zoeterwoude
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