

Yeast

A Newsletter for Persons Interested in Yeast

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Editorials

Robert Bandoni 1926-2009

I regret to announce the passing of our colleague Dr. Robert J. Bandoni, May 18, 2009, at the age of 82, after suffering from a stroke. An obituary has been written by Dr. Yasuyuki Hiratsuka (2010 *Mycoscience* 51:88–89). Bob was liked by all who knew him. His contributions to mycology were many and included mushroom field guides and as well as advances in the systematics of basidiomycetous yeasts, in particular the genus *Tremella*.

GenBank anomalies

At a time when the headlines assure us that Neanderthals introgressed with human populations throughout Eurasia, the problem of contaminating DNA in whole-genome sequences is becoming more and more significant. In the December 2009 issue (p. 30), I offered a few examples of cases where yeast sequences seem to have found their way into those of other organisms. These apparently are not isolated incidents. Dr. Álvaro Fonseca brought to my attention yet another example, when a large rDNA sequence of *Candida dubliniensis* turned up in the genome of a blood fluke. Readers who encounter such anomalies are encouraged to communicate them to me so that they can be compiled and offered to a broader readership.

MA Lachance, Editor

I CBS Fungal Biodiversity Centre, Department of Yeast and Basidiomycete Research, Uppsalalaan 8, NL-3584CT Utrecht, The Netherlands. Communicated by Ferry Hagen <f.hagen@cbs.knaw.nl>.

Recent publications.

- 1 Wuczowski M, Passoth V, Turchetti B, Andersson AC, Olstorpe M, Laitila A, Theelen B, van Broock M, Buzzini P, Prillinger H, Sterflinger K, Schnürer J, Boekhout T, Libkind D In press Description of *Holtermanniella takashimae* sp. nov., *Holtermanniella* gen. nov. and proposal of the order Holtermanniales to accommodate Tremellomycetous yeasts of the Holtermannia clade. Int J Syst Evol Microbiol. Epub (PMID: 20382789).
- 2 Wang QM, Bai FY, Fungsin B, Boekhout T, Nakase T In press Proposal of *Mingxiaea* gen. nov. for the anamorphic basidiomycetous yeast species in the *Bulleribasidium* clade (Tremellales) based on molecular phylogenetic analysis and description of four novel *Mingxiaea* species. Int J Syst Evol Microbiol. Epub (PMID: 20139282).
- 3 Khan ZU, Ahmad S, Hagen F, Fell JW, Kowshik T, Chandy R, Boekhout T 2010 *Cryptococcus randhawai* sp. nov., a novel anamorphic basidiomycetous yeast isolated from tree trunk hollow of *Ficus religiosa* (peepal tree) from New Delhi, India. Antonie van Leeuwenhoek. **97**:253-9 (PMID: 20091225).
- 4 Thomas-Hall SR, Turchetti B, Buzzini P, Branda E, Boekhout T, Theelen B, Watson K 2010 Cold-adapted yeasts from Antarctica and the Italian Alps-description of three novel species: *Mrakia robertii* sp. nov., *Mrakia blollopis* sp. nov. and *Mrakiella niccombsii* sp. nov. Extremophiles. **14**:47-59 (PMID: 19898737).

Cryptococcus research papers.

- 5 Hagen F and Boekhout T In press The Search for the Natural Habitat of *Cryptococcus gattii*. Mycopathologia Epub (PMID: 20414730).
- 6 Guinea J, Hagen F, Peláez T, Boekhout T, Tahoune H, Torres-Narbona M, Bouza E In press Antifungal susceptibility, serotyping, and genotyping of clinical *Cryptococcus neoformans* isolates collected during 18 years in a single institution in Madrid, Spain. Med Mycol. Epub (PMID: 20297948).
- 7 Illnait-Zaragozi MT, Martínez-Machín GF, Fernández-Andreu CM, Boekhout T, Meis JF, Klaassen CH 2010 Microsatellite typing of clinical and environmental *Cryptococcus neoformans* var. *grubii* isolates from Cuba shows multiple genetic lineages. PLoS One **5**:e9124 (PMID: 20161737)
- 8 De Jong MA, Vriend LE, Theelen B, Taylor ME, Fluittsma D, Boekhout T, Geijtenbeek TB 2010 C-type lectin Langerin is a beta-glucan receptor on human Langerhans cells that recognizes opportunistic and pathogenic fungi. Mol Immunol **47**:1216-1225 (PMID: 20097424).

Malassezia research papers.

- 9 Aspíroz C, Gilaberte Y, Rezusta A, Boekhout T, Rubio MA 2010 Gentamycin inhibits the growth of *Malassezia pachydermatis* in culture. Rev Iberoam Micol **27**:20-21 (PMID: 20149702).

Book published.

- 10 Boekhout T, E Guého P. Mayser & A Velegraki, eds 2010 *Malassezia* and the Skin. Science and Clinical Practice, Springer, Heidelberg, 319 pp.

The genus *Malassezia* currently comprises 13 species of lipophilic yeasts. Although these species belong to the resident flora of human and animal skin are also associated with common skin diseases that adversely affect the quality of life and may

impose a financial burden for patients. The book is the first comprehensive overview on these very unusual yeasts. It has been written by a group of experts who are also members of a recently established working group on *Malassezia* within the

International Society of Human and Animal Mycology (ISHAM). All relevant aspects of the genus *Malassezia* and its 13 species are covered in detail within 11 chapters. The first chapter reviews the long controversial history of this genus, while the second describes all mycological characteristics of the 13 species, including media and techniques adapted to their isolation, description and maintenance. Subsequent chapters methodically address issues as the effect of *Malassezia* yeasts on human and animal health, and the current therapeutic approaches for *Malassezia* induced or exacerbated diseases. The last chapter provides a summary of data to be presented on a website that will be regularly updated, thus, incorporating latest findings. Microbiologists, mycologists, dermatologists, and veterinarians will find this book a useful and up-to-date source of information.

Contents

Preface: Roderick J Hay.

Chapter 1. Introduction, *Malassezia* yeasts from a historical perspective. Roderick J Hay and Gillian Midgley

Chapter 2. Biodiversity, phylogeny and ultrastructure. Eveline Guého-Kellermann, Teun Boekhout and Dominik Begerow

Chapter 3. Epidemiology of *Malassezia*-related skin diseases. Takashi Sugita, Teun Boekhout, Aristeia Velegraki, Jacques Guillot, Suzana Hadina and F Javier Cabañes

Chapter 4. Physiology and biochemistry. Peter Mayser and George Gaitanis

Chapter 5. *Malassezia* species and immunity: host-pathogen interactions. H. Ruth Ashbee and Ross Bond

Chapter 6. Pityriasis versicolor and other *Malassezia* skin diseases. Vicente Crespo Erchiga and Roderick Hay

Chapter 7. *Malassezia* yeasts in seborrhoeic and atopic eczemas. George Gaitanis, Peter Mayser, Annika Scheynius and Reto Cramer

Chapter 8. *Malassezia* fungemia, antifungal susceptibility testing and epidemiology of nosocomial infections. Athanasios Tragiannidis, Andreas Groll, Aristeia Velegraki and Teun Boekhout

Chapter 9. Genomics and pathophysiology: dandruff as a paradigm. Jun Xu, Teun Boekhout, Yvonne DeAngelis, Tom Dawson and Charlie W. Saunders

Chapter 10. *Malassezia* yeasts in animal diseases. Ross Bond, Jacques Guillot and F Javier Cabañes

Chapter 11. *Malassezia* database. Vincent Robert and Aristeia Velegraki

II School of Biological Sciences, University of East Anglia, Norwich NR4 7TJ, England. Communicated by J.A. Barnett <j.barnett@uea.ac.uk>.

Current publication.

- 1 Barnett JA 2010 A history of research on yeasts 14: medical yeasts part 2, *Cryptococcus neoformans*. Yeast (in the press).

III Departamento de Microbiologia, ICB, C.P. 486, Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, 31270-901, Brazil. Communicated by C.A. Rosa <carlrosa@icb.ufmg.br>.

The following papers have been recently published.

- 1 Brandão LR, Medeiros AO, Duarte MC, Barbosa AC, Rosa CA 2010 Diversity and antifungal susceptibility of yeasts isolated by multiple-tube fermentation from three freshwater lakes in Brazil. J Water Health 8:279-289.

The diversity and antifungal resistance of yeasts able to grow at 37°C and the occurrence of bacterial indicators of water quality were studied in three lakes in Southeastern Brazil. The densities of yeasts, *Escherichia coli*, *Enterococcus* spp. and *Pseudomonas aeruginosa* were determined by the multiple-tube fermentation technique, and counts of heterotrophic bacteria were determined using the pour plate method. The yeasts were identified using physiological and molecular techniques and their resistance to amphotericin B, itraconazole and fluconazole was tested. Yeast occurrence was significantly correlated only with the density of fecal coliforms. *Candida krusei*, *C. guilliermondii* and

C. tropicalis, the most frequently isolated yeast species, are associated with fecal contamination of water by warm-blooded animals. Yeast isolates were most resistant to amphotericin B (21.7%), followed by itraconazole (20%) and then fluconazole (2.8%). In addition to tests for the fecal coliform group, the density of yeasts grown at 37°C could be used as a complementary microbial indicator that aquatic environments contain organic matter of human origin. The incidence of yeast species resistant to three antifungal drugs shows that these microorganisms could pose a health risk to the people who use these lakes for recreation.

- 2 Pimenta RS, Silva JFM, Coelho CM, Morais PB, Rosa CA, Correa Jr A 2010 Integrated control of *Penicillium digitatum* by the predacious yeast *Saccharomycopsis crataegensis* and sodium bicarbonate on oranges. *Braz J Microbiol* **41**:404-410.

Our investigation of integrated biological control (IBC) started with an assay testing activity of the predacious yeast *Saccharomycopsis crataegensis* UFMG-DC19.2 against *Penicillium digitatum* LCP 4354, a very aggressive fungus that causes postharvest decay in oranges. Under unfavourable environmental conditions, the yeast showed a high potential for control (39.9% disease severity reduction) of this fungus. This result was decisive for the next step, in which *S. crataegensis* was tested in association with sodium bicarbonate salt, a generally regarded as safe (GRAS) substance. The yeast was able

to survive at different concentrations of the salt (1%, 2% and 5%), and continued to grow for a week at the wound site, remaining viable at high population for 14 days on the fruit surface. The yeast alone reduced the severity of decay by 41.7% and sodium bicarbonate alone reduced severity of decay by 19.8%, whereas the application of both led to a delay in the development of symptoms from 2 to 10 days. Ingredients of the formulations were not aggressive to fruits since no lesions were produced in control experiments.

- 3 Loque CP, Medeiros AO, Pellizzari FM, Oliveira EC, Rosa CA, Rosa LH 2010 Fungal community associated with marine macroalgae from Antarctica. *Polar Biol* **33**:641-648.

Filamentous fungi and yeasts associated with the marine algae *Adenocystis utricularis*, *Desmarestia anceps*, and *Palmaria decipiens* from Antarctica were studied. A total of 75 fungal isolates, represented by 27 filamentous fungi and 48 yeasts, were isolated from the three algal species and identified by morphological, physiological, and sequence analyses of the internal transcribed spacer region and D1/D2 variable domains of the large-subunit rRNA gene. The filamentous fungi and yeasts obtained were identified as belonging to the genera *Geomyces*, *Antarctomyces*, *Oidiodendron*, *Penicillium*,

Phaeosphaeria, *Aureobasidium*, *Cryptococcus*, *Leucosporidium*, *Metschnikowia*, and *Rhodotorula*. The prevalent species were the filamentous fungus *Geomyces pannorum* and the yeast *Metschnikowia australis*. Two fungal species isolated in our study, *Antarctomyces psychrotrophicus* and *M. australis*, are endemic to Antarctica. This work is the first study of fungi associated with Antarctic marine macroalgae, and contributes to the taxonomy and ecology of the marine fungi living in polar environments. These fungal species may have an important role in the ecosystem and in organic matter recycling.

- 4 Badotti F, Belloch C, Rosa CA, Barrio E, Querol A 2010 Physiological and molecular characterisation of *Saccharomyces cerevisiae* cachaça strains isolated from different geographic regions in Brazil. *World J Microbiol Biotechnol* **26**:579-587.

In this work, 74 *Saccharomyces cerevisiae* strains isolated from cachaça fermentation of six different geographic regions in Brazil were characterized by mitochondrial DNA restriction fragment length polymorphism (mtDNA-RFLP) and by their ability to grow on stress conditions occurring during the cachaça fermentation process. Cachaça *S. cerevisiae* strains showed high mtDNA-RFLP polymorphism with the occurrence of 32 different molecular patterns. The *S. cerevisiae* strains presenting prevalent mtDNA were able to grow better in the stress conditions than strains represented by infrequent patterns.

The principal coordinate analysis on 17 stress conditions revealed that the major source of growth variation were high ethanol concentrations and low temperatures. These results indicate that the stress conditions occurring in the fermentation process influence the prevalence of the most adapted *S. cerevisiae* strains in each distillery. The physiological tests used in our study can be used as a criterion for rapidly selecting autochthonous yeast strains for further purposes such as the selection of fermentative starters of *S. cerevisiae* strains.

- 5 Cadete RM, Santos RO, Melo MA, Mouro A, Gonçalves DL, Stambuk BU, Gomes FCO, Lachance MA, Rosa CA 2009 *Spathaspora arborariae* sp. nov., a D-xylose-fermenting yeast species isolated from rotting wood in Brazil. *FEMS Yeast Res* **9**:1338-1342.

IV Russian Collection of Microorganisms (VKM), Institute for Biochemistry and Physiology of Microorganisms, Pushchino, 142290, Russia. Communicated by WI Golubev
<wig@ibpm.pushchino.ru> <http://www.vkm.ru>.

Recent publications.

- 1 Golubev WI, Tomashevskaya MA 2010 Yeast fungi in *Picea abies* (L.) Karst. needle litter. *Mikrobiologiya* **79**(3 - in press).

Count of yeast cells, by using needle infusion agar with penicillin, in spruce needle litter can reach up nearly 3 millions/g,

making up over a quarter of the whole micromycete population. During a 3-year survey, more 20 species belonging to 9 genera

were found. Among them, the representatives of the genera *Cryptococcus*, *Fellomyces*, *Rhodotorula* and *Trichosporon* were typical, specifically, *Cr. carnescens*, *Cr. taiwanensis* nov. comb., *F. penicillatus*, *Rh. laryngis*, *Tr. moniliiforme*. The isolates

showed lipase activity and were able to utilize hemicelluloses, phenolic compounds. Some of them secreted antifungal substances (mycocins, glycolipids).

- 2 Golubev WI, Scorzetti G, 2010 *Rhodotorula rosulata* sp. nov., *Rhodotorula silvestris* sp. nov. and *Rhodotorula straminea* sp. nov., novel myo-inositol-assimilating yeast species in the Microbotryomycetes. *Int J Syst Evol Microbiol* **60** (in press).

Three novel species are described as *Rhodotorula rosulata* (type strain VKM Y-2962 = CBS 10977), *Rhodotorula silvestris* (type strain VKM Y-2971 = CBS 11420) and *Rhodotorula straminea* (type strain VKM Y-2964 = CBS 10976) based on the study of eight isolates from needle litter. The new

species, phylogenetically located within the Microbotryomycetes, are related to glucuronate-assimilating species of the genus *Rhodotorula*. Sequencing of the D1/D2 domains of the LSU rDNA and the ITS regions, as well as physiological characterization, revealed their distinct taxonomic positions.

V State Scientific-Research Institute for Genetics and Selection of Industrial Microorganisms (GosNIIGenetika), I-Dorozhnyi 1, Moscow 117545, Russia. Communicated by G.I. Naumov and E.S. Naumova <gnaumov@yahoo.com>.

We are grateful to Dr. J. Schnürer for the invitation to participate at 1st International *Pichia anomala* mini-Symposium on 10-12 February 2010, Uppsala, Sweden.

The following are papers for 2009–2010 or in press.

- 1 Naumov GI, Kondratieva VI, Naumova ES 2009 Taxonomic genetics of *Zygowilliopsis* yeasts. *Russian J Genet* **45**(12):1422–1427.
- 2 Naumov GI 2009 Genetic identification of the yeast *Saccharomyces kudriavzevii* from European population. *Ecol Genet (St. Petersburg)* **7**(1):9–11 (in Russian).

Using genetic hybridization analysis we showed for the first time that Portuguese isolates belong to the biological species *Saccharomyces kudriavzevii* Naumov et al. (2000). Earlier this species was described on Japanese isolates. Divergence of

Portuguese and Japanese *S. kudriavzevii* populations, as well as different *S. cerevisiae* populations, on molecular galactose markers is discussed.

- 3 Mikhailova YuV, Castello S, Naumova ES, Naumov GI 2009 Allo- and sympatric sibling species of *Saccharomyces cerevisiae*: DNA-DNA reassociation. *Ecol Genet (St. Petersburg)* **7**(4): 3–7 (in Russian).

Precise DNA-DNA reassociation data were obtained for new biological species *S. cariocanus*, *S. kudriavzevii* and *S. mikatae*, for the first time. The three species showed 25–51%-of DNA-DNA reassociation with one another and with the known species *S. cerevisiae*, *S. bayanus* and *S. paradoxus*. Only in the combination *S. paradoxus* x *S. cariocanus* there was 99% DNA-

DNA homology. Despite high DNA-DNA reassociation value, the two yeasts are genetically isolated: their hybrids are sterile forming non-viable meiotic products (ascospores). Having four reciprocal translocations in its karyotype, *S. cariocanus* represents species *in statu nascendi*.

- 4 Naumova ES, Serpova EV, Naumov GI 2009 Comparative genomics of yeast-like fungi *Yarrowia lipolytica*. *Int J Immunopath Allergol Infectol. (Moscow)* **1**:11 (In Russian).
- 5 Naumov GI, Naumova ES 2010 Comparative genetics of yeasts. A novel β -fructosidase gene *SUC8* in *Saccharomyces cerevisiae*. *Russian J Genet* **46**(3):323–330.
- 6 Naumov GI, Naumova ES 2010 Polygenic control for fermentation of β -fructosides in the yeast *Saccharomyces cerevisiae*: new genes *SUC9* and *SUC10*. *Microbiol (Moscow)* **79**(2):160–166.
- 7 Naumova ES, Serpova EV, Naumov GI 2010 Genome variability of the yeast *Yarrowia lipolytica*. *Microbiol (Moscow)* **79**(2):229–236.

- 8 Naumov GI, Naumova ES, Masneuf-Pomarède I 2010 Genetic identification of new biological species *Saccharomyces arboricolus* Wang et Bai. *Antonie van Leeuwenhoek*, **98**:1–7.
- 9 Naumov GI, Naumova ES, Choi E-S 2010 Natural and industrially important peculiarities of sugars utilization in the yeast *Kluyveromyces marxianus*. *Biotechnol (Moscow)* **2**:54–58 (in Russian).
- 10 Naumoff DG, Naumov GI 2010 Finding of new family of β -glucosidase genes *IMA* in the yeast *Saccharomyces cerevisiae*. *Doklady Biochem Biophys* **432**(4): (in press).

Comparative genomic analysis of the yeast *Saccharomyces cerevisiae* S288C and *IMA* gene of *S. cerevisiae* strain ATCC56960 allowed us to reveal a new polymeric

isomaltose genes *IMA1-IMA4* located in telomeric regions of chromosomes VII, XV, IX and X.

- 11 Naumov GI, Naumova ES 2010 Comparative genetics of *Saccharomyces cerevisiae* yeasts. Chromosomal translocations carrying the *SUC2* marker. *Russian J Genet* (in press).

Using pulsed-field gel electrophoresis of intact chromosomal DNAs and Southern hybridization with the probe *SUC2*, we determined three different translocations involving chromosome IX in natural strains of *Saccharomyces cerevisiae*.

Due to crossing-over, back dislocation of, at least, marker *SUC2* takes place during meiosis of hybrids between such strains and genetic lines with normal molecular karyotype. Significance of the translocations found is discussed.

- 12 Naumov GI, Naumova ES 2010 Taxonomy and genetics of the yeast *Pichia/Hansenula anomala*. 1st International *Pichia anomala* mini-Symposium, 10-12 February 2010, Uppsala, Sweden, p. 9.

- 13 Naumoff DG Sequence analysis of yeast glycoside hydrolases. The Seventh International Conference on Bioinformatics of Genome Regulation and Structure\Systems Biology (BGRS\SB-2010). June 20-27, 2010. Novosibirsk. Russia.

- 14 Sybirny AA 2010 Gennadi Ivanovich Naumov - sixty-fifth anniversary. *Cytol & Genet (Kiev)* **3**:82.

- 15 Mikhailova YuV 2009 Comparative genomics of *Saccharomyces* yeasts. Ph.D. Thesis, GosNIIgenetika, Moscow.

- 16 Serpova EV 2009 Molecular phylogeny of the yeast *Lachancea*. Ph.D. Thesis, GosNIIgenetika, Moscow.

VI Food Science and Technology, Wiegand Hall, Oregon State University, Corvallis, OR 97331-6602, USA. Communicated by Alan Bakalinsky <alan.bakalinsky@oregonstate.edu>.

Recent papers.

- 1 Zara S, Gross, G Zara, M Budroni, AT Bakalinsky 2010 Ethanol-independent biofilm formation by a flor wine yeast. *Appl Environ Microbiol*, June, In press.

Flor strains of *Saccharomyces cerevisiae* form a biofilm on the surface of wine at the end of fermentation, when sugar is depleted and growth on ethanol becomes dependent on oxygen.

Here, we report greater biofilm formation on glycerol and ethyl acetate and inconsistent formation on succinic, lactic, and acetic acids.

- 2 Rowe JD, JF Harbertson, JP Osborne, M Freitag, J Lim, AT Bakalinsky 2010 Mannoproteins are enriched in model wine aged 9 months on the yeast lees. *J Ag Food Chem* **58**:2337-2346.

Total protein and protein-associated mannan concentrations were measured and individual proteins identified during extraction into model wines over 9 months of aging on the yeast lees following completion of fermentations by 7 wine strains of *Saccharomyces cerevisiae*. In aged wines, protein-associated mannan increased about 6-fold (\pm 66%), while total protein only increased 2-fold (\pm 20%), which resulted in a significantly greater protein-associated mannan/total protein ratio

for 3 strains. A total of 219 proteins were identified among all wine samples taken over the entire time course. Of the 17 “long-lived” proteins detected in all 9-month samples, 13 were cell wall mannoproteins and 4 were glycolytic enzymes. Most cytosolic proteins were not detected after 6 months. Native mannosylated yeast invertase was assayed for binding to wine tannin and was found to have a 10-fold lower affinity than non-glycosylated bovine serum albumin. Enrichment of mannoproteins in the aged

VII University of Guelph, School of Environmental Sciences, Guelph, Ontario, Canada. Contributed by Hung Lee <hlee@uoguelph.ca>.

The following are abstracts of recently published papers.

- 1 Bajwa PK, D Pinel, VJJ Martin, JT Trevors & H Lee 2010 Strain improvement of the pentose-fermenting yeast *Pichia stipitis* by genome shuffling. *J Microbiol Methods* **81**:179-186.

Genome shuffling based on cross mating was used to improve the tolerance of the pentose-fermenting yeast *Pichia stipitis* towards hardwood spent sulphite liquor (HW SSL). Six UV-induced mutants of *P. stipitis* were used as the starting strains, and they were subjected to 4 rounds of genome shuffling. After each round, improved strains were selected based on their growth on HW SSL gradient plates. Mutant libraries were established after each round and these improved mutant strains served as the starting pool for the next round of shuffling. Apparent tolerance to HW SSL on the gradient plate increased progressively with each round of shuffling up to 4 rounds. Selected improved mutants were further tested for tolerance to liquid HW SSL. After 4 rounds of shuffling, 4 mutants, two from the third round (designated as GS301 and GS302) and two from the fourth round (designated as GS401 and GS402), were

selected that could grow in 80% (v/v) HW SSL. GS301 and GS302 grew also in 85% (v/v) HW SSL. GS301 was viable in 90% (v/v) HW SSL, although no increase in cell number was seen. The *P. stipitis* wild type strain (WT) could not grow on HW SSL unless it was diluted to 65% (v/v) or lower. Genome-shuffled strains with improved tolerance to HW SSL retained their fermentation ability. Fermentation performance of GS301 and GS302, the 2 strains that exhibited the best tolerance to liquid HW SSL, was assessed in defined media and in HW SSL. Both strains utilized 4% (w/v) of xylose or glucose more efficiently and produced more ethanol than the WT. They also utilized 4% (w/v) of mannose or galactose and produced ethanol to the same extent as the WT. GS301 and GS302 were able to produce low levels of ethanol in undiluted HW SSL.

- 2 Bajwa, P, T Shireen, F D'Aoust, D Pinel, VJJ. Martin, JT Trevors & H Lee 2009 Mutants of the pentose-fermenting yeast *Pichia stipitis* with improved tolerance to inhibitors in hardwood spent sulphite liquor. *Biotechnology and Bioengineering* **104**:892-900.

Mutants of *Pichia stipitis* NRRL Y-7124 able to tolerate and produce ethanol from hardwood spent sulphite liquor (HW SSL) were obtained by UV mutagenesis. *P. stipitis* cells were subjected to three successive rounds of UV mutagenesis, each followed by screening first on HW SSL gradient plates and then in diluted liquid HW SSL. Six third generation mutants with greater tolerance to HW SSL as compared to the wild type (WT) were isolated. The WT strain could not grow in HW SSL unless it was diluted to 65% (v/v). In contrast, the third generation mutants were able to grow in HW SSL diluted to 75% (v/v). Mutants PS301 and PS302 survived even in 80% (v/v) HW SSL, although there was no increase in cell number. All the third generation mutants exhibited higher growth rates but

significantly lower growth yields on xylose or glucose compared to the WT. The mutants fermented 4% (w/v) glucose as efficiently as the WT and fermented 4% (w/v) xylose more efficiently with a higher ethanol yield than the WT. In a medium containing 4% (w/v) each of xylose and glucose, all the third generation mutants utilized glucose as efficiently and xylose more efficiently than the WT. This resulted in higher ethanol yield by the mutants. The mutants retained the ability to utilize galactose and mannose and ferment them to ethanol. Arabinose was consumed slowly by both the mutants and WT with no ethanol production. In 60% (v/v) HW SSL, the mutants utilized and fermented glucose, mannose, galactose and xylose while the WT could not ferment any of these sugars.

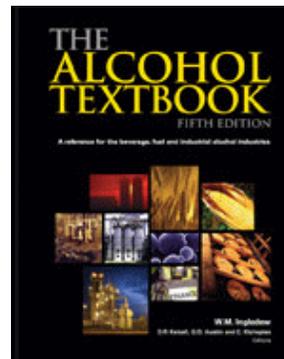
- 3 Chu BCH & H Lee 2007 Genetic improvement of *Saccharomyces cerevisiae* for xylose fermentation. *Biotechnology Advances* **25**:425-441.

There is considerable interest in recent years in the bioconversion of forestry and agricultural residues into ethanol and value added chemicals. High ethanol yields from lignocellulosic residues are dependent on efficient use of all the available sugars including glucose and xylose. The well-known fermentative yeast *Saccharomyces cerevisiae* is the preferred microorganism for ethanol production, but unfortunately, this

yeast is unable to ferment xylose. Over the last 15 years, this yeast has been the subject of various research efforts aimed at improving its ability to utilize xylose and ferment it to ethanol. This review examines the research on *S. cerevisiae* strains that have been genetically modified or adapted to ferment xylose to ethanol. The current state of these efforts and areas where further research is required are identified and discussed.

VIII University of Saskatchewan, Canada - c/o 1421 Saturna Drive, Parksville B.C. V9P 2Y1 Canada.
Communicated by W. M. Mike Ingledew <mike.ingledew@usask.ca>.

I retired from the University of Saskatchewan in July of 2007 and have been working as Scientific Director of Ethanol Technology Institute (Lallemand Ethanol Technology) ever since. The Institute offers two Alcohol Schools (Toulouse in April and Montreal in September) each year as well as two Operator Schools in the Midwest. The focus of the Schools is on production of ethanol by yeast for fuel and beverage. See www.ethanoltech.com under education for details. The seminal textbook on ethanol production, The Alcohol Textbook, 5th Ed., was published in March 2009. In 2009, I have been awarded an Earned Doctor of Science degree in 2009 based on work done in the biochemistry of ethanol production by yeast.



The following papers have been published or are in press since the last report by his lab.

- 1 Ingledew WM 2010 Bioconversions: Fuel Ethanol. Encyclopedia of Biotechnology in Agriculture and Food. (in press).
 - 2 Ingledew WM 2009 Ethanol: Fuel Production by Yeasts. Encyclopedia of Industrial Biotechnology, Bioprocess, Bioseparation and Cell Technology, Ed. M Flickinger, John Wiley and Sons (in press).
 - 3 Ingledew WM, GD Austin and DR Kelsall 2009 The Alcohol Industry: How has it Changed and Matured? The Alcohol Textbook. 5th Edition. Edited by: WM Ingledew, GD Austin, DR Kelsall and C Kluhspies. Nottingham Press UK. pp 1-6.
 - 4 Ingledew WM 2009 Yeasts: Physiology, Nutrition and Ethanol Production. The Alcohol Textbook. 5th Edition. Edited by: WM Ingledew, GD Austin, DR Kelsall and C Kluhspies. Nottingham Press UK. pp 101-115.
 - 5 Ingledew WM 2009 Yeast Stress in the Fermentation Process. The Alcohol Textbook. 5th Edition. Edited by: WM Ingledew, GD Austin, DR Kelsall and C Kluhspies. Nottingham Press UK. pp 115-126.
 - 6 Ingledew WM, GD Austin, and K Kraus 2009 Commercial Yeast Production for the Fuel Ethanol and Distilled Beverage Industries. The Alcohol Textbook. 5th Edition. Edited by: WM Ingledew, GD Austin, DR Kelsall and C Kluhspies. Nottingham Press UK. pp 127-144.
 - 7 Abbott DA and WM Ingledew 2009 Wild Yeast Contamination and Control of the Process. The Alcohol Textbook. 5th Edition. Edited by: WM Ingledew, GD Austin, DR Kelsall and C Kluhspies. Nottingham Press UK. pp 357-370.
 - 8 Ingledew WM 2007 Fermentation: Recent Advances. Getreidetechnologie (Cereal Technology) **61**:165-169.
 - 9 Ingledew WM 2006 Yeast Production and Availability for the Fuel Alcohol Industry. Getreidetechnologie (Cereal Technology), **60**(3):180-184.
 - 10 Ingledew WM 2006 Improvements in Alcohol Technology Through Advancements in Fermentation Technology. Getreidetechnologie (Cereal Technology), **59**(5):308-311.
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IX Department of Genetics and Applied Microbiology, University of Debrecen, H-4032 Debrecen, Hungary. Communicated by Matthias Sipiczki <gecela@post.sk>.

Recent publications.

- 1 Sipiczki M, Kajdacs E 2009 *Jaminaea angkorensis* gen. nov., sp. nov., a novel anamorphic fungus containing an S943 nuclear small subunit rRNA group IB intron represents a basal branch of Microstromatales. *Int J Syst Evol Microbiol* **59**:914-920.
- 2 Farkas V, Takeo K, Mecekova D, Ohkusu M, Yoshida S, Sipiczki M 2009 Secondary cell wall formation in *Cryptococcus neoformans* as a rescue mechanism against acid-induced autolysis. *FEMS Yeast Res* **9**:311-320.
- 3 Batta G, Szilagyi Z, Laczik M, Sipiczki M 2009 The involvement of the *Schizosaccharomyces pombe sep9/spt8⁺* gene in the regulation of septum cleavage. *FEMS Yeast Res* **9**:757-767.
- 4 Miklos I, Ludanyi K, Sipiczki M 2009 The pleiotropic cell separation mutation *spl1-1* is a nucleotide substitution in the internal promoter of the proline tRNA^{CGG} gene of *Schizosaccharomyces pombe*. *Curr Genet* **55**:511-520.
- 5 Mehta S, Miklos I, Sipiczki M, Sengupta S, Sharma N 2009 The Med8 mediator subunit interacts with the Rpb4 subunit of RNA polymerase II and Ace2 transcription activator in *Schizosaccharomyces pombe*. *FEBS Lett* **583**:3115-3120.
- 6 Sipiczki M 2010 *Candida stigmatis* sp. nov., a new anamorphic yeast species isolated from flowers. *FEMS Yeast Res* **10**:362-365.

Abstracts of presentations at recent meetings.

- 7 Sipiczki M 2009 Splitting of the *Schizosaccharomyces* septum. 37th Annual Conference on Yeasts. Smolenice, Slovakia. Program and Abstracts, p. 53.
 - 8 Sipiczki M 2009 Septum splitting. The 5th International Fission Yeast Meeting. Tokyo, Japan. Abstract Book p.73.
 - 9 Munoz J, Sipiczki M, Cortes JCG, Moreno B, Ramos M, Clemente-Ramos JA, Duran A, Ribas JC 2009 The glucan synthase Bgs4 is essential for secondary septum synthesis and primary septum stability. The 5th International Fission Yeast Meeting. Tokyo, Japan. Abstract Book p. 256.
 - 10 Miklos I, Sipiczki M 2009 A nucleotide substitution (*spl1-1*) in the internal promoter of the proline tRNA^{CGG} gene causes a cell separation defect. The 5th International Fission Yeast Meeting. Tokyo, Japan. Abstract Book p. 276.
 - 11 Madar A, Balazs A, Banyai G, Batta G, Gyuricza K, Miklos I, Sipiczki M 2009 Interspecific complementation of mutations in genes coding for regulators of cell separation in *S. pombe*. The 5th International Fission Yeast Meeting. Tokyo, Japan. Abstract Book p. 277
 - 12 Sipiczki M 2009 Genetic stability and instability of wine yeasts. 2nd International Symposium: Wine Microbiology and Safety (Microsafetywine). Martina Franca (Italy). Book of Abstracts p. 29.
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X Canadian Institute of Fisheries Technology, Dalhousie University, P.O. Box 1000; Halifax, Nova Scotia, Canada B3J 2X4. Communicated by Alex Speers <aspeers@dal.ca>.

Recent publications.

- 1 Lake JC, Speers RA, Gill TA, Reid AJM, Singer DS 2009 Modelling of yeast in suspension during malt fermentation assays. *J Inst Brew* **115**:296B299.

Premature yeast flocculation (PYF) is a poorly understood condition leading to attenuation of fermentation and poor alcohol yields. The yeast in suspension in fermenting worts prepared from either normal or premature flocculating malts was continually measured during the small 15 mL fermentation test recently developed in the Dalhousie laboratories. A simple inexpensive monitoring system was constructed from a laser level, photometric cell and data logger. This system allowed non-destructive data collection of absorbance data (over 700 data points per fermentation) at ~650 nm. A non-linear modeling

technique was applied to the data, and yielded two best-fitting logistic models. The model parameters were quantitatively compared to determine if statistical differences between PYF and normal wort were apparent. A student's t test of the logistic parameters indicated a significant difference ($p > 0.025$) between control and PYF worts for the increase in absorbance at the beginning of the fermentation. A significant difference ($p > 0.0001$) in the inflection time of absorbance down-curve between the control and PYF wort was also noted.

- 2 Kaur M, Evans E, Stewart D, Sheehy M, Speers A, Lake J, Bowman J 2009 L51: Microbial T-RFLP screening as a solution for premature yeast flocculation (PYF) assurance for malt. Paper presented and published in the Proceedings of the European Brewery Convention, Hamburg 2009.

Premature yeast flocculation (PYF) is an intermittent brewing fermentation problem that results in incomplete wort fermentation, and is a significant problem for some breweries. When PYF occurs it can cause significant losses in out of specification beer (incompletely fermented beer) to the brewer. The occurrence of PYF appears to be related to certain malt batches, however detection of these problem batches by way of a fermentation test is problematic and time consuming. Previous research investigations have been directed at identifying the causal wort PYF active components of PYF. These approaches have not been particularly successful over the past 40+ years. Consequently we have approached the problem from a different perspective. That was to use molecular finger printing of malt microbes as a step to identify the microbial taxa that cause PYF

by comparing PYF +ve/-ve malts using terminal restriction fragment length polymorphism (TRFLP). TRFLP is a rapid, sensitive, sequence based technique for microbial diversity assessment based on the conserved small subunit rRNA genes allowing comparison of the composition of microbial populations. We have made a significant breakthrough with the TRFLP approach and concept. Very striking differences in the microbial DNA finger-print patterns, particularly for the fungal PCR primers, between PYF +ve/-ve malts are obvious by using the TRFLP technique. Various microbial taxa, particularly some fungal members, are strongly associated with the PYF +ve malt determinations made with conventional fermentation tests. We are currently screening further confirmed PYF +ve/Bve batches of malt to validate our discovery.

XI Mycology Program, American Type Culture Collection (ATCC), 10801 University Blvd, Manassas, Virginia 20110, USA. Communicated by S.-O. Suh <ssuh@atcc.org>.

Recent publications.

- 1 Gujjari P, Muldrow T, and Zhou JJ 2010 Effect of Cryopreservation protocols on the phenotypic stability of yeast. *Cryoletters* (in press).

Eight cryopreservation protocols were assessed for their effects on the viability and phenotypic stability of the yeast *Saccharomyces cerevisiae* during a five-year study. It is found that viability and phenotypic features have remained largely unchanged when the yeast was preserved in glycerol, dimethyl sulphoxide, or sucrose at -80°C or in liquid nitrogen. When sorbitol was used as a cryoprotectant, yeast cells frozen and stored at -80°C manifested great decreases in viability after six months in storage and concomitantly large fluctuations in the rate

of the *trp1* auxotrophic reversion. This phenotypic reversion was stable passage after passage. Such a degree of phenotypic fluctuations, however, was not observed for yeast cells preserved in the same sorbitol solution that went through a controlled freezing program and were subsequently stored in liquid nitrogen. These results indicate that some combinations of cryoprotective agent, freezing program, and storage temperature disturb biomaterials more profoundly during cryopreservation and imply a genetic basis of this phenotypic change.

- 2 Suh S-O and Zhou JJ 2010 Methylotrophic yeasts near *Ogataea* (*Hansenula*) *polymorpha*: a proposal of *O. angusta* comb. nov. and *Candida parapolyomorpha* sp. nov. *FEMS Yeast Res* (in press).

Ogataea (*Hansenula*) *polymorpha* and related yeasts were studied to clarify their taxonomy and phylogenetic

relationships. The molecular analyses based on ribosomal DNA sequences revealed that 1) ATCC 14755, type strain of *Pichia*

angusta, is phylogenetically distinguished from the majority of *O. polymorpha* strains including ATCC 34438^T (= NRRL Y-5445^T = CBS 4732^T), type of the species; 2) *Ogataea thermophila* is conspecific to *O. polymorpha*; and 3) two of the strains, ATCC 26012 and ATCC 58401, are a novel *Candida* species closely related to *O. polymorpha*. The conclusions were

also supported by physiological characteristics and other taxonomic features of these strains. Therefore, we propose here two novel species, *Ogataea angusta* comb. nov. (ATCC 14755^T = CBS 7073^T = NRRL Y-2214^T) and *Candida parapolyomorpha* sp. nov. (ATCC 26012^T = NRRL Y-7560^T), and conclude *O. thermophila* as a synonym of *O. polymorpha*.

- 3 Suh S-O and Zhou JJ 2010 Yeasts associated with curculionid beetle, *Xyloterinus politus*; *Candida xyloterini* sp. nov., *Candida palmyrensis* sp. nov., and three common ambrosia yeasts. Int J Syst Evol Microbiol (in press).

Seven yeast strains were isolated from the body surface and galleries of *Xyloterinus politus*, the ambrosia beetle which attacks black oak trees. Based on rDNA sequence comparisons and other taxonomic characteristics, five of the strains were identified as *Saccharomycopsis microspora*, *Wickerhamomyces hampshirensis*, and *Candida mycetangii*, which have been reported as insect associates previously. The remaining two yeast strains were proposed as novel species, *Candida xyloterini* sp. nov. (ATCC 62898^T = CBS 11547^T) and *Candida palmyrensis*

(ATCC 62899^T = CBS 11546^T). *Candida xyloterini* is a close sister taxon to *Ogataea dorogensis*, and assimilates methanol as a sole carbon source but lacks ascospores. On the other hand, *C. palmyrensis* is phylogenetically distinct from any other ambrosia yeasts reported so far. The species was placed near *Candida sophiae-reginae* and *C. beechii* from DNA sequence analyses but neither of the two were close sister taxa to *C. palmyrensis*.

XII Institute of Cryobiology and Food Technology, 53A Cherni vrah, 1407, Bulgaria. Communicated by P. Venkov <PVEN@abv.bg>.

During the last years research in our group concentrated on i) freezing as a mutagen and ii) the role of reactive oxygen species in freeze-induced mutagenicity. Bellow are the abstracts of some recent publications.

- 1 Stoycheva T, PVenkov, Ts Tsvetkov 2007 Mutagenic effect of freezing on mitochondrial DNA of *Saccharomyces cerevisiae*. Cryobiology **54**:243-250.

Although suggested in some studies, the mutagenic effect of freezing has not been proved by induction and isolation of mutants after treatment at subzero temperatures. Using a well defined genetic model, we supply in this communication evidence for the mutagenic effect of freezing on mitochondrial DNA (mtDNA) of the yeast *Saccharomyces cerevisiae*. The cooling for 2hs at +4°C, followed by freezing for 1h at -10°C and 16hs at -20°C resulted in induction of respiratory mutations. The immediate freezing in liquid nitrogen was without mutagenic effect. The study of the stepwise procedure showed that the induction of respiratory mutants takes place during the freezing at -10°C and -20°C of precooled at +4°C cells. The genetic crosses of freeze-induced mutants evidenced their mitochondrial *rho*⁻ origin. The freeze-induced *rho*⁻ mutants are most likely free

of simultaneously appeared nuclear mutations. The extracellular presence of cryoprotectants did not prevent the mutagenic effect of freezing while accumulation of cryoprotectors inside cells completely escaped mtDNA from cryodamage. Although the results obtained favor the notion that the mutagenic effect of freezing on yeast mtDNA is due to formation and growth of intracellular ice crystals; other reasons, such as impairment of mtDNA replication or elevated level of ROS production are discussed as possible explanations of the mutagenic effect of freezing. It is concluded that: i) freezing can be used as a method for isolation of mitochondrial mutants in *S. cerevisiae* and ii) given the substantial development in cryopreservation of cells and tissues, special precautions should be made to avoid mtDNA damages during the cryopreservation procedures.

- 2 Stamenova R, M Dimitrov, T Stoycheva, M Pesheva, PVenkov, Ts Tsvetkov 2008 Transposition of *Saccharomyces cerevisiae* Ty1 retrotransposition is activated by improper cryopreservation, Cryobiology **56**:241-247.

Ty1 is a retrotransposon of the yeast *Saccharomyces cerevisiae* whose transposition at new locations in the host genome is activated by stress conditions, such as exposure to UV light, X-rays, nitrogen starvation. In this communication, we supply evidence that cooling for 2 h at +4°C followed by freezing for 1 h at -10 °C and 16 h at -20 °C also increased Ty1 transposition. The mobility of Ty1 was induced by cooling at slow rates (3°C/min) and the accumulation of trehalose inside cells or the cooling at high rates (100°C/min) inhibited significantly the induction of the transposition. The freeze-induced Ty1 transposition did not occur in mitochondrial mutants

(*rho*⁻) and in cells with disrupted *SCO1* gene (*sco1Δ* cells) evidencing that the Ty1 transposition induced by cooling depends on the mitochondrial oxidative phosphorylation. We also found that the freeze induced Ty1 transposition is associated with increased synthesis and accumulation of superoxide anions (O₂⁻) into the cells. Accumulation of O₂⁻ and activation of Ty1 transposition were not observed after cooling of cells with compromised mitochondrial functions (*rho*⁻, *sco1Δ*), or in cells pretreated with O₂⁻ scavengers. It is concluded that (i) elevated levels of reactive oxygen species (ROS) have a key role in activation the transposition of Ty1 retrotransposon in yeast cells

undergoing freezing and (ii) given the deleterious effect of increased ROS levels on cells, special precautions should be

taken to avoid ROS production and accumulation during cryopreservation procedures.

3 Stoycheva T, M Pesheva, P Venkov 2009 The Role of Reactive Oxygen Species in the Induction of Ty1 Retrotransposition in *Saccharomyces cerevisiae*, Yeast (in press).

Here we provide evidence for a dependence between the increased production of reactive oxygen species and the activation of Ty1 retrotransposition. We have found that the strong activator of Ty1 mobility, methylmethane sulfonate, can not induce Ty1 retrotransposition in cells with compromised mitochondrial oxidative phosphorylation (*rho-*; *sco1Δ*) which is the major source for production of reactive oxygen species in *S. cerevisiae*. The quantitative estimation of superoxide anions in living cells showed that *rho+* cells exposed to methylmethane sulfonate increase Ty1 retrotransposition and superoxide levels.

The increase of superoxide anions by the superoxide generator menadione is accompanied by induction of Ty1 mobility without any treatment with a DNA damaging agent. Higher frequencies of retrotransposition were found in *rho+* and *rho-* cells treated with exogenously added hydrogen peroxide or in cells with disrupted *YAPI* gene characterized by increased intracellular levels of hydrogen peroxide. These data indicate that increased levels of reactive oxygen species may have an independent and key role in the induction of Ty1 retrotransposition.

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This is the summary of a recently completed study.

1 Amorim HV, Lopes ML, Paulillo SCL, Freiburger T, Costa VM, Antonio MB, Duval EH, Stambuk BU - An industrial and genetically modified *Saccharomyces cerevisiae* yeast strain does not survive ethanol distillation in laboratory.

Genetically modified *Saccharomyces cerevisiae* yeasts belongs to the Risk I group of microorganisms and have a number of potential applications in industrial process where can be useful to increase ethanol production. Therefore, it is necessary to give attention to the products and residues generated in the ethanol industry. Brazilian sugar and ethanol industry produces vinasse as a residue after the distillation process when ethanol is obtained from sugar cane; it's known that 12 liters of vinasse is produced in average for each liter of ethanol. Vinasse obtained during routine analysis which determines the ethanol content from wine distillation, in laboratory scale, can represent a source of yeast contamination even if they are transgenic or not. However, there's a lack of studies regarding yeast survival in vinasse after distillation process in laboratory and industrial scale. With the aim to verify if yeasts survive in vinasse after distillation, fermentation tests were carried out with selected yeasts which

were also modified genetically with a gene that provides resistance to kanamycin (*suc2::Kan^r*). Fermentation tests were prepared with must of molasses and sugar cane juice with 18% of total sugars under a temperature of 33°C and 10% of yeast biomass. The results showed that the yeasts found in vinasse didn't survive to the distillation process because there was no growth of colonies after sample isolation, and after countings at the microscope the yeast cells were also shown to be not viable by colorimetric methods. We can conclude that the distillation process of wine with and without yeast was efficient to kill the selected and transgenic yeasts. Thus, the vinasse originating from distillation doesn't offers biological risk to the environment. However, it is appropriate to emphasize the importance of extending this study to the industry, where there will higher volumes of vinasse produced by a wide number of distillers.

XIV Geobotany, Faculty of Biology and Biotechnology, Ruhr-University Bochum, Universitätsstraße 150, 44780 Bochum, Germany - <http://www.ruhr-uni-bochum.de/geobot/en/>. Communicated by Dominik Begerow <dominik.begerow@rub.de> and Andrey Yurkov <andrey.yurkov@rub.de>.

Recent publications.

1 Begerow D, Henrik Nilsson H, Unterseher M & Maier W 2010 Current state and perspectives of fungal DNA barcoding and rapid identification procedures. Appl Microbiol Biotechnol **87**:99-108.

Fungal research is experiencing a new wave of methodological improvements that most probably will boost mycology as profoundly as molecular phylogeny has done during the last 15 years. Especially the next generation sequencing technologies can be expected to have a tremendous effect on fungal biodiversity and ecology research. In order to realise the full potential of these exciting techniques by accelerating biodiversity assessments, identification procedures of fungi need to be adapted to the emerging demands of modern large-scale ecological studies. But how should fungal species be identified

in the near future? While the answer might seem trivial to most microbiologists, taxonomists working with fungi may have other views. In the present review, we will analyse the state of the art of the so-called barcoding initiatives in the light of fungi, and we will seek to evaluate emerging trends in the field. We will furthermore demonstrate that the usability of DNA barcoding as a major tool for identification of fungi largely depends on the development of high-quality sequence databases that are thoroughly curated by taxonomists and systematists.

- 2 Glushakova AM, Maximova IA, Kachalkin AV & Yurkov AM 2010 *Ogataea cecidiorum* sp. nov., a methanol-assimilating yeast isolated from galls on willow leaves. *Antonie van Leeuwenhoek* **98**:93-101.

Ten strains of a new endophytic ascospore-forming, methanol-assimilating yeast were isolated from the galls induced by sawflies on the leaves of willows in the Losiny Ostrov National Park (Moscow region). Standard phenotypical tests and phylogenetic analyses of 18S rRNA gene, 5.8S-ITS gene region and 26S rRNA gene (D1/D2 domains) sequences showed that the

species belongs to the genus *Ogataea*. We describe it as *Ogataea cecidiorum* and designate type culture KBP Y-3846 (= CBS 11522^T = VKM Y-2982^T = VKPM Y-3482^T = MUCL 52544^T = NCAIM Y.01965¹) as the type strain. The new species was registered in MycoBank under MB 515233.

- 3 Yurkov AM, Schäfer AM & Begerow D 2009 *Clavispora reshetovae*. *Fungal Planet* **35**, Persoonia **23**:182-183.

- 4 Yurkov AM, Schäfer AM & Begerow D 2009 *Barnettozyma vustinii*. *Fungal Planet* **38**, Persoonia **23**:188-189.

Book chapter.

- 5 Guého-Kellermann E, Boekhout T & Begerow D 2010 Biodiversity, Phylogeny and Ultrastructure In: *Malassezia and the Skin*, Boekhout T, Guého-Kellermann E, Mayser P, & Velegraki A (Eds), Springer Verlag Berlin Heidelberg, pp. 17-64.

This chapter presents and discusses all techniques and media used to isolate, maintain, preserve, and identify the 13 species that are presently included in the genus. Each species is described morphologically, including features of the colonies and microscopic characteristics of the yeast cells, either with or without filaments; physiologically, including the growth at 37 and 40°C, three enzymatic activities, namely catalase, α-glucosidase and urease, and growth with 5 individual lipid supplements, namely Tween 20, 40, 60 and 80, and Cremophor EL. Their ecological preferences and role in human and veterinary pathology are also discussed. For quite a long time, the genus

was known to be related to the Basidiomycota, despite the absence of a sexual state. The phylogeny, based on sequencing of the D1/D2 variable domains of the ribosomal DNA and the ITS regions, as presented in the chapter, confirmed the basidiomycetous nature of these yeasts, which occupy an isolated position among the Ustilaginomycetes. The relationship to the Basidiomycetes is also supported by monopolar and percurrent budding and the multilamellar cell wall ultrastructure. Some characteristics of this cell wall, which is unparalleled in the world of fungi, together with the lipophilicity demonstrate the uniqueness of this genus in the fungal kingdom.

XV Institute of Fermentation Technology and Microbiology, Technical University of Lodz, Wolczanska 171/173, 90-924 Lodz, Poland. Communicated by D. Kregiel <dorota.kregiel@p.lodz.pl>.

Recent publication.

- 1 Kregiel D, Berlowska J 2009 Evaluation of yeast cell vitality and culture heterogeneity using different fluorescent dyes. *Zeszyty Naukowe PL, Chemia Spozywcza i Biotechnologia* **73**:5-14.

Vitality of different industrial yeast strains was investigated using four standard fluorescent dyes by studying changes in microscopic evaluation of yeast nuclei and cell membranes. Fluorescent dyes were: acridine orange, DAPI, trypan blue and primuline. Comparison of the results obtained by

fluorescent techniques with these dyes showed good correlation of yeast cell vitality measurements. Simultaneous staining with fluorochromes provides a powerful way to demonstrate culture heterogeneity and changes within yeast cells during long cultivation.

The following posters were presented recently.

- 1 Kregiel D, Czyzowska A, Dziugan P 2010 The selection of yeast strains suitable for ethanol production from waste plant materials. 38th Annual Conference on Yeasts, Smolenice, Slovakia, 2010, PH12.

Replacement of gasoline by liquid fuels produced from renewable sources is a high-priority goal in many countries worldwide. One such fuel is ethanol produced from biomass such as agricultural waste. Fuel ethanol production is considerably more modest in EU than in US and Brazil. However, to compete with gasoline, production cost must be substantially lowered.

Plant waste products, including agricultural and forestry residues, are an abundant and relatively cheap raw materials and are the real option for replacement of large fraction of the gasoline produced today. Plant processing wastes contain mainly different soluble sugars, poly- and oligosaccharides and/or organic acids. It is known that some microorganisms, mainly yeasts, can utilize

soluble sugars and organic acids, producing biomass with high protein content or ethanol. The aim of this work was the selection of yeast strains suitable for fermentation process of waste plant materials. The six yeast strains: *Hansenula jadinii* (syn. *Candida utilis*) LOCK 0021, *Saccharomyces cerevisiae* LOCK 0132, *Saccharomyces cerevisiae* LOCK 0133, *Candida tropicalis* LOCK 0003, *Schizosaccharomyces pombe* LOCK 0244, *Pichia stipitis* LOCK 0047 from the Pure Culture

2 Kregiel D, Berłowska J, Ambroziak W, Mizerska U, Fortuniak W, Chojnowski J 2010 The influence of chemical modification of chamotte carriers on yeast adhesion. 38th Annual Conference on Yeasts, Smolenice, Slovakia, 2010, p22.

The immobilization of microorganisms is a useful tool applied in many branches of food industry and biotechnological processes. It is known that the nature of chemical and physical structure of the carrier surface is mainly responsible for activity of immobilized cells and the progress of reactions in biological systems. Therefore, the chemical modification of the surface properties by generating of new functional groups to promote cell adhesion can be seen as a field of proper research. The main objective of this study was to increase adhesion of selected yeast strains on the surface of chamotte carrier modified by chemical reactions with specific polymer compounds. Three distinct groups of carriers were tested. Group 1 formed by native chamotte: control (A) and chamotte covered with 3-glycidoxypropyl-methyldiethoxysilane (B); Group 2 formed by chamotte after hydrophobization by the mixture of siloxane telomers with reactive etoxyl groups: control (C) and chamotte with hydrophobizate and 3-glycidoxypropyl-methyldiethoxysilane (D); Group 3 formed by chamotte after hydrophilization by Chemical Vapour Deposition (CVD) in the atmosphere of argon and water vapor: control (E), chamotte after CVD treatment and covered with 3-glycidoxypropyl-methyldiethoxysilane (F), chamotte after CVD treatment and coated with 3-aminopropyl-trimethoxysilane (ATPS) (G), chamotte after CVD treatment and covered with L- dopamine

3 Berłowska J., Kregiel D., Ambroziak W. Pyruvate decarboxylase activity in free industrial yeast strains. 38th Annual Conference on Yeasts, Smolenice, Slovakia, 2010, p32.

Pyruvate decarboxylase PDC (EC 4.1.1.1) is a key enzyme at the branchpoint downstream of the glycolytic end product – pyruvate, that catalyses the first and irreversible step in the pathway leading to ethanol production. The Crabtree-positive and Crabtree-negative yeast strains show different kinetics of glucose uptake, rate of glycolysis and the levels of key enzymes involved in pyruvate metabolism. In the present PDC activity was investigated in different industrial yeasts showing differences in ethanol productivity - the fermentative, Crabtree-positive distillery and brewery yeasts include the genera *Saccharomyces* (*S. cerevisiae*, *S. pastorianus*) and Crabtree-negative amylolytic strain belonging to *Debaryomyces occidentalis*. These strains were investigated as free and immobilized on chamotte carriers during fermentation. Static fermentations were conducted under oxygen-limited conditions in mineral medium supplemented with 12% glucose. Fermentative activity of yeast strains was expressed in grams of carbon dioxide excreted during fermentation. Enzymatic assay for PDC activity was measured *in situ* after permeabilization with

Collection of the Institute of Fermentation Technology and Microbiology LOCK105 were used. Yeasts were observed for their abilities to utilize of sugars in the conditions of limited oxygen. The fermentation profiles for each strain were analysed chromatographically (HPLC). The results of experiments confirm that selection of the strains is the crucial step in the choosing of the proper yeast strains for specific substrates.

(DOPA) (H). Two industrial strains of top (*Saccharomyces cerevisiae* 1183) and bottom (*Saccharomyces pastorianus* 680) fermenting yeasts from NCYC Collection were used in this study. The suspension of $5 \cdot 10^7$ cells/ml in wort broth (*S. pastorianus* 680) or Ringer solution (*S. cerevisiae* 1183) was incubated with chamotte carriers for 24 h at 30°C on the laboratory shaker with 100 rpm. After incubation the surface area of adherent yeast cells stained with methylene blue was examined under a light microscope at 400× magnification. For the estimation of cells adhesion the qualitative method based on special behavioral patterns was developed. The amount of yeast cells adhered to the chamotte surface was changed significantly upon the way of chemical modification. The better adhesion was observed for the surfaces showed appropriate hydrophilic/hydrophobic balance, with no significant difference between top and bottom fermenting strain. The efficiency of immobilization procedure for tested strains was high on the chamotte surface covered with 3-glycidoxypropyl-methyldiethoxysilane, both native and after hydrophobization. The significant differences between type of applied yeast and the level of adhesion were not observed. However we can conclude, that: 1) the modification of surface characteristics can be an effective method in increasing adhesion of industrial yeast strains, 2) the optimal adhesion carrier should be estimated individually for each strain.

digitonin and incubation with substrate – sodium pyruvate at 30°C for 20 min. Product of this reaction – acetaldehyde was detected chromatographically using GC technique with Headspace Autosampler. In Crabtree-positive strains the CO₂ production rates showed a clear positive correlation with the level of pyruvate decarboxylase activity. All Crabtree-positive yeasts contain higher levels of PDC activity than the Crabtree-negative strain, both as free and immobilized cells. It was shown in all experiments that immobilization affected positively CO₂ productivity, while PDC activity was lowered, except bottom fermenting strain *S. pastorianus* 680 where the enzymatic activity of immobilized cells was few times higher. In general, the behavior of Crabtree-positive, brewery top fermenting and distillery yeasts was very similar, for both free and immobilized state. However the Crabtree-negative strain and the bottom fermenting yeast have shown much higher fermentative activity after immobilization. Therefore we can conclude that the immobilization usually led to lower level of PDC activity, but the higher concentration of immobilized yeast cells in fermentation

medium increases the rate of fermentation.

- 4 Cyzowska A, Nowak A, Dziugan P 2010 β -Glucosidase (anthocyanase) activity of yeast *S. cerevisiae*. 38th Annual Conference on Yeasts, Smolenice, Slovakia, 2010, p21.

Red wines include a number of polyphenolic constituents, such as monomeric flavonoids, anthocyanins, phenolic acids and polymeric tannins, that can affect human health. Anthocyanins that are extracted from the skins of fruits during crushing, pressing and fermentation are the major components responsible for red wine colour. Some yeast strain express β -glucosidase activities promoting anthocyanin degradation. The objective of this research was to examine the influence of yeast with β -glucosidase activity used for winemaking on the colour of grape extract from Chr.Hansen

Poland, nr 2626551, GIN 501606. Enzymatic activity was evaluated by determining the loss of monomeric anthocyanins from grape extract in medium pH around 3,5 (wine pH). After 30 min of reaction, glucosides of delphinidin, cyanidin, petunidin, peonidin and malvidin were quantified by HPLC. The decrease of anthocyanins content compared to quantity of enzymatic preparation, gives a good estimation of β -glucosidase (anthocyanase) activity. Protein concentration was determined by Bradford method. All of strains showed specific activity from 76 to 132 U/mg protein. Activity was strain-dependent.

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Journal paper and monograph published in 2010.

- 1 Yamaguchi M, Kopecká M 2010 Ultrastructural disorder of the secretory pathway in temperature-sensitive actin mutants of *Saccharomyces cerevisiae*. J Electron Microscopy **59**:141–152 (doi: 10.1093/jmicro/dfp050) (Japan).
- 2 Kopecká M, Svoboda A 2010 Ten years of activity of Laboratory for Cell Biology of Human Pathogenic Yeasts at the Department of Biology, Faculty of Medicine Masaryk University Brno. Chapter in Monograph: “Fifty Years of Czech and Slovak Yeast Research Period 2000-2009”, pp.44-46. Editors: E. Breierová, V. Farkaš, I. Hapala, K. Sigler. Bratislava 2010. ISBN: 978-800-89257-20-1.

Paper in the press in 2010.

- 3 Kopecká M, Ilkovic L, Ramíková V, Yamaguchi M 2010 (in the press) Effect of cytoskeleton inhibitors on conidiogenesis and capsule in the long neck yeast *Fellomyces* examined by scanning electron microscopy. Chemotherapy **255** - Doi: 10.1159/000XXXX

Invited Lectures at the 38th Annual Conference on Yeast, Smolenice, Slovakia, 11 – 14 May, 2010.

- 4 Svoboda A, laureate of Patoèka Prize: Yeast cell biology in Brno – some personal reflections.
- 5 Kopecká M.: Yeast pathogens: the cytoskeleton and the cell wall as targets for antifungals.

Abstracts of these lectures can be found in the programme and abstracts book, XXXVIIIth Annual Conference on Yeasts May 11-14th 2010, SAS Congress Centre Smolenice, Slovakia, 2010. Eds. V. Farkaš et al. ISSN 1336-4839, p31 and p33, respectively.

Application for new research grant for period 2011-2013 to Czech Science Foundation GA CR, Prague, Czech Republic.

Title: Yeast Pathogens: the Cytoskeleton and the Cell Wall as Targets for Antifungals. Applicants: Marie Kopecká and Augustin Svoboda, Department of Biology Faculty of Medicine Masaryk University, Brno, Czech Republic in cooperation with Masashi Yamaguchi, Chiba University, Japan.

XVII Laboratorio de Microbiología Aplicada y Biotecnología (Applied Microbiology and Biotechnology Lab.), Instituto de Investigaciones en Biodiversidad y Medio Ambiente (CONICET-UNComahue), Quintral 1250, (8400), Bariloche, Argentina. Communicated by Diego Libkind <libkind@crub.uncoma.edu.ar>.

Recent publications.

- 1 de Garcia V, Brizzio S, Russo G, Rosa CA, Boekhout T, Theelen B, Libkind D & van Broock M 2010 *Cryptococcus spencermartinsiae* sp. nov., a basidiomycetous yeast isolated from glacial waters and apple fruits. *Int J Syst Evol Microbiol* **60**:707-711.
- 2 Russo G, Libkind D, Ulloa RJ, de García V, Sampaio JP, van Broock MR 2010 *Cryptococcus agrioensis* sp. nov., a basidiomycetous yeast of the acidic rock drainage ecoclade, isolated from acidic aquatic environments of volcanic origin (River Agrio, Argentina). *Int J Syst Evol Microbiol* **60**:996-1000.

Papers in press.

- 3 de Garcia V, Brizzio S, Libkind D, Rosa C, & van Broock M - *Wickerhamomyces patagonicus* sp. nov., a novel teleomorphic ascomycetous yeast from Patagonia, Argentina. *Int J Syst Evol Microbiol - IJS/2009/015974*.
- 4 Libkind D, Sampaio JP & van Broock M - Cystobasidiomycetes yeasts from Patagonia (Argentina): description of *Rhodotorula meli* sp. nov. from glacial meltwater. *Int J Syst Evol Microbiol - IJS/2009/018499*.
- 5 Wuczowski M, Passoth V, Turchetti B, Andersson AC, Olstorpe M, Laitila A, Theelen B, van Broock M, Buzzini P, Prillinger H, Sterflinger K, Schnürer J, Boekhout, T, Libkind D - Proposal of *Holtermanniella takashimae* sp. nov., *Holtermanniella* gen. nov. and the new order Holtermanniales to accommodate Tremellomycetous yeasts of the *Holtermannia* clade. *Int J Syst Evol Microbiol - IJS/2009/019737*.
- 6 Moliné M, Regina Flores M, Libkind D, Diéguez MC, Farías ME & van Broock M - Photoprotection by carotenoid pigments in the yeast *Rhodotorula mucilaginosa*: the role of torularhodin. *Photochem Photobiol Sci - PP-ART-01-2010-000009*.

Book chapter.

- 7 Libkind D - *Rhodotorula*. In: Molecular detection of human pathogens. D Liu (Ed.) Ch. 58. CRC Press, Taylor & Francis Group - In Press.

XVIII Yeast Molecular Genetics Laboratory, Institute of Molecular Biology Acad. Rumen Tsanev, Bulgarian Academy of Sciences, Acad. G. Bonchev str., 1113 Sofia, Bulgaria. Communicated by G. Miloshev <miloshev@bio21.bas.bg>.

The following are summaries of our current projects.

- 1 A detailed study of the role of yeast linker histone Hho1p in the processes of chromatin remodeling. Investigators: Georgieva G, Efremov T, Krumova S¹, Psycheva E, Balashev K², Miloshev G.

¹ Institute of Biophysics, Bulgarian Academy of Sciences

² Laboratory of Biochemistry. Faculty of Chemistry, University of Sofia

Chromatin structure and dynamics are prerequisite for the processes of cellular transformation and cancer propagation. Unfortunately, the changes in the chromatin during these processes are still poorly understood. *Saccharomyces cerevisiae* has long been considered as a model organism in all kinds of

molecular biology studies. The only homologue of the linker histones in this organism is Hho1p, which possesses some unique characteristics in comparison to the linker histones of higher eukaryotic cells. On one hand, this protein is coded by one gene copy and on the other its molecule has two globular domains and

no carboxyl – end in contrast to the other linker histones. However, the most doubtful and yet unproven remain its roles in the chromatin organization and regulation of gene expression. In the current project we intend to study in details the role of Hho1p in the higher-order structuring of yeast chromatin and its dynamics in the nucleus under normal and stress conditions. For that reason we intend to delete the gene *HHO1* in three different *S. cerevisiae* strains and to study the phenotype of these mutants by comparing them with their isogenic wild type strains. Additionally, we intend to probe for a relationship between Hho1p and some of the chromatin – remodeling complexes. Therefore, we plan to create double *S. cerevisiae* mutants

comprising a deleted gene for the linker histone and point mutations in Act3p/Arp4 (an important subunit of INO80, SWR1 and NuA4 chromatin modifying complexes). The rationale is to thoroughly investigate these mutants in search for alterations in the chromatin compaction. On the basis of the expected results we could develop a model, describing the interaction between Hho1p and the chromatin remodeling complexes in yeast cells. Such a model could be easily applied to higher eukaryotic cells, where implications in the processes of chromatin remodeling and gene expression lead to abnormality and malignant transformation. Current Project sponsored by the Bulgarian Science Fund DMU 02/8 (period 2010-2012).

2 Georgieva M and Miloshev G. *Saccharomyces cerevisiae* – model organism for study of human diseases.

Saccharomyces cerevisiae is a unicellular organism used in the bread-making industry. Yeasts are eukaryotes and many of their basic biological properties are shared with the human beings. In comparison with human genome ~ 4x10⁸ base pairs, yeast genome is small - just over 12 million base pairs in length and contains about 6000 genes. Surprisingly, about 20 per cent of human genes, proved to be involved in certain disease development, have counterparts in yeast. This suggests that most of the diseases result from the disruption of very basic cellular processes, such as DNA repair and cell division. Therefore, studying their mechanisms in yeast cells is a promising alternative. The yeast *Saccharomyces cerevisiae* has been used as model organisms for human diseases for more than 10 years, including neurodegenerative diseases, aging, tumor development, heart failures and even psychological problems. The results from this approach allow scientists to apply the revealed mechanisms in the search for novel therapeutic strategies. Here, we report our

attempts to transform *S. cerevisiae* into a model for studying of human glioma development. Human gliomas account for a large number of medical cases in Bulgaria. Annually, 250-300 patients are diagnosed with gliomas. The failure of glioma treatment is determined by the invasiveness, irresponsiveness to any kind of therapy and tendency for recurrence of these tumors. In spite of the technological advances leading to a better surgical resection and the improvement of radio- and chemotherapy, still there is no significant amelioration of patients' quality of life, free survival and prognosis. Obviously, the explanation for this poor outcome lies in the cellular mechanisms of glioma development. We intend to use yeast cells as a model organism for a detailed molecular study of human gliomas expansion. The obtained results will shed light on the molecular mechanisms of this severe condition together with development of strategies for future gliomas treatment.

3 Peycheva E, Alexandrova R¹, Miloshev G Assessment of genotoxicity of compounds used in food and pharmaceutical industries using the method of Yeast Comet Assay.

¹Institute of Experimental Pathology and Parasitology, Laboratory of Oncovirology, Bulgarian Academy of Sciences, 1113, Sofia, Bulgaria

Additives are widely used in food industry. The rationale for their use is preservation, coloring or sweetening of the foods. Some additives have been prohibited from use because of their proven toxicity. Nevertheless, some of them are still added in foods although in smaller concentrations. We used Comet assay to detect concentrations at which additives could reveal DNA damaging activity – genotoxicity. Seven substances,

commonly added to foods or pharmaceuticals showed DNA damaging effect. In order to detect minimal concentrations at which these compounds damage DNA we compared the neutral and alkaline variant of Comet assay. The comparison of Comet assay on higher eukaryote cells with Comet assay on yeast cells showed higher sensitivity of yeast cells towards genotoxic activity.

4 Staneva D, Georgieva M, Efremov T, Miloshev G Sensitivity of *Kluyveromyces lactis* cells to genotoxins assessed by Yeast Comet Assay.

Genotoxins are generally described as chemical or physical agents that could damage the molecule of DNA in the cell. To know the sensitivity of yeast species to genotoxins could be of interest for people dealing with yeast as biotechnology tool, medical problem or experimental model. *Kluyveromyces lactis* is a yeast species with industrial applications important for the mankind. In order *K. lactis* to be practically useful and beneficial, however, we need comprehensive knowledge of its life cycle,

sensitivity to different physical or chemical agents, which should be assessed with as much as possible clarity. Comet assay (CA) is a versatile tool for the assessment of damages in the genome. Recently we designed CA for *S. cerevisiae* and named it YCA (Yeast Comet Assay). In the present study we settled conditions of the CA method for a successful application on the yeast *K. lactis*. Using Comet assay we obtained results showing that two genetically closely related yeasts, i.e. *K. lactis* and

S. cerevisiae, exhibit species-specific sensitivity to the action of three genotoxic compounds. Comparison of the length of comets formed after *DNaseI* treatment of *K. lactis* and *S. cerevisiae*

suggests different organization of chromatin and DNA loops in the two yeast nuclei.

XIX Food Microbiology Laboratory, Sikkim Government College, Sikkim University, Tadong 737 102, India. Communicated by Jyoti Prakash Tamang <jyoti_tamang@hotmail.com>.

The following are recent publications related to fermented foods and beverages:

- 1 Tamang JP 2009 Himalayan Fermented Foods: Microbiology, Nutrition, and Ethnic Values. CRC Press, Taylor & Francis, USA, 295 pp. ISBN: 9781420093247; ISBN 10: 142009324X. Price: \$149.95. Cat. #: 9324X.

www.crcpress.com/product/isbn/9781420093247

www.taylorandfrancis.com

The magnificent Himalayan Mountains, the highest in the world and home to the famed Mount Everest and K2, are also imbued with a rich diversity of ethnic fermented foods. Dr. Jyoti Prakash Tamang, one of the leading authorities on food microbiology, has studied Himalayan fermented foods and beverages for the last twenty-two years. His comprehensive volume, Himalayan Fermented Foods: Microbiology, Nutrition, and Ethnic Values catalogs the great variety of common as well as lesser-known fermented foods and beverages in the Himalayan region. This volume begins with an introduction to the Himalayas and the Himalayan food culture. Using a consistent format throughout the book, Dr. Tamang discusses fermented

vegetables, legumes, milk, cereals, fish and meat products, and alcoholic beverages. Each chapter explores indigenous knowledge of preparation, culinary practices, and microorganisms for each product. Additional information on microbiology and nutritive value supplements each section, and discussions on ethnic food history and values as well as future prospects for these foods complete the coverage. Dr. Tamang demonstrates that fermentation remains an effective, inexpensive method for extending the shelf life of foods and increasing their nutritional content through probiotic function, and therefore remains a valuable practice for developing countries and rural communities with limited facilities.

- 2 Tamang JP and Fleet GH 2009 Yeasts Diversity in Fermented Foods and Beverages. In: *Yeasts Biotechnology: Diversity and Applications* (Eds: Satyanarayana, T. and Kunze, G.). Springer, New York, pp. 169- 198.

People across the world have learnt to culture and use the essential microorganisms for production of fermented foods and alcoholic beverages. A fermented food is produced either spontaneously or by adding mixed/pure starter culture(s). Yeasts are among the essential functional microorganisms encountered in many fermented foods, and are commercially used in production of baker's yeast, breads, wine, beer, cheese, etc. In Asia, moulds are predominant followed by amyolytic and alcohol-producing yeasts in the fermentation processes, whereas in Africa, Europe, Australia and America, fermented products are prepared exclusively using bacteria or bacteria-yeasts mixed cultures. This chapter would focus on the varieties of fermented foods and alcoholic beverages produced by yeasts, their microbiology and role in food fermentation, widely used commercial starters (pilot production, molecular aspects),

production technology of some common commercial fermented foods and alcoholic beverages, toxicity and food safety using yeasts cultures and socio-economy. It is concluded that in fermentation of any substrate, *Saccharomyces* ferments sugar, produces secondary metabolites; inhibits growth of mycotoxin-producing moulds and has several enzymatic activities such as lipolytic, proteolytic, pectinolytic, glycosidase and urease activities. *Debaryomyces* contributes in sugar fermentation, increases pH of the substrates, and produces growth factors for bacteria. *Hanseniaspora* and *Candida* also contribute in sugar fermentation, production of secondary metabolites, and enzymatic activities. *Yarrowia lipolytica* also plays role in sugar fermentation, lipolytic, proteolytic and urease activities and reduction of fat rancidity in the product.

XIV Department of Biology, University of Western Ontario, London, Ontario, Canada N6A 5B7. Communicated by MA Lachance <lachance@uwo.ca>.

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

- 1 Lachance MA, Dobson J, Wijayanayaka DN, Smith AME In press The use of parsimony network analysis for the formal delineation of phylogenetic species of yeasts: *Candida apicola*, *Candida azyma*, and *Candida parazyza* sp. nov., cosmopolitan yeasts associated with floricolous insects. *Antonie van Leeuwenhoek* **97**:155-170.

Recent lecture.

- 2 Lachance MA 2010 Floricolous yeasts and the ubiquity model. Biodiversity 2010 and Beyond. Joint conference of the Society for the Preservation of Natural History Collections (SPNHC) and the Canadian Botanical Association. Ottawa, Canada, June 2010.

It is often assumed that microorganisms are more or less randomly distributed across the biosphere and that any available niche will be filled by a suitable guild of microbial species. The contemporary version of the microbial ubiquity model (Fenchel and Finlay) posits that by virtue of their small size, microorganisms disperse at a rate such that they are essentially ubiquitous. Advocates of microbial biogeography counter that niche characteristics and geographic history both are of importance. I shall review some of our knowledge of the global distribution of yeasts found at the insect-plant interface, showing that examples of both models exist. Yeasts that are vectored by

insects that feed and breed in flowers or other plant parts are clearly subject to strong selection, such that each type of insect-plant ecosystem is expected to harbor a guild of species that meet certain growth requirements. However, members of such guilds, when compared in different biogeographic regions, often show a high degree of endemism that must be attributed to geographic history on a broad time scale. My examples will be drawn principally from yeasts of the nitidulid beetle-flower and cactus necrosis ecosystems, which will be contrasted to some human-associated species.

XV CREM – Centro de Recursos Microbiológicos, Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal. Communicated by Á. Fonseca <amrf@fct.unl.pt> and J. P. Sampaio <jss@fct.unl.pt>.

The Portuguese Yeast Culture Collection (PYCC) – an update.

PYCC is a research collection associated to the Centre for Microbial Resources (CREM) and housed in the Department of Life Sciences (DCV) of “Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa” (FCT/UNL, Caparica, Portugal). PYCC was founded in 1952 by Prof. Nicolau van Uden, who headed the Collection until 1991. PYCC was housed successively at the Faculty of Sciences of the University of Lisbon and at the Gulbenkian Institute of Science (IGC) in Oeiras. PYCC was transferred to FCT/UNL in 1996 and was headed by prof. Isabel Spencer-Martins until 2008. Upon the transfer to FCT/UNL the collection’s acronym was changed from IGC to PYCC. Álvaro Fonseca was appointed coordinator of PYCC in 2009. Current staff includes also a research technician (Cláudia Carvalho, BSc). PYCC provides support to research conducted by CREM members and to teaching activities of DCV. PYCC also distributes yeast cultures to other yeast groups in Portugal and abroad. Other activities include: preservation of yeast cultures deposited by researchers or industrialists; supply of certified yeast cultures to users in academia, research and industrial laboratories; identification and characterization of the preserved yeast cultures; storing

of strain information in a dedicated database. A main goal of PYCC is to increase visibility of the collection and of the strain information by setting up a website and an online catalogue. To this end we recently acquired the BioLMICS software (BioAware) and we plan to have a new website online by the end of 2010. The URL of our provisional webpage is:

www.crem.fct.unl.pt/Research_Lines/Line_5/Line_5.htm

Long term aims include providing tutorial training and carrying out R&D activities in the areas of yeast classification, evolution, ecology and biotechnology. We have recently set up a yeast molecular identification service. PYCC currently holds approximately 2500 yeast strains, representing ca. 600 species and 120 genera. Among the current holdings at least 850 yeast strains were isolated either by researchers of the housing institutions (IGC, FCT/UNL) or by researchers from other laboratories and academic institutions in Portugal. PYCC has been essentially a small research collection, but the envisaged setting up of a database and website are intended to enhance its potential to become a service collection in the near future.

The following papers were recently published or accepted for publication.

- 1 J Inácio, W Ludwig, I Spencer-Martins and Á Fonseca 2010 Assessment of phylloplane yeasts on selected Mediterranean plants by FISH with group- and species-specific oligonucleotide probes. FEMS Microbiol Ecol 71:61-72.

A previous culture-dependent survey of phylloplane yeasts from selected Mediterranean plants showed that a few species were present in high densities in almost all leaf samples, regardless of the plant type, location or sampling season. However, a few species appeared to be restricted to *Cistus albidus* leaves, namely *Cryptococcus cistialbidi*. Here, we describe a culture-independent FISH assay to detect and quantify whole yeast cells in leaf washings. After optimization, the technique was used to check the apparent association between *C. albidus* leaves and *C. cistialbidi* and the abundance and ubiquity of other basidiomycetous yeast species such as *Erythrobasidium hasegawianum* and *Sporobolomyces* spp. in leaf samples from

this and other neighboring plants (*Acer monspessulanum* and *Quercus faginea*). No yeast cells were detected in *Pistacia lentiscus* leaf samples. We were also able to demonstrate that three phylloplane yeasts (*C. cistialbidi*, *E. hasegawianum* and *Sporobolomyces* spp.) appeared to be log-normally distributed among individual *C. albidus* leaves. The log-normal distribution has important implications for the quantification of phylloplane yeasts based on the washing and plating of bulk leaf samples, which will tend to overestimate the size of the respective populations and become an error source in yeast surveys or related biocontrol studies.

- 2 LB Connell, R Redman, R Rodriguez, A Barrett, M Iszard and Á. Fonseca 2010 *Dioszegia antarctica* sp. nov. and *Dioszegia cryoxerica* sp. nov., psychrophilic basidiomycetous yeasts from polar desert soils in Antarctica. *Int. J. Syst. Evol. Microbiol.* **60**:1466-1472

During a survey of the culturable soil fungal population in samples collected in Taylor Valley, South Victoria Land, Antarctica, 13 basidiomycetous yeast strains with orange-coloured colonies were isolated. Phylogenetic analyses of internal transcribed spacer (ITS) and partial LSU rRNA gene sequences showed that the strains belong to the *Dioszegia* clade of the Tremellales (Tremellomycetes, Agaricomycotina), but did not correspond to any of the hitherto recognized species. Two novel species, *Dioszegia antarctica* sp. nov. (type strain ANT-03-116^T =CBS 10920^T =PYCC 5970^T) and *Dioszegia cryoxerica* sp. nov.

(type strain ANT-03-071^T =CBS 10919^T =PYCC 5967^T), are described to accommodate ten and three of these strains, respectively. Analysis of ITS sequences demonstrated intrastain sequence heterogeneity in *D. cryoxerica*. The latter species is also notable for producing true hyphae with clamp connections and haustoria. However, no sexual structures were observed. The two novel species can be considered obligate psychrophiles, since they failed to grow above 20°C and grew best between 10 and 15°C.

- 3 Almeida JMGCF 2010 BiDiBlast: Comparative Genomics Pipeline for the PC. Genomics, Proteomics & Bioinformatics (in press.)

Bi-directional BLAST is a simple approach to detect, annotate, and analyze candidate orthologous or paralogous sequences in a single go. This procedure is usually confined to the realm of customized Perl scripts, usually tuned for UNIX-like environments. Porting those scripts to other operating systems involves refactoring them, and also the installation of the Perl programming environment with the required libraries. To overcome these limitations a data pipeline was implemented in Java. This application submits two batches of sequences to local versions of the NCBI BLAST tool, manages result lists, and refines both bi-directional and simple hits. GO Slim terms are

attached to hits, several statistics are derived, and molecular evolution rates are estimated through PAML. The results are written to a set of delimited text tables intended for further analysis. The provided graphic user interface allows a friendly interaction with this application, which is documented, and available to download at <http://moodle.fct.unl.pt/course/view.php?id=2079> or <https://sourceforge.net/projects/bidblast/> under the GNU GPL license.

- 4 Coelho MA, Almeida JMF Martins IM, Jorge da Silva A and Sampaio JP 2010 The dynamics of the yeast community of the Tagus river estuary – testing the hypothesis of the multiple origins of estuarine yeasts. *Antonie van Leeuwenhoek* (in press).

Yeasts are common inhabitants of different types of aquatic habitats, including marine and estuarine waters and rivers. Although numerous studies have surveyed yeast occurrence in these habitats, the identification of autochthonous populations has been problematic because several yeast species seem to be very versatile and therefore mere presence is not sufficient to establish an ecological association. In the present study we investigated the dynamics of the yeast community in the Tagus river estuary (Portugal) by combining a microbiological study involving isolation, quantification, and molecular identification of dominant yeast populations with the analysis of hydrological and hydrographical data. We set out to test the hypothesis of the multiple origins of estuarine yeast populations

in a transect of the Tagus estuary and we postulate four possible sources: open sea, terrestrial, gastrointestinal and the estuary itself in the case of populations that have become resident. *Candida parapsilosis* and *Pichia guilliermondii* were correlated with *Escherichia coli*, which indicated an intestinal origin. Other cream-colored yeasts like *Debaryomyces hansenii* and *Candida zeylanoides* had similar dynamics, but no association with *E. coli* and quite distinct ecological preferences. They might represent a group of resident estuarine populations whose primary origin is diverse and can include marine, terrestrial, and gastrointestinal habitats. Another major yeast population was represented by *Rhodotorula mucilaginosa*. The cosmopolitan nature of that species and its moderate association with *E. coli* point to

terrestrial sources as primary habitats.

- 5 Coelho MA, Sampaio JP and Gonçalves P 2010 A deviation from the bipolar-tetrapolar mating paradigm in an early diverged basidiomycete. PLoS Genetics (accepted).

In fungi, sexual identity is determined by specialized genomic regions called *MAT* loci which are the equivalent to sex chromosomes in some animals and plants. Usually, only two sexes or mating types exist, which are determined by two alternate sets of genes (or alleles) at the *MAT* locus (bipolar system). However, in the phylum Basidiomycota a unique tetrapolar system emerged in which four different mating types are generated per meiosis. This occurs because two functionally distinct molecular recognition systems, each encoded by one *MAT* region, constrain the selection of sexual partners. Heterozygosity at both *MAT* regions is a pre-requisite for mating in both bipolar and tetrapolar basidiomycetes. Tetrapolar mating behaviour results from the absence of genetic linkage between the two regions bringing forth up to thousands of mating types. The subphylum Pucciniomycotina, an early diverged lineage of basidiomycetes encompassing important plant pathogens such as the rusts and saprobes like *Rhodosporidium* and *Sporidiobolus*,

has been so far poorly explored concerning the content and organization of *MAT* loci. Here we show that the red yeast *Sporidiobolus salmonicolor* has a mating system unlike any previously described because occasional disruptions of the genetic cohesion of the bipolar *MAT* locus originate new mating types. We confirmed that mating is normally bipolar and that heterozygosity at both *MAT* regions is required for mating. However, a laboratory cross showed that meiotic recombination may occur within the bipolar *MAT* locus, explaining tetrapolar features like increased allele number and evolution rates of some *MAT* genes. This pseudo-bipolar system deviates from the classical bipolar-tetrapolar paradigm and to our knowledge has never been observed before. We propose a model for *MAT* evolution in the Basidiomycota in which the pseudo-bipolar system may represent a hitherto unforeseen gradual form of transition from an ancestral tetrapolar system to bipolarity.

Recent Meeting

38th Annual Conference on Yeasts of the Czech and Slovak Commission on Yeasts, Smolenice, Slovakia, May 11-14, 2010

The 38th Annual Conference on Yeasts organized by the Czech and Slovak Commission on Yeasts, the Institute of Chemistry, Slovak Academy of Sciences, and the Department of Biochemical Technology, Slovak University of Technology, took place in the Smolenice Castle, the Congress Center of the Slovak Academy of Sciences, May 11-14, 2010. The participation of foreign scientists and the use of English as the conference language gave the event a truly international character. Several invited speakers were supported by the Commission or by the organization NATURA associated with the Faculty of Natural Sciences of the Comenius University. Prof. André Goffeau from the Leuven Catholic University in Belgium presented the opening memorial lecture in honour of Dr. A. Kocková-Kratochvílová "From Yeast to Yeast Genomology". The conference was attended by over 100 scientists, mainly from Czech Republic and Slovakia, although there were also participants from Austria, France, Hungary, India, Italy, Poland, Portugal, Spain, and Thailand, among them several invited speakers. During the registration all participants received the abstract book and the booklet dedicated to the 50th anniversary of the foundation of the Yeast Commission of the Czechoslovak Society for Microbiology, "Fifty Years of Activity in Czech and Slovak Yeast Research, Period 2000-2010", edited by E. Breierová, V. Farkaš,

I. Hapala, and K. Sigler (ISBN 978-80-89257-20-1). The Commission publishes this type of almanac every ten years.

The opening ceremony was attended by Doc. Dr. Ivan Čižnár, DrSc, Chair of the Czechoslovak Society for Microbiology, who awarded the František Patočka Medal of the Society to Prof. MUDr. Augustín Svoboda, DrSc, the employee of the Medical Faculty of the Masaryk University in Brno, for his merits for development of microbiology.

The conference program consisted of three sessions dedicated to Biochemistry and Cell Biology Biotechnology, Genetics and Molecular Biology, and Biotechnology and Medical Mycology. The 27 oral presentations were complemented by 16 short 5 min presentations (Poster Highlights) and 39 posters. The interesting scientific program was interrupted by some relaxed moments, such as a wine presentation and wine tasting by the Czech and Slovak wine-producing companies, VINO Hruška and Villa VINO Rača, from the suburb of Bratislava, capital of Slovakia. Old Herold Distilleries from Slovakia participated as well.

The successful conference ended with a meeting of the Committee of the Czech and Slovak Yeast Commission. Doc. Ing. Vladimír Farkaš, DrSc, resigned from the position of the Chair of the Commission after eight years of excellent service. The position was filled

with RNDr. Ivan Hapala, PhD, the second current Slovak representative in the International Commission for Yeasts. On the meeting it was also decided that the 39th Annual Yeast Conference will be organized at the Smolenice Castle on May 3-6, 2011. Its program will cover again the main streams of yeast research in previous Czechoslovakia, Genetics and Molecular Biology, Cell Biology, Medical Mycology and Biotechnology. Further information about the activities of the Czech and Slovak Commission for Yeasts can be found on the website www.chem.sk/yeast. The titles of lectures and poster of the 37th Annual Yeast Conference are listed below:

Invited Lecture to the memory of Dr. A. Kocková-Kratochvílová

- 1 André Goffeau (Belgium) From Yeast to yeasts genomics.

Lectures in the session Biochemistry and Cell Biology

- 2 Ludovico P (Portugal) Yeast Cell death: Apoptosis induced by environmental stresses.
- 3 Kopecká M (Czech Republic) Yeast pathogens: the cytoskeleton and the cell wall as targets for antifungals.
- 4 Bártil J (Czech Republic) Mitochondria in aging.
- 5 Kuchler K (Austria) Fungal pathogens meet mammalian hosts – reciprocal attack & defence and the winner takes it all.
- 6 Petrežselyová S (Czech Republic) *VSCI*, a novel gene required for ion and volume homeostasis in yeast vacuole.
- 7 Rumpf C (Austria) Casein kinase-1 is required for efficient removal of Rec8 during meiosis I.
- 8 Valachovič M (Slovakia/Austria) Sterol uptake in yeast *S. cerevisiae*.

Lectures in the session Genetics and Molecular Biology

- 9 Cid J (Spain) Humanized yeast as a tool for cancer research: focus on phospho-inositide-dependent signaling.
- 10 Malcová I (Czech Republic) Nuclear import of the chromatin-remodeling factor Isw1 in *Saccharomyces cerevisiae*.
- 11 Gregaň J (Austria) Phosphorylation induced oligomerization of Mde4 ensures proper segregation of chromosomes.

- 12 Zahrádka J. (Czech Republic) Role of 14-3-3 proteins in alkali-metal-cation homeostasis in *Saccharomyces cerevisiae*.

- 13 Kinský S (Slovakia) Telomeres in *Yarrowia lipolytica*: Characterization of the mutant lacking catalytic subunit of telomerase.

- 14 Kramara J (Slovakia) Identification of a novel yeast telomere-binding factor.

Lectures in the session Biotechnology

- 15 Laoteng K, Cheawchanlertfa P, Cheevadhanarak S, Sooksai S (Thailand) Probing fatty acid metabolism in *Hansenula polymorpha* by comparative analysis of defective and overexpressing strains.

- 16 Khongto B, Laoteng L, Tongta A (Thailand) Potential strategies for optimization of gamma-linolenic acid production in *Hansenula polymorpha*.

- 17 Leandro MJ, Prista C, Loureiro-Dias M, Sychrová H (Czech Republic) The osmotolerant yeasts *Zygosaccharomyces* possess unique fructose transporters.

- 18 Kumar Salar R, Čertík M, Brezová V, Brlejšová M, Hanusová V (India/ Slovakia) The role of stress factors in enhancing phenolic content and radical scavenging capacity of *Rhodotorula glutinis* CCY 20-2-26.

- 19 Anan Tongta (Thailand) Metabolic overflow of *Pichia pastoris*.

- 20 Suwannarat Y, Tongta A (Thailand) High cell density cultivation of *Pichia pastoris* km71 for production of human growth hormone.

- 21 Mazúr M, Husáriková L, Furdíková K, Kaliňák M, Valko M (Slovakia) Tokaj wines - a NMR spectroscopy study.

Lectures in the session Medical Mycology

- 22 Würzner R (Austria) Complement evasion by fungi.

- 23 Nemeth T, Hamari Z, Vagvolgyi, C, Gácsér A (Hungary) Host response to *Candida parapsilosis* infection.

- 24 Buc M (Slovakia) Innate and adaptive immunity in *Candida albicans* infections.

- 25 Bujdaková H, Kucharíková S, Šimová Z, Paulovičová, E, Paulovičová L, Kolečka A. (Slovakia) The *Candida* surface antigen CR3-RP - a novel member of DING protein family - a general overview.

- 26 Moráňová Z, Virtudazo E, Pospíšilová K, Ohkusu M, Kawamoto S, Husičková V, Raclavský V (Czech Republic and Japan) The *CRZ1* homologue plays important role in survival under limited aeration in the pathogenic yeast *Cryptococcus neoformans*.

Community Resources Lecture

- 27 Vinař T (Slovakia) Bioinformatics research at the Faculty of Mathematics, Physics and Informatics.

Five min presentations of selected posters (Poster Highlights)

- 1 Buček A (Czech Republic) Influence of polyunsaturated fatty acids produced by fatty acid desaturases CPFAD2 and CPFAD3 from *Candida parapsilosis* on phenotype of *S. cerevisiae*.
- 2 Drobcová B (Slovakia) Action of proapoptotic protein tBID reconstituted in yeast.
- 3 Bardelčíková A. (Slovakia) The functional state of the ATP synthase and mito-chondrial morphology of *Kluyveromyces lactis* mutant cells.
- 4 Mazáň M Biochemical properties of Crh proteins catalyzing transglycosylation in yeast cell wall.
- 5 Frýdlová I (Czech Republic) Dse1p overproduction and its influence on polarity proteins in *Saccharomyces cerevisiae*.
- 6 Tarnowski L (Poland) Crm1-dependent nuclear export signals of human cohesion STAG2 expressed in yeast *Saccharomyces cerevisiae*.
- 7 Borecká S (Slovakia) Role of the Snf1p protein kinase in stress response and virulence of the yeasts *Saccharomyces cerevisiae* and *Candida glabrata*.
- 8 Džugasová V (Slovakia) Molecular and phenotypic characterization of *Saccharomyces cerevisiae* *pdr3* mutant alleles prepared by site-directed mutagenesis.
- 9 Višacká K (Slovakia) Biochemical analysis of the HMG-box containing mitochondrial protein CaGc1 *Candida albicans*.
- 10 Pangallo D (Slovakia) Molecular strategy for identification and selection of fungal and yeast populations on grapes and in musts of slovakian wines.
- 11 Šuranská H (Slovakia) Identification and comparison of yeasts population isolated from ecological and integrated vineyard by PCR-RFLP method.

- 12 Czyzowska A (Poland) The selection of yeast strains suitable for ethanol production from waste plant materials.
- 13 Šuchová K. (Slovakia) Novel α -glucuronidase of *Pichia stipitis*.
- 14 Farkas Z. (Slovakia) Identification of killer toxin produced by *Pichia anomala* VKM Y- 159 strain.
- 15 Pfeiffer I (Hungary) Differential sensitivity of *C. parapsilosis*, *C. metapsilosis* and *C. orthopsilosis* to statins.
- 16 Paulovičová L. (Slovakia) Immunogenicity of synthetic mannan derived oligosaccharides–protein conjugates.

List of posters

- 1 Borecká S, Schwarzmüller T, Novohradská S, Talafová K, Kuchler K, Šubík J (Slovakia/Austria) Role of the Snf1p protein kinase in stress response and Virulence of the yeasts *Saccharomyces cerevisiae* and *Candida glabrata*.
- 2 Fertáľová J, Gérecová G, Drobcová B, Bhatia I, Polčic P, Mentel M (Slovakia) BH3-only proteins BIK, NOXA and BMF inhibit anti-apoptotic effect of both BCL-xl and BCL-2 proteins.
- 3 Fričová, D, Valach, M, Farkas, Z, Pfeiffer, I, Tomáška, L, Nosek, J. (Slovakia/Hungary) Mitochondrial genome from the yeast *Candida jiufergensis* provides clues for evolution of the linear genomes in yeast mitochondria.
- 4 Hegedúsová E, Nosek J. (Slovakia) Functional analysis of the NTG1 gene coding for DNA N-glycosylase from the yeast *Candida parapsilosis*.
- 5 Hodúrová Z, Tóth Hervay N, Balková K, Gbelská Y (Slovakia) Autoregulation of *KIPDR1* gene encoding the transcription factor involved in *Kluyveromyces lactis* multidrug resistance.
- 6 Kováč J, Valach V, Nosek J, Brejová B, Vinař T (Czech Republic/Slovakia) Reconstructing ancestral gene orders in yeast mitochondrial genomes.
- 7 Mešžánek J, Brejová B. (Slovakia) Software for annotation of protein coding genes in yeast mitochondrial genomes.
- 8 Slezáková-Holešová Z, Zavadiaková I, Jakúbková M, Zeman I, Nosek J (Slovakia) Investigation of genes implicated in the degradation of hydroxyaromatic compounds by the pathogenic yeast *Candida parapsilosis*.

- 9 Teigell-González, A, Krajčiová, M, Tomáška,Ľ, Nosek, J, Neboháčová, M. (Slovakia) *Candida parapsilosis* repertoire of the genes coding for telomere maintenance proteins.
- 10 Valach M, Gregorová J, Zemanová J, Tomáška Ľ, Nosek J (Slovakia) A linear mitochondrial genome with telomeric hairpins of the yeast *Candida vartiovaare*.
- 11 Vránová D, Šuranská H, Krätschmerová K, Palíková P (Czech Republic) Comparison of certain regions of rDNA in order to identify of *Saccharomyces* genus.
- 12 Bubnová M, Sychrová H (Czech Republic) Active glycerol transporters in the osmotolerant yeast *Zygosaccharomyces rouxii*.
- 13 Garaiová M, Nahálková V, Kohút P, Hapala I (Slovakia) Squalene accumulation in the yeast *Saccharomyces cerevisiae* is induced by mutations in the ERG1 gene.
- 14 Halgaš O, Sulo P, Hapala I (Slovakia) *Sall.1* mutation begets moot petite phenotype in systematic deletion mutants.
- 15 Čertík M, Jalčáková M, Cirjak M, Jandíková J (Slovakia) Characterization of lipid profile of *Pichia pastoris* grown under various cultivation conditions.
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- 17 Breierová E, Márová I, Čertík M, Mikušová L, Antalová M (Slovakia/Czech Republic) Bioaccumulation and uptake of iron ions by red yeasts.
- 18 Márová I, Hároniková A, Petrik Siniša, Čáčková K, Čertík M, Breierová E (Czech Republic/Slovakia) Production of carotene-enriched biomass by several red yeast strains cultivated on processed plant waste substrates.
- 19 Duroňová K, Lichnová A, Pařilová K, Márová I (Czech Republic) Study of antimutagenic effect of “czech beer” using yeast test system *Saccharomyces cerevisiae* d7.
- 20 Lichnová A, Vondráčková H, Obruča S, Matoušková P, Hároniková A, Márová I (Czech Republic) Comparison of hydrolytic effect of some yeast and fungal extracellular enzymes to cereal waste substrates: a preliminary study.
- 21 Czyzowska A, Nowak A, Dziugan P (Poland) β -glucosidase (anthocyanase) activity of yeast *S.cerevisiae*.
- 22 Kregiel D, Berlowska J, Ambroziak W, Mizerska U (Poland) The influence of chemical modification of Chamotte carriers on yeast adhesion.
- 23 Dokupilová I, Repka V, Friedlandärová V, Kaňuchová Pátková J (Slovakia) Screening a virus diseases in vine in Slovakia.
- 24 Lakatošová J, Hrivňák J, Kaňuchová Pátková J (Slovakia) The database of aromagrams.
- 25 Husáriková L, Mazúr M, Furdíková K, Kaliňák M, Valko M. (Slovakia) Slovak Tokaj wines oxidative vs. reductive processing technology.
- 26 Sláviková E, Vadkertiová R. (Slovakia) Influence of pesticides on the yeasts colonizing the leaves.
- 27 Jana Molnárová, Vadkertiová R (Slovakia) The killer activity of yeasts isolated from plant material.
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- 29 Paulovičová E, Kertys P, Hrubíško M, Hudáková T (Slovakia) β -Glucan and α -mannan antibodies-novel in vitro diagnostics of candidal colpitis.
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- 37 Fertáľová J, Gérecová G, Drobcová B, Bhatia I, Polčic P, Mentel M. (Slovakia) BH3-only proteins bik, noxa and bmf inhibit anti-apoptotic effect of both BCL-xL and BCL-2 proteins.
- 38 Jatzová K, Procházka E, Sulo P (Slovakia) Intron games in the interspecies hybrid mtDNA (intron thrown in throne).
- 39 Procházka E, Hagman A, Sulo P, Piškur J (Slovakia/Sweden) Experimental evolution of good brewer: “the rise”.
- 40 Breierová E, Pátková-Kaňuchová J, Nimcová K, Lakatošová J (Slovakia) Diversity yeasts and yeast-like microorganisms on the vine ecosystems of Slovakia.

Communicated by Peter Biely

Forthcoming Meeting

ISSY28, Bangkok, Thailand

ISSY28 is still being planned for 15-18 September 2010 at Montein Riverside Hotel, Bangkok, Thailand. On-line registration is opened. In view of the recent improvements in the political situation in Bangkok, the organizers, in consultation

with the International Commission on Yeasts, have decided to proceed with the meeting. Readers are encouraged to look for updates on the program and excursions on the ISSY28 website: www.issy28.org

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For up-to-date announcements on other forthcoming meetings, please see the YNL website
<http://publish.uwo.ca/~lachance/Future%20meetings.html>

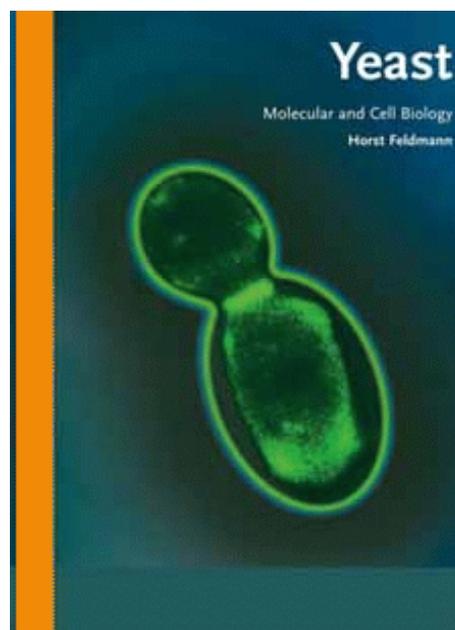
Publications of Interest

Yeast Molecular and Cell Biology

Horst Feldmann, Adolf-Butenandt-Institute, Molecular Biology,
University of Munich, Germany

Paperback • 348 pages November 2009 ISBN: 978-3-527-32609-9
£80.00 / \$129.95 / €89.00

This book is an up-to date resource providing a comprehensive account of yeast biology and its use as a tool and model organism for understanding cellular and molecular processes of eukaryotes. Topics covered range from the fundamentals of yeast biology such as cell structure, biochemistry, genetics and signaling, to current approaches and applications such as metabolomics, disease models and uses in biotechnology. Written by a top expert in the field, this book offers an invaluable companion to beginners and experts in yeast research.



The Yeasts, a Taxonomic Study, Fifth Edition, 2010 **Edited by Cletus P. Kurtzman, Jack W. Fell, and Teun Boekhout.** **Elsevier Science Publishers B. V. – Amsterdam.**

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- 154 *Reniforma* Pore & Sorenson (1990)
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- 155 *Rhodotorula* Harrison (1928)
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- 161 *Trichosporon* Behrend (1890)
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**Fifty Years Ago in “YEAST: A news Letter for Persons Interested in Yeast”
(Volume IX Number 1, May 1960)**

Editor: H. J. Phaff, University of California, Davis; Associate Editors L. R. Hedrick, Illinois Institute of Technology and C. Dunn, Massachusetts Institute of Technology).

Mrs. **N. Kreger-van Rij**, Centraalbureau voor Schimmelcultures, Delft reported that CBS was preparing a new catalog of cultures. CBS researchers published descriptions of eleven new species since the previous Yeast News Letter, including *Candida atmosphaerica*, *C. fimeteria*, *C. krusei* var. *saccharicola*, *Cryptococcus terricolus*, *Hansenula coprophila*, *Pichia minuscula*, *Saccharomyces elegans* var. *intermedia*, *Schwanniomyces hominis*, *Torulopsis buchneri*, *T. fujisanensis*, and *T. saccharini*.

J. P. van der Walt, National Chemical Research Laboratory, Pretoria, South Africa reported that the wine research group moved from Stellenbosch to Pretoria. He also reported observations of spore formation among

various species of *Brettanomyces*. “As the type species of the genus appears to be sporogenous, it appears as if the entire genus should be transferred to the Endomycetaceae.”

L. J. Wickerham, USDA-ARS, Northern Utilization Research and Development Division, Peoria, Illinois, USA reported on various lines of biochemical phylogenetics.

Samuel P. Meyers, University of Miami, The Marine Laboratory, Miami, Florida USA reported that Dr. N. van Uden, University of Lisbon, Portugal planned to be at the Marine Laboratory, University of Miami in summer 1960 as a Visiting Research Scientist, to work on “aspects of the marine yeast program, especially on studies related to the possible association of yeasts with marine animals.”

Herman J. Phaff, University of California, Davis, CA, USA reported on studies of yeasts associated with bark beetles, digestion of yeast cell walls with microbial enzymes, and the effect of sorbic acid on the metabolism of yeast. Visitors to the lab in spring 1960 included Dr. van Uden (Lisbon, Portugal). [*Associate editor's note: beetle-associated yeasts continue to be a focus of study at the Phaff Yeast Culture Collection, where studies of beetle-associated yeasts in Indonesia are underway.*]

K. Kodama, Kodama Brewing Co. Ltd., Iitagawamachia, Japan, requested that readers ship samples of soil and decaying fruit to Japan to be used in studies of film-forming yeasts. “It is best to airmail samples in plastic envelopes or small vials to my laboratory.”

Kyria Boundy-Mills

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