Y E A S T

A News Letter for Persons Interested in Yeast

Official publication of the
International Council of Yeasts and Yeast-like microorganisms

June 1969 Volume XVIII, Number 1

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Many thanks to those who have contributed to this issue by sending in news items and accounts of research projects. The next issue will be published in December 1969. A contribution of $1.00 from those who have not contributed for some time would be appreciated to finance future editions of the News Letter. Many thanks to those who have contributed recently.

H. J. Phaff

I Université De Lyon, Laboratoire De Biologie Végétale, 43, Boulevard Du 11 Novembre 1918, 69 - Villeurbanne, France. Communicated by Dr. M. C. Pignal.

Below follows the latest news from our laboratory.

I. Recently completed work and submitted for publication.

1) Description of new species and varieties: Three of Pichia, two of Torulopsis and two of Candida (by F. Jacob).

2) Application of enzymology to systematics, α-Glucosidase, β-galactosidase, and β-glucosidase in Kluyveromyces wikenii and Kl. aestuarii. Kl. wikenii possesses a β-galactosidase and a β-glucosidase, both of which are constitutive, but this species is lactose and arbutin negative. Its enzymes are compared with those of Kl. aestuarii.

A study of the validity of the criteria separating Kl. wikenii and Kl. aestuarii, on the basis of their respective enzymes, hybridization between the two species and their base composition (GC content) indicates a close relationship.

II. Work in progress.

Base composition (% G + C) by thermal denaturation in species of Pichia and Kluyveromyces.

II Muséum National D'Histoire Naturelle, Laboratoire D'Ethologie, Parc Zoologique, Paris XII. Communicated by Dr. H. Saëz.

The following publications have appeared or will be published shortly:

I) Yeasts:

Considérations sur les levures isolées du poumon des Mammifères. Recueil de Médecine Vétérinaire, T.144, no 4, 357-373, 1968.

L'incidence du type de prélèvement choisi dans l'isolement des levures chez des Oiseaux. Le Gerfaut, 58, 1-2, 152-161, 1968.

Levures isolées du tube digestif des Mammifères examinés de 1959 a 1963. Resultats en fonction de l'âge. Annales de l'Institut Pasteur, 116, 2, 218-237, 1969.

To appear:

Candidose aviaire de l'oesophage associée à une helminthose.

H. Saez & J. Rinjard: Levures isolées chez des Mammifères a régime alimentaire omnivore.

H. Saez & J. Rinjard: ... à régime alimentaire carnivore.

" " : ... à régime alimentaire piscivore.

" " : ... à régime alimentaire herbivore.

2) Geotrichum:

Geotrichum gracile (Weigmann et Wolff 1909) Windisch 1952, un endosporé. Mykosen, 2, 5, 347-352, 1968.

Geotrichum pseudocandidum n. sp., isolé chez un Cerf d'Eld - Rucervus eldi (Guthrie). Mycopath. Mycol. Appl., 34, 3-4, 359-363, 1968.

Etude de quatre champignons arthrosporés, formant des endospores. Microbiologia Española, 21, 3-4, 193-204, 1969.

To appear:

Formation d'endospores chez G. candidum.

III Research Institute for Viticulture and Enology, Bratislava, Czechoslovakia. Communicated by Dr. E. Minarik.

The following paper has been prepared for publication in Wein-Wissenschaft (German Federal Republic): "Occurrence of Saccharomyces inconspicuus van der Walt on grapes and in fermenting grape juice".

From a number of 32 yeast strains isolated from grapes and fermenting grape juice in several wine regions of Czechoslovakia formerly classified as Saccharomyces (Torulaspora) rosei Lodder et Kreger van Rij, 5 strains were reidentified as the new species Saccharomyces inconspicuus van der Walt. The main criterion in the differentiation of both species is the behaviour towards sucrose and raffinose. Whilst Saccharomyces rosei ferments sucrose and raffinose to 1/3 easily, the fermentation of sucrose is weak and that of raffinose very weak and slow with Saccharomyces inconspicuus, as recently shown by van der Walt. No morphological or other important physiological or biochemical differences between these two species could be found.

IV Lehrstuhl für Mikrobiologie der Technischen Universität Berlin und Forschungsinstitut für Mikrobiologie im Institut für Gärungsgewerbe und Biotechnologie, SeestraBe 13, 1 Berlin 65 (West). Communicated by Prof. Dr. S. Windisch.

Since the last contribution the following publications have appeared:

S. Windisch: Das Leben der Mikroorganismen in ihrer Umwelt. (Life of micro-organisms in their environment). Physikal.Medizin u. Rehabilitation 9, 69-70, 1968.

S. Windisch: Über die Grundlagen der Ökologie der Hefen. (Principle of ecology of yeasts). Oecologia Plantarum (Montpellier/Paris) 3, 69-82, 1968.

N. van Uden und S. Windisch: Candida friedrichii sp.n., a melibiose fermenting yeast. A. v. Leeuwenhoek 34, 270-274, 1968.

S. Windisch: Flocculation of Brewing Yeasts, a review. Brewers Digest, Nov. 1968, 62-66.

S. Windisch: Bericht über osmotolerante Hefen. (Short report on osmotolerant yeasts). Gordian (Hamburg) 1969, Nr. 3, 115-119.

S. Windisch: Studies on osmotolerant yeasts. Proc. 2nd Symposium on Yeasts, Bratislava 16-21 July 1966.

J. Firnhaber und S. Windisch: Über das Kopulationsverhalten von Saccharomyces-Hefen. (About the conjugation of Saccharomyces-yeasts). Arch. f. Mikrobiologie 65, 329-345, 1969.

The 2nd Symposium "Technical Microbiology" will be held from 15 to 17 April 1970 in the Institut für Gärungsgewerbe und Biotechnologie, Berlin. Persons interested may ask for circular.

V University of Illinois, Department of Plant Pathology, Urbana, Illinois 61801
Communicated by Dr. James B. Sinclair.

I have recently moved from Louisiana State University to the Department of Plant Pathology, University of Illinois, Urbana 61801.

The following are abstracts of two papers, one recently published and the second one in press.

Zeineb M. El-Tobshy and J. B. Sinclair. 1969. Pathological relationship between plant and animal isolates of Geotrichum candidum in avian egg. Phytopathology 59: 532-535. A method of virulence assay in embryonated chicken eggs was used to determine pathogenicity of seven plant and animal isolates of Geotrichum candidum. The two animal isolates were more pathogenic to the chorioallantoic membrane (CAM) than the five plant isolates. Yolk sacs were more susceptible than the CAM to both plant and animal isolates, but susceptibility decreased with age of the embryos. Serial passage of the fungus on the CAM tended to increase the virulence of both plant and animal isolates on this tissue. All isolates retained their pathogenicity to three citrus fruits after 10 serial passages on the CAM. Plant and animal isolates of the fungus grew in the CAM and incited hyperplasia and hypertrophy, followed by tissue disintegration as a response to infection. Plant and animal isolates of G. candidum are reciprocally pathogenic to plant and animal tissues.

Sinclair, J. B., and Zeineb M. El-Tobshy. 1969. Pathogenicity of plant and animal isolates of Geotrichum candidum in the turtle. Mycologia 61: in press. Arthrospore suspensions of seven plant and animal isolates of Geotrichum candidum ink were injected separately into two species of turtles. G. candidum was recovered after 2-week incubation at 31 C from 10 of 12 organs assayed for the fungus. Histological studies showed all fungus isolates penetrated turtle tissues, grew and produced secondary arthrospores. The seven isolates maintained their pathogenicity to orange, lemon, and tomato after passage through turtle. These results help establish the reciprocal pathogenicity of plant and animal isolates of G. candidum for plant and animal tissues. G. candidum may be considered a biopathogen.

VI Argonne National Laboratory, Division of Biological and Medical Research, 9700 Cass Ave., Argonne, Illinois, 60440. Communicated by Drs. F. Schlenk and G. Svihla.

Dr. Kathleen A. Killick (formerly at Illinois Institute of Technology) will join the investigations related to yeast cytology.

The applications and techniques of ultraviolet micrography to problems of microbiology have been covered in two publications:

Janicek and Svihla, The Microscope 15:500 (1967); J. Biol. Photographic Association 36: 59 (1968).

The earlier work (F. Schlenk et al., Arch. Biochem. Biophys. 113:127; J. Bact. 89:428, 93:759, 94:1509) on the interaction of small protein molecules with yeast cell membranes has been continued. Cytochrome c was found particularly useful to demonstrate the penetration into the cells by photomicrography. A summary (presented by H. J. Phaff) will be included in the Proceedings of the Second International Symposium on Yeast Protoplasts, Brno, Czechoslovakia, 1968. A detailed report is in preparation.

VII University of Wisconsin, Laboratory of Molecular Biology, 1525 Linden Drive, Madison, Wisconsin 53706. Communicated by Dr. Harlyn O. Halvorson.

The following papers are currently in press or have appeared recently:

E. Schweizer, C. Mackechnie, and H. O. Halvorson, The Redundancy of Ribosomal and Transfer RNA Genes in Sacchromyces cerevisiae, Journal of Molecular Biology, Vol. 40, page 261 (1969).

E. Schweizer and H. O. Halvorson, On the Regulation of Ribosomal RNA Synthesis in Yeast, in press, Experimental Cell Research.

The DNA and RNA contents of a diploid strain of Sacchromyces cerevisiae were measured during aerobic growth in various media. The ratio of RNA to DNA was found to be a function of the growth rate. A comparison of a haploid strain with a series of polyploid cultures grown under the same conditions revealed that the RNA to DNA and the RNA to protein ratios were ploidy-independent. Ribosomal RNA-DNA hybridization experiments demonstrated that a constant percentage of the genome (2.4%) was homologous to ribosomal RNA. No evidence of specific ribosomal RNA gene amplification was found.

W. S. Vincent, H. O. Halvorson, H. R. Chen and D. Shin, A Comparison of Ribosomal Gene Amplication in Uni- and Multinucleolate Oocytes, Experimental Cell Research, in press.

Using ribosomal RNA-DNA hybridization, yeast ribosomal RNA was found to hybridize with a variety of DNA's from marine organisms. This permitted a comparison of measure of the amplification of ribosomal cistrons in organisms differing in the number of nucleoli.

Patric Tauro, E. Schweizer, R. Epstein and H. O. Halvorson, Synthesis of Macromolecules During the Cell Cycle in Yeast, In The Cell Cycle, Gene Enzyme Interactions, edited by G. M. Padilla, G. L. Whitson, and I. L. Cameron, 1969, Academic Press.

A program is currently underway with Dr. T. Oyen and Dr. J. Idriss to search for the ribosomal genes in yeast with disomic strains. Dr. Schweizer's early experiments indicated that the ribosomal genes were non-randomly distributed over the chromosomes.

R. Roth and H. O. Halvorson, Sporulation of Yeast Harvested during Logarithmic Growth, Journal of Bacteriology, May, 1969.

M. Esposito and R. Esposito, The Genetic Control of Sporulation in Sacchromyces I. The Isolation of Temperature Sensitive Sporulation Deficient Mutants, Genetics, January, 1969.

M. Esposito, R. Esposito, M. Arnaud, and H. O. Halvorson, Acetate Utilization and Macromolecular Synthesis During Sporulation of Yeast, Journal of Bacteriology, in press.

We are interested in obtaining information on antifungal agents or antibiotics which are active against yeast. Our hope is to collect potential inhibitors of RNA and protein synthesis which can be used for more detailed studies on the physiology of yeast. We would be willing to test any potential inhibitors or exchange information with others interested in this class of inhibitors.

II University of Strathclyde, Department of Applied Microbiology, Royal College, George Street, Glasgow C1. Communicated by Dr. J. R. Johnston.

Mr. P. V. Patel has completed the requirements for the Ph.D. degree and has taken up a fellowship with Professor Miller in McMaster University, Ontario. A summary of his thesis "Genetic studies on resistance to nystatin and amphotericin B in yeast" is enclosed.

(1) Nystatin resistant mutants of Candida albicans and of Saccharomyces have been isolated from various sensitive strains. The degree of resistance of these mutants varied up to 12X that of the sensitive strains.
(2) Kinetic studies of the effect of nystatin on a strain of Candida albicans and on haploid, diploid and tetraploid strains of Saccharomyces showed that there is a positive relationship between survival rate and ploidy. This is explained in terms of the cell surface: volume ratio.
(3) Both recessive and dominant genes were identified. These were designated NYS-4, NYS-5 and NYS-6. The existence of five functionally-distinct alleles of NYS-5 is suggested.
(4) Negative interaction in diploid cells was observed between different alleles.
(5) The presence is postulated of an allele-specific suppressor-modifier gene, SU^{N5}, which decreases or cancels resistance conferred by the NYS-5 gene. Two different alleles of this modifier gene are proposed. The existence of a cytoplasmic entity, λ, necessary for expression of the modifier gene, SU^{N5}, is inferred.
(6) No linkage of genes nys-4 and NYS-5 to a selection of mapped genes was found.
(7) Results of cross resistance of nystatin mutants to fungizone suggest that such studies can assist in identification of mutant loci.

IX Suntory Limited, The Central Research Institute, 2-43 Dojimanaka, Kita-ku, Osaka, Japan. Communicated by Dr. Yasuji Oshima.

One of the main current projects of this laboratory is concerned with a study of the genetic control of homothallism versus heterothallism in Saccharomyces. The following is a brief summary of research in progress:

Two unlinked genes, designated HO_α and HM, which control homothallism versus heterothallism in Saccharomyces, have been identified in a strain of S. oviformis. The HO_α gene acts as a specific mutator for the α mating type allele and changes the α genotype to an a (i.e., a'). The a' character is stable with respect to further action by HO_α as well as the normal a. A comparison between the map position of the normal a and that of the a' allele was made and it was observed that the mutational event caused by the HO_α gene occurred at a similar point as the mating type controlling locus on chromosome III but approximately 5 stranes closer to the thr_4 marker than the normal a allele.

Another gene HM has no effect on either mating type allele by itself; but in combination with the HO_α gene, it is effective in converting the a type culture to homothallism.

Homothallic cultures having the α HO_α hm genotype have shown essentially 2 homothallic : 2a : 0α segregations with a relatively high frequency of irregular asci which contain more than two a clones, while the cultures which have the α HO_α HM or a HO_α HM genotype give 4 homothallic : 0 heterothallic segregations for every ascus.

Allelism tests among the HO_α and HM gene systems using Winge's D gene and Takahashi's complementary gene system which consists of HM_1, HM_2 and HM_3 (Genetics 43, 705-714, 1958) have been made. Results of these tests indicate that (a) the D gene is not a single gene but consists of the HO_α and HM genes, (b) one of Takahashi's homothallic gene systems, i.e., the hm_1 HM_2 HM_3 genotype, is identified with the HO_α HM genotype. Takahashi's HM gene, HM_1, is concluded to be the α mating type allele itself and the homothallic HM_1 HM_2 hm_3 genotype corresponds to the α HO_α hm genotype.

The following papers have been published or were submitted to "Genetics".

I. Takano & Y. Oshima. An allele specific and a complementary determinant controlling homothallism in Saccharomyces oviformis. Genetics 57, 875-885, 1967.

I. Takano & Y. Oshima. Mutational nature of an allele specific conversion of the mating type by the homothallic gene HO_α in Saccharomyces.

X Forstbotanisches Institut, 78 Freiburg, Bertoldstr. 17, Germany. Communicated by Dr. F. K. Zimmermann.

Progress report on the Gene-Enzyme-Relations at the is_1-Locus of Saccharomyces cerevisiae.

The gene locus is_1 of Saccharomyces cerevisiae is the structural gene for threonine dehydratase (Kakar & Wagner: Genetics 49, 213, 1964). This enzyme catalyses the first reaction in the isoleucine biosynthetic pathway, i.e.

conversion of threonine to α-ketobutyrate. Properties of this enzyme in yeast have been worked out by Holzer, Boll & Gennamo (Angew. Chem. 75, 894, 1963). Mutants lacking threonine dehydratase are readily recognized by their requirement for isoleucine. Genetic and enzymatic studies with the is_1-threonine dehydratase system have been used to deal with several genetic problems.

1. The process of mitotic gene conversion.

In diploid cells, homologous chromosomes occasionally interact to undergo reciprocal mitotic recombination and non-reciprocal mitotic recombination (also called mitotic gene conversion). Mitotic gene conversion has been studied using the two mutant alleles is_{1-1} and is_{1-2} (Kaker: Genetics 48, 957, 1963). The two alleles are very stable in the haploid or the diploid homoallelic (is_{1-1}/is_{1-1} or is_{1-2}/is_{1-2}) condition, whereas the heteroallelic (is_{1-1}/is_{1-2}) diploid is relatively unstable, i.e. it produces cells no longer requiring isoleucine for growth. This spontaneous instability could further be increased by treatment with various chemical mutagens. Genetic analysis showed that these revertants to prototrophy were due to intragenic events, most probably mitotic gene conversion but not due to either reciprocal mitotic recombination or mutation (Zimmermann & Schwaier: Molec. Gen. Genetics 100, 63, 1967). Twenty three of such genetically analysed convertants (prototrophs generated by mitotic gene conversion) were tested for the properties of their threonine dehydratases. In all cases, the enzymes produced by these convertants turned out to be identical with wild type (Zimmermann: Molec. Gen. Genetics 101, 171, 1968). This result is interpreted to mean that gene conversion leads to an accurate transfer of pieces of genetic material between homologous positions of homologous chromosomes in a way predicted by the hybrid DNA hypothesis of recombination and gene conversion (Holliday: Genet. Res. 5, 282, 1964). This means, in the case of a heteroallelic diploid with two inactive but different alleles, that the mutated site in one allele is replaced by a non-mutated homologous DNA-span from the intact part of the other allele or vice versa. Thus, heteroallelism generates defined types of new alleles, a process which can be formally described as directed mutation.

2. Intragenic complementation.

Many gene loci code for multimeric enzymes, i.e. enzymes which in their active form consist of aggregates of identical subunits or monomers. In a diploid cell heterozygous for a gene locus coding for such an aggregate or multimeric enzyme two different types of monomers are formed corresponding to the two alleles present. Consequently, multimers can be formed which consist of only one type of monomers, homogeneous aggregates, or else are composed of both kinds of monomers, hybrid aggregates or hybrid enzymes. The most spectacular case of hybrid enzyme formation is observed in intragenic or interallelic complementation where two inactive mutant alleles combine in a heteroallelic diploid produce an active hybrid protein (cf. Fincham: Genetic Complementation. New York and Amsterdam: W. A. Benjamin, Inc., 1966). Interallelic complementation has been observed among mutants of the is_1-locus of Saccharomyces cerevisiae.

Threonine dehydratase was assayed in complementing, heteroallelic diploids. Fifteen complementing combinations of alleles were tested. Seven of these diploids yielded a threonine dehydratase activity that was high enough for further characterization. In five cases threonine dehydratase was clearly different from wild type, the most salient feature being the lack of feedback inhibition by isoleucine (Zimmermann & Gundelach: Molec. Gen. Genetics 103, 348, 1969). This shows that interallelic complementation does not always lead to a complete restoration of wild type enzyme.

3. Dominance relations.

Nutritional mutants are considered to be recessive because when they are crossed to wild type a diploid is regularly obtained which does not express any nutritional requirement. This was also the case with 40 *is*$_1$-mutants. Threonine dehydratase was assayed in the corresponding heterozygotes. The specific activity of threonine dehydratase was drastically reduced in many of the heterozygotes down to a level that was less than 10% of the activity in wild type cells. Moreover, four heterozygotes produced a fraction of threonine dehydratase resistant to feedback inhibition by isoleucine. The resistant enzymes showed altered substrate affinities and pH dependences. In other heterozygotes up to three threonine dehydratase fractions differing by their substrate affinities could be demonstrated simultaneously in one diploid (Zimmermann & Gundelach: Molec. Gen. Genetics 103, 348, 1969; Zimmermann, Schmiedt & ten Berge: Molec. Gen Genetics, in the press). The results can be interpreted to mean that dominance and recessiveness or intermediate behavior are not adequate concepts to describe conditions in diploids heterozygous for structural genes coding for aggregate enzymes. There are not only quantitative but also qualitative differences between homozygotes and the corresponding heterozygotes.

4. The gene dosage problem.

When an active and an inactive allele are crossed together in a heterozygous diploid it can be assumed that the amount of active gene product formed is half that found in the diploid homozygous for the active allele provided there is no regulatory mechanism adjusting the production of the gene product to a given level. This expectation has been borne out (Mangelsdorff & Fraps: Science 73, 271, 1931) and has led to the establishment of the gene dosage concept. In the case of *is*$_1$-mutant x wild type heterozygotes specific activities are expected to be half that of wild type. The expected level of activity was found with only a few of the mutant x wild type crosses. There were deviations from expectation in both directions: specific activities well below and well above the 50% wild type level. These observations can be explained by the formation of hybrid enzymes which are either inactive or of reduced activity in the first case or else of wild type like activity in the case of specific activities higher than the expected 50% level. Thus, hybrid enzyme formation also blurs simple gene dosage relations (Zimmermann, Schmiedt & ten Berge: Molec. Gen. Genetics, in the press).

1 Southwest Center for Advanced Studies, P. O. Box 30365, Dallas, Texas 75230.
Communicated by Dr. Miguel Flores da Cunha.

The following is the English summary of my Doctoral Dissertation on Parasexuality in Schizosaccharomyces pombe, submitted to the Federal University of Rio de Janeiro, Brazil, in January 1969.

These studies were carried out at the Southwest Center for Advanced Studies (Division of Biology), under the supervision of Dr.Herbert Gutz.

Genetic mapping by means of mitotic haploidization (induced by para-fluorophenylalanine) and mitotic crossing-over was carried out with the fission yeast Schizosaccharomyces pombe. The minimum haploid chromosome number obtained by such analysis was, in addition, checked by cytological procedures. Furthermore, in an attempt to study the mechanism of action of para-fluoro-phenylalanine (p-FPA) on mitotic haploidization, pedigree analyses were performed by micromanipulation of diploid cells growing in the presence of p-FPA.

Thirty-two different markers were considered for the present mapping studies; some meiotic linkage relationships had been previously reported (Leupold, Megnet) for 15 of these loci. The haploidization experiments showed that the markers are distributed in at least 6 chromosomes as follows:

Chromosome I:

ade 3
ura 3
lys 2
— LEUPOLD, personal communication
ura 2
leu 2
ade 2
ade 4
lys 1
lys 3
lys 5
ura 1
ura 4
— haploidization data

Chromosome II:

ade 7	MEGNET, personal communication	haploidization data
glt		
arg 7		
ura 5		

Chromosome III:

centromere	LEUPOLD, personal communication	haploidization data
ade 6		
arg 1		

Chromosome IV:

arg 3 (haploidization data)

Chromosome V:

arg 6 (haploidization data)

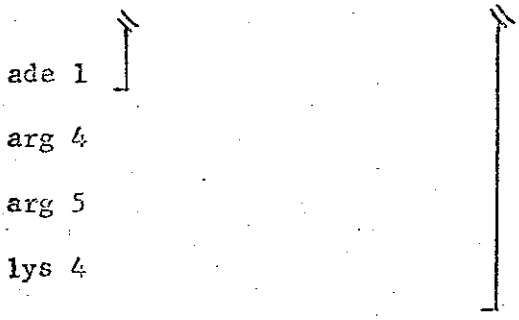
Chromosome VI:

ade 5 (haploidization data)

Because of technical difficulties, the genes of the mating-type (MT) linkage group (below) could not be used in most haploidization experiments. However, 3 genes were assigned to this linkage group by means of mitotic crossing-over; these markers are arg 4, arg 5 and lys 4. They are probably located distal to the MT region.

MT linkage group:

leu 1	LEUPOLD, 1958	mitotic crossing-over data
his 7		
MT		
his 2		
his 5		
leu 3		
met 3		



It remains to be shown whether the MT linkage group is located in an additional 7th chromosome or in any of the previously characterized chromosomes, with the exception of chromosome III.

Cytological observations (Giemsa staining) showed 3 to 5 chromatin granules present at anaphase I of a sporulating diplont. However, since the number of chromatin granules is not the same as the number of chromosomes obtained by genetic analysis, some of these granules could be interpreted as chromosome aggregates, rather than individual units. Due to a lack of more refined cytological techniques, it has not yet been possible to improve the correlation between the cytological and the genetic findings.

By pedigree analyses, it was determined that p-FPA induces haploidization at least as early as the 4th consecutive cell division. It was also observed that diploid cells dividing in the presence of p-FPA often give rise to lethal pedigree branches.

XII Centre National De La Recherche Scientifique, Laboratoire D'Enzymologie, 91 - Gif-Sur-Yvette, France. Communicated by H.de Robichon-Szulmajster.

The following paper is in press in the European J. Biochem.

Regulation of Isoleucine-Valine Biosynthesis in Saccharomyces cerevisiae. V. Altered Threonine Deaminase in an is_1 Mutant Responding to Threonine. A. Brunner, A. Devillers-Mire and H. de Robichon-Szulmajster.

An isoleucine requiring mutant (M6) of Saccharomyces cerevisiae was found to have an altered threonine deaminase. The mutation maps in the is_1 locus which corresponds to a threonine deaminase deficiency in other isoleucine requiring mutants.

Both the molecular weight and the absolute number of sites for the ligands remain the same in the wild type and the mutant enzyme.

The following catalytic and regulatory properties are modified in the mutant enzyme:

1) Affinity towards threonine is 4 to 6 fold lower. Also in contrast with the wild type, cooperativity between substrate molecules is maintained at pH 7.5.

2) Affinity towards the substrate analogue (competitive inhibitor), allothreonine, is 2 to 3 fold lower.

3) Affinity towards a feedback inhibitor, isoleucine, is increased by 5 to 6 fold.

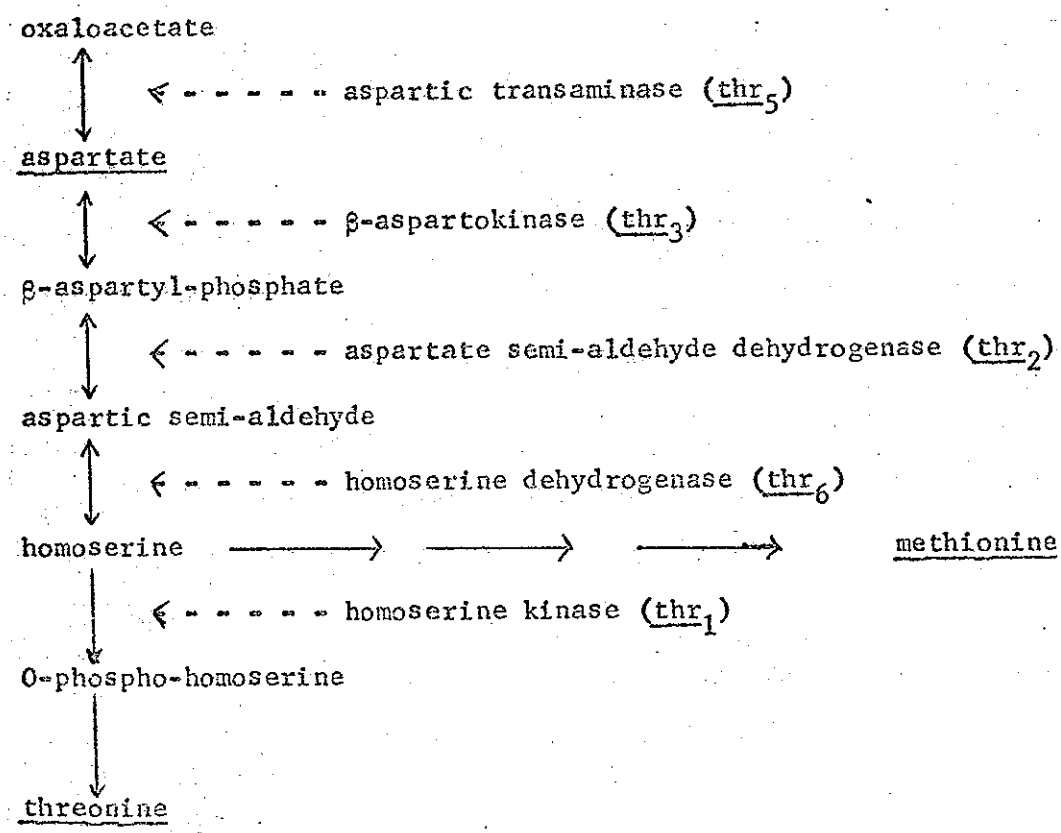
4) Valine remains active as a positive effector (suppressing the cooperativity between substrate molecules) but a 20 fold higher concentration is required for a 50% maximal effect. On the other hand, at high concentrations, valine is inhibitory. The apparent K_i, at substrate saturation, is 36 mM.

The changes in kinetic properties of the mutant enzyme, which occurred for each individual ligand in the most unfavorable direction, can explain its complete inefficiency in vivo, and account for the isoleucine requirement of the mutant strain. Growth studies have shown that the impaired enzyme can, in vivo, utilize exogenous threonine and be activated by exogenously supplied valine. These results have been interpreted as an indication that endogenous threonine and valine concentrations were the factors responsible for the mutant's inability to grow in minimal medium.

In addition to explaining the physiological behavior of the mutant M6, the present study contributes information on the interdependence between various ligand sites on the yeast threonine deaminase.

Threonine Biosynthesis and Regulation in S. cerevisiae. Y. Surdin-Kerjan Thesis, University of Paris, June, 1969. Laboratoire d'Enzymologie du C.N.R.S. - 91 - Gif-sur-Yvette, France

In S. cerevisiae, previous biochemical studies have shown that biosynthesis of threonine proceeds as in E. coli:



Genetic studies indicate that six unlinked genes are involved in threonine biosynthesis. The enzyme deficiency for five of these 6 genes has been determined. The metabolic pathway and the gene enzyme relationships are summarized in the above figure. At present, the enzyme defect in thr_4 mutants is unknown.

During this study we found that all mutants blocked in threonine biosynthesis are simultaneously deficient in cytochrome oxidase. As the thr genes are unlinked this suggests a metabolic relationship between the two phenotypes. A change in the carbon source (ethanol or glycerol instead of glucose) or a high concentration of threonine (10mM) permits the synthesis of cytochrome oxidase. We interpret this as a possible role of a differential auxotrophy for the cytoplasmic and the mitochondrial protein synthesis systems. This hypothesis is presently under investigation.

The second enzyme of the pathway, aspartic semi-aldehyde dehydrogenase has been purified to homogeneity. This enzyme has the unusual property of being activated by bicarbonate.

Kinetic studies show that the bicarbonate may interact with the phosphate sites, on the enzyme. Heat inactivation studies at different pH's suggest that the enzyme exists in three forms:

$$E \underset{H^+}{\rightleftharpoons} EH \underset{H^+}{\rightleftharpoons} EH_2$$

One form, EH, is stable at 60° (t1/2 = 3 to 5 hours) while the other two forms are heat labile.

The regulation studies of this pathway have shown that the specific activity of aspartokinase and aspartic semi-aldehyde dehydrogenase responds to exogenous threonine concentration, while homoserine dehydrogenase level seems to be controlled by exogenous methionine concentration.

XIII Research Laboratories of the State Alcohol Monopoly (Alko), Helsinki, Finland. Communicated by Prof. Heikki Suomalainen.

Timo Nurminen and Heikki Suomalainen, Respiratory enzyme activities of anaerobically and aerobically grown baker's and brewer's yeast. Ann. Acad. Sci. Fennicae Ser. A IV, No. 128, 45-46 (1968).

A study has been made of the enzyme activities which appear in the electron transport, as well as in the tricarboxylic acid cycle of baker's and brewer's yeast, grown under anaerobic and aerobic conditions, in homogenates and in subcellular fractions isolated from spheroplasts.

Heikki Suomalainen and A. J. A. Keränen, The fatty acid composition of baker's and brewer's yeast. Chem. Phys. Lipids 2, 296-315 (1968).

Straight-chain C_{13}-C_{18} fatty acids, added together with aspartic acid to a biotin-free medium, are capable of promoting the growth of baker's yeast under aerobic conditions. The effect of biotin is compensated by oleic acid and

palmitoleic acid, and the influence of elaidic acid, like that of stearic or palmitic acid, is only slightly less marked. The addition of long-chain fatty acids, or their ethyl esters, did not noticeably influence the fatty acid content of yeast, although the addition of oleic or palmitoleic acid caused an accumulation of the acid concerned, and correspondingly a clear diminution of the other unsaturated component. The elaidic acid taken up by the yeast was not isomerized to oleic acid, but was as such capable of replacing oleic acid in promoting the growth of yeast. Normally, the fraction of $C_{18:1}$ acids of baker's yeast mainly contained oleic acid and small amounts, less than 5%, of elaidic acid, and about 5% vaccenic acid, in its cis-form, and traces of the trans-form.

Tridecanoic acid, taken up by baker's yeast from the medium, was converted into pentadecanoic acid, and, to some extent, to heptadecanoic acid; increases occurred in the amounts of the corresponding mono-unsaturated acids, tridecanoic, pentadecanoic and heptadecanoic. On the addition of palmitic acid -1- ^{14}C at the first stages of growth, a more distinct accumulation of activity was discernible in the C_{16} acids when biotin-poor baker's yeast was grown, than was the case with biotin-containing yeast. The situation was reversed with C_{18} acids, and the activity continued to accumulate in the C_{18} acids of biotin containing yeast.

Bottom-fermenting brewer's yeast contained amounts of C_8-C_{12} fatty acids which considerably exceeded those in baker's yeast. Moreover, palmitic and palmitoleic acid, along with linoleic and linolenic acid, were found more abundantly, although less oleic acid was found in brewer's than in baker's yeast.

Heikki Suomalainen, Olli Kauppila, Risto J. Peltonen and Lalli Nykänen, Branntweine, Handbuch der Lebensmittelchemie, Bd. 7, Springer Verlag, Berlin-Heidelberg-New York 1968, S. 496-653.

A large review is given on the production and composition of heavy liquors and distilled potable spirits.

T. Nurminen and H. Suomalainen, Location and activity of the respiratory enzymes of baker's yeast and brewer's bottom yeast grown under anaerobic and aerobic conditions. J. Gen. Microbiol. 53, 275-285 (1968).

The activity of the electron-transport enzymes of baker's yeast or brewer's bottom yeast, grown under anaerobic conditions, was very low. When anaerobic baker's yeast was cultured aerobically to the mid-exponential phase with limited carbon source, the activity of the electron-transport enzymes increased 3- to 10-fold and, correspondingly, the activity in the stationary phase rose 10- to 50-fold. For brewer's bottom yeast the increase of activity induced by oxygen in the aerobic stationary phase was only about 3- to 4-fold and the activity was clearly lower than that of baker's yeast. The activity of the electron-transport enzymes accumulated in the 10,000 g sediment, which under aerobic conditions contained 60-80% of the total activity, the $NADPH_2$ oxidase-system formed an exception. The activity of the enzymes of the citric acid cycle also increased under aerobic conditions but only 2- to 10-fold in baker's yeast of the aerobic stationary phase; in brewer's bottom yeast the increase during oxygen adaptation was proportionally greater. The bulk of the enzymes of the citric acid cycle were found in the postmitochondrial supernatant, while the 10,000 g sediment contained 20 to 40% of the total activity.

The 10,000 g sediment of anaerobically grown baker's yeast contained mitochondrial precursors, while the 10,000 g sediment from the aerobic exponential phase contained mitochondria with a more developed structure, showing a respiratory control ratio of 1.4-1.7 with several substrates. The internal structure of the mitochondria was not completely developed until the aerobic stationary phase, where the uptake of oxygen with several substrates also increased many-fold.

Heikki Suomalainen and Pentti Ronkainen, Mechanism of diacetyl formation in yeast fermentation. Nature 220, 792-793 (1968).

Diacetyl is formed in yeast fermentation by decomposition of the α-acetolactic acid synthesized by yeast, which was transferred from the cells into the fermenting medium. 2,3-Pentanedione is formed in an analogous way from α-aceto-α-hydroxybutyric acid. The suggestion that diacetyl in yeast fermentation is formed by decomposition of acetolactate also explains the observation that the addition of valine inhibits the formation of diacetyl by yeast, while valine causes a feed-back inhibition on acetolactate formation, by the inhibition of α-acetohydroxy-acid synthetase. (Presented at the Meeting of Scandinavian Chemists, Copenhagen August 20th, 1968).

Heikki Suomalainen, Penetration of some metabolic compounds into and from the yeast cell, Suomen Kemistilehti 41A, 239-254 (1968).

A review of investigations made at the Research Laboratories of the Finnish State Alcohol Monopoly (Alko) concerning the following topics: Penetration of some metabolic compounds into the yeast cell (α-Keto acids, Fatty acids, Effect of buffer system, Keto acid esters); Release of some metabolic compounds from the yeast cell (Dried yeast, Appearance of α-keto acids in the medium); Aroma compounds in alcoholic beverages (Aroma components of distilled beverages, Aroma compounds in fermentation solutions); Yeast protoplasts and plasma membrane.

P. Ronkainen, S. Brummer, H. Suomalainen, New methods for the determination of carbonyl compounds in alcoholic solutions. Fermentations et vinifications, 2^{e} Symposium International d'Oenologie, Bordeaux-Cognac 1967, Vol. 2, Institut National de la Recherche Agronomique, Paris 1968, p. 603-617.

Aldehydes, dicarbonyl compounds, and keto acids, have been utilized as model compounds in the development of a method for the isolation of trace amounts of these compounds as 2,4-dinitrophenylhydrazones from a dilute (8% w/w) aqueous solution (standard solution), and methods have been developed for the subsequent identification of the components of the hydrazone mixtures. The dicarbonyl compounds were analyzed as bishydrazones by thin-layer chromatography; the aldehydes were first analyzed as hydrazones by paper chromatography, and then as the corresponding carboxylic acids after ozonation of the hydrazone mixture. Analysis of the keto acids was effected by resolution of the hydrazone mixture on thin-layer plates, and also by gas chromatography, as keto acid methyl esters, after esterification and ozonation of their hydrazones. These methods have been applied for the study of fermented solutions, spirits, and wine and malt distillates.

Heikki Suomalainen, Kaija Konttinen and Erkki Oura, Decarboxylation by intact yeast and pyruvate decarboxylase of some derivatives of pyruvic acid and α-ketoglutaric acid. Arch. Mikrobiol. 64, 251-261 (1969).

Under anaerobic conditions at pH 2 pyruvic acid is vigorously decarboxylated by intact baker's yeast, but hardly at all at pH 5.5. The penetration of pyruvic acid ethyl ester into the cell is not dependent upon the pH of the medium. The ester is decarboxylated by intact yeast at about the same rate, at pH 2 and 5.5. It is not decarboxylated by a purified preparation of pyruvate decarboxylase (EC 4.1.1.1). α-Ketoglutaric acid is decarboxylated neither by intact yeast nor by an enzyme preparation, but with disintegrated yeast a noticeable formation of CO_2 is observable. By intact yeast, the γ-ethyl ester of α-ketoglutaric acid reacts towards the acidity of the medium in the same way as does pyruvic acid. α-Ketoglutaric acid diethyl ester behaves in a similar way to pyruvic acid ethyl ester: it penetrates the plasma membrane, and is decarboxylated by yeast but not by a preparation of pyruvate decarboxylase.

A standardization of methods for determination of the alcohol content of beverages and distilled potable spirits. Pure and Applied Chemistry 17, 274-312 (1968).

While drawing up a survey of the fermentation industries of the world, the Fermentation Industries Section of IUPAC found that the divergent ways of expressing alcohol content, and particularly the use of mutually uncomparable units, have lead to a great deal of confusion and misinterpretation. For this reason, the Section in July 1965 decided to include in its working programme the standardization of the methods for determination of the alcohol content as well as the drawing up of alcohol tables. At the meeting of the Section in Paris, 1966, it was decided that a standardized method should be presented for the determination of the alcohol content at 20°C, and that an alcohol table for use with this method should be prepared on the basis of the densities of alcohol-water solutions determined by Osborne et al. in 1913. The calculations have been carried out at the Research Laboratories of the Finnish State Alcohol Monopoly (Alko).

XIV University of Puget Sound, Tacoma, Washington 98416. Communicated by Dr. John G. Kleyn.

1) A publication tentatively titled "Some Preliminary Observations on Yeast Flora Present in Puget Sound" by Kokich, V., Rodich, J., and J. Kleyn, will be submitted for publication in the near future.

2) A paper titled "Ethylenediamine Tetra Acitic Acid, a New Biological Preservative for Beer" by J. Kleyn, has been presented at the 3rd International Yeast Symposium in Delft this June.

3) Mr. George Mills, a Master of Science degree candidate in Biology, and I are engaged in a project in conjunction with Seattle Metro to accomplish the following:

(a) To evaluate the potential use of waste brewer's yeast as an indicator organism for determining the boundaries of a sewage field formed in Pugent Sound by effluent from the Seattle Metro West Point Sewage Treatment Plant. Puget Sound is a deep body of sea water with swift moving currents.

(b) To learn more about other yeast types present in Puget Sound, in air above Puget Sound, and in sewage.

(c) To evaluate the effect of sea water on yeast viability and reproduction.

XV Faculty of Agriculture, University of Ankara, Turkey. Communicated by Dr. M. Hilmi Pamir.

The following study will soon be published.

Utilization of turkish sulphite waste liquors for the production of fodder and food yeasts, and on the production of certain other yeasts on this substrate.

First the utilization of turkish sulphite waste liquors for the production of fodder and food yeasts was studied, to determine the required nutrients in order to obtain optimal growth rate of the yeast or the substances to be eliminated from the substrate and to minimize the loss of additional nutrients by means of variation in the neutralization methods.

Next, the following three yeasts have been reproduced on a laboratory scale on the substrate supplied with certain basic nutrients.

C.B.S.842 Torulopsis utilis var. major Thaysen et Morris
C.B.S.1517 T. " " thermophila
C.B.S.94 Candida tropicalis (Cast.) Berkhout

The productivity of these yeasts has been determined according to the Pfeffer's equation. The economic coefficients were 90.26, 89.93, and 71.48% respectively and the percentages sugar utilization were 81.88, 75.5 and 84.9, respectively.

In this assay it has been demonstrated that there is no significant difference between the two Torulopsis strains according to their economic coefficients, whereas Candida shows a lower coefficient.

These three yeasts have been also tested for their compositions.

T. utilis var. thermophila proved to be the best yeast due to the high digestibility coefficient of its protein. However, this value (%86.19) was lower than that (%88-94) of DLG (Futterwerttabellen der DLG-Wiederkauer.1961). The protein of the variety "major" appeared to be less digestable (71.92%) than that of "thermophila". As to C. tropicalis, the digestible protein coefficient decreased to 41.73%.

With respect to total ash, T. utilis var. thermophila has been also found superior to the other yeasts tested. However, this value (%15.12) was higher than those stated by other workers.

In their ability to synthesize vitamins the same yeasts have shown rather big differences, e.g. T. utilis var. thermophila synthesized the most riboflavin (81.55 mg %) in regard to the other yeasts, but it appeared to produce the lowest biotin content (0.01 mg %) among the yeasts tested. On the contrary, C. tropicalis produced more biotin (0.34 mg %), but less pantothenic acid than the Torulopsis yeasts.

I Meetings

The Third International Symposium on Yeast, Delft and the Hague has been completed successfully by the organizing committee under the able chairmanship of Prof. T. O. Wiken. The Symposium opened on Sunday, June 1 with an informal gathering. A plenary session was held on Monday in the beautiful new aula of the Technical University in Delft. The five general lectures presented will be published in full as Part 1 of the Proceedings in an early supplement of Antonie van Leeuwenhoek. Part 2, containing brief versions of the remainder of the papers was available to the participants after registration.

The remainder of the sessions were held in the recently completed Congress Center in the Hague, a superb facility for such events. The large number of papers submitted made it necessary to hold three simultaneous sessions. A number of social events during the evenings and an excursion on Wednesday provided for relaxation. The meeting which attracted 391 active participants from about 30 countries closed with a plenary session on Friday, June 6 at 5 p.m. Professor C. Robinow spoke for the participants to express thanks and appreciation to the Organizing Committee for the excellent arrangements made.

The following resolution, proposed by the Council for International Cooperation in Yeast Science, was adopted by the participants of the Third International Symposium on Yeasts, held at Delft and The Hague, June 2 - 6, 1969:

1. Need for specialized Symposia in addition to general Symposia

In view of the large increase in attendance at the previous symposia - Smolenice 60, Bratislava 145, Delft and The Hague 391 active members - it appears desirable to expand the number of symposia devoted to specialized topics. The Council proposes the following special symposia:

a) In 1971 in Smolenice, Czechoslovakia, on characterization of yeast strains based on the techniques of genetics, cytology, ecology, biochemistry, etc.

b) In 1972 in Japan, in connection with the Fourth International Fermentation Symposium, on technological, medical and ecological aspects.

c) In 1973 in Helsinki, Finland, on metabolism and regulation of cellular processes.

2. Time and place of the next general Symposium on Yeasts

In 1974 a general symposium is to be held either in Austria, the U.S.A., U.S.S.R., or elsewhere. It is hoped that a final decision can be announced next year shortly after the International Congress for Microbiology in Mexico City.

3. The proposal for members of the next Council is as follows:

In Bratislava it was decided that the chairman and secretary of the organizing committee of the 3rd symposium shall succeed the respective officers of the organizing committee of the 2nd symposium. It is proposed that the chairman and secretary of the 3rd symposium shall remain in office until the 4th symposium in 1974.

Chairman: T. O. Wiken, The Netherlands
Vice Chairman: A. Kocková-Kratochvílová, Czechoslovakia
Secretary: L. Rodrigues de Miranda, The Netherlands
Members: K. Beran, Czechoslovakia
J. Boidin, France
L. do Carmo-Sousa, Portugal
N. Elinov, U.S.S.R.
Y. Fukazawa, Japan
P. Galzy, France
R. B. Gilliland, Ireland
F. S. M. Grylls, England
J. C. Hoogerheide, The Netherlands
J. Jakubowska, Poland
V. Johanides, Yugoslavia
H. Klaushofer, Austria
V. Kudriavzev, U.S.S.R.
U. Leupold, Switzerland
Ph. Matile, Switzerland
E. Minarik, Czechoslovakia
E. O. Morris, Scotland
R. Müller, German Democratic Republic
S. Nagai, Japan
O. Nečas, Czechoslovakia
E. K. Novak, Hungary
H. J. Phaff, U.S.A.
C. F. Robinow, Canada
J. Santa Maria, Spain
J. F. T. Spencer, Canada
A. Stenderup, Denmark
H. Suomalainen, Finland
J.P. van der Walt, South Africa
L. J. Wickerham, U.S.A.
S. Windisch, German Federal Republic

4. It is proposed that the Yeast News Letter edited by Professor Dr. H. J. Phaff, Davis, California, be adopted as the official medium of communication between the Council and workers in yeast science.

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A meeting on aspects of the physiology, ecology, and systematics of yeasts will be held at the Miner Institute, Chazy, New York and at the State University College of Arts and Sciences at Plattsburgh, New York from August 11 - 17, 1969 under the auspices of the "Summer Community of Distinguished Scholars". As part of this meeting, a colloquium "Recent Trends In Yeast Research" will be conducted on August 15 and 16 at the Plattsburgh campus. Plattsburgh, New York is located across Lake Champlain from Burlington, Vermont, the site of the AIBS meeting which convenes August 17. The colloquium on August 15 and 16 will be open to the general scientific community and will be held in an ultra-modern 470 seat lecture hall. To receive a complete program of events write to Dr. D. G. Ahearn, Department of Biology, Georgia State College, Atlanta, Georgia 30303. The program will include the following presentations.

1. "Sexuality in Candida lipolytica" by Cletus P. Kurtzman, U.S. Department of Agriculture.

2. "Growth of yeast on hydrocarbons" by Vladimir Munk, State University College of Arts & Sciences, Plattsburgh.

3. "Influence of wood pulp and oil wastes on populations of yeast in fresh waters" by Donald G. Ahearn, Georgia State College.

4. "The relationship of yeast phylogeny to recovery from radiation damage" by Alvin Sarachek, Wichita State University.

5. "Taxonomic significance of DNA base composition in yeast" by Sally A. Meyer, University of California, Davis.

6. "Nucleic acid homology among the fungi: An approach to evolutionary relationships" by James N. Bicknell, University of Washington.

7. "Correlation of DNA base composition and taxonomic characteristics in Hansenula" by Lynferd J. Wickerham, U.S. Department of Agriculture.

8. "Physiology of starch synthesis in Cryptococcus laurentii and its taxonomic implications" by Herman J. Phaff, University of California, Davis.

9. "Implications of alkylated amine utilization by yeast" by Samuel P. Meyers, Louisiana State University.

10. "Some recent observations on spore formation and germination in Saccharomyces" by J. J. Miller, McMaster University.

11. "Black Yeasts" by C. J. K. Wang, State University College of Forestry at Syracuse University.

12. "Seasonal populations of yeast in Lake Champlain" by Warren L. Cook, State University College of Arts & Science, Plattsburgh, N.Y.

13. "Recent studies in the taxonomy of the genus Metschnikowia" by Martin W. Miller, University of California, Davis.

14. "Yeast with heterobasidiomycetous life cycles by Jack W. Fell, University of Miami.

XVII New Books.

T H E Y E A S T S

Edited by A. H. Rose and J. S. Harrison.

Publisher: Academic Press Ltd. (London). Berkeley Square House, Berkeley Square, London W.1, England

Contents of Volume 1: The Biology of Yeasts

(to be published appr. April, 1969)

Chapter 1. Introduction.

A. H. Rose, School of Biological Sciences, Bath University of Technology, Bath, England AND

J. S. Harrison, Research Department, The Distillers Co. (Yeast) Ltd., Great Burgh, Epsom, Surrey, England.

Chapter 2. Taxonomy and Systematics of Yeasts
N. J. W. Kreger-Van Rij, Bacteriologische-Serologische Laboratorium, University of Groningen, Groningen, The Netherlands.

Chapter 3. Distribution of Yeasts in Nature.
L. Do Carmo-Sousa, Laboratory of Microbiology, Gulbenkian Institute of Science, Oeiras, Portugal.

Chapter 4. Yeasts as Human and Animal Pathogens.
J. C. Gentles, Dept. of Medical Mycology, University of Glasgow, Glasgow, Scotland AND
C. J. La Touche, Mycology Unit, The General Infirmary, Leeds, England.

Chapter 5. Yeasts Associated with Living Plants and their Environs.
F. T. Last AND D. Price, Glasshouse Crops Research Institute, Littlehampton, Sussex, England.

Chapter 6. Yeast Cytology.
C. F. Robinow, Dept. of Bacteriology and Immunology, University of Western Ontario, London, Canada AND
Ph. Matile AND H. Moor, Institut für allgemeine Botanik, Eidg. Technische Hochschule, Zürich, Switzerland.

Chapter 7. Sporulation and Hybridization in Yeasts.
R. R. Fowell, Research Department, The Distillers Co. (Yeast) Ltd., Great Burgh, Epsom, Surrey, England.

Chapter 8. Yeast Genetics.
Robert K. Mortimer, Donner Laboratory, University of California, Berkeley, California 94720, U.S.A. AND
Donald C. Hawthorne, Dept. of Genetics, University of Washington, Seattle, Washington 98105, U.S.A.

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THE YEASTS
Edited by A. H. Rose and J. S. Harrison
Volume 2: Physiology and Biochemistry of Yeasts.
(to be published appr. Spring 1970)

Chapter	Proposed Title	Authors
1	Introduction	A. H. Rose, School of Biological Sciences, Bath University of Technology, Bath, Somerset, England and J. S. Harrison, The Distillers Co. Ltd., Epsom, Surrey, England.

Chapter	Proposed Title	Author
2	Yeast Nutrition and Solute Uptake	H. Suomalainen and E. Oura, State Alcohol Monopoly, Helsinki, Finland.
3	Growth of Yeasts	N. Van Uden, Laboratory of Microbiology, Gulbenkian Institute of Science, Oeiras, Portugal.
4	Temperature Effects on Yeasts	J. L. Stokes, Department of Bacteriology & Public Health Washington State University, Pullman, Washington, U.S.A.
5	Structure and Biosynthesis of The Yeast Cell Envelope	H. J. Phaff, Department of Food Science and Technology, University of California, Davis, California, U.S.A.
6	Yeast Membranes and Lipids: Composition, Structure and Biosynthesis	R. J. Diamond and A. H. Rose, School of Biological Sciences, Bath University of Technology, Bath, Somerset, England.
7	Energy-Yielding Metabolism in Yeasts	A. Sols, Consejo Superior de Investigaciones, Cientificas, Madrid, Spain.
8	Nucleic Acid and Protein Synthesis in Yeasts: Regulation of Synthesis and Activity.	H. de Robichon-Szulmajster and Y. Surdin-Kerjan, Laboratoire d'Enzymologie, CNRS, Gif-sur-Yvette, Seine-et-Oise, France.
9	Structure and Biosynthesis of Storage Carbohydrates in Yeasts.	D. J. Manners, Department of Brewing and Biochemistry, Heriot-Watt University, Edinburgh, Scotland.
10	Biochemistry of Morphogenesis in Yeasts.	S. Bartnicki-Garcia and I. McMurrough, Department of Plant Pathology, University of California, Riverside, California, U.S.A.
11	Yeast Pigments	C. O. Chichester and H. J. Phaff, Department of Food Science and Technology, University of California, Davis, California, U.S.A.

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THE YEASTS

Edited by A. H. Rose and J. S. Harrison

Volume 3: Contents

(to be published appr. June 1969)

Chapter	Proposed Title	Authors
1	Introduction	J. S. Harrison, The Distillers Co. Ltd., Epsom, Surrey, England and

Chapter	Proposed Title	Authors
		A. H. Rose, School of Biological Sciences, Bath University of Technology, Bath, Somerset, England
2	Baker's Yeasts	S. Burrows, The Distillers Co. Ltd., Epsom, Surrey, England.
3	Brewer's Yeasts	C. Rainbow, Bass, Worthington, Ltd., Burton-on-Trent, Staffs, England.
4	Yeasts in Wine-making	R. F. Kunkee and M. A. Amerine, Department of Viticulture and Enology, University of California, Davis, California, U.S.A.
5	Distillery Yeasts	J. S. Harrison and J. C. J. Graham, The Distillers Co. Ltd., Epsom, Surrey, England.
6	The Role of Yeasts in Cider-making	F. W. Beech and R. R. Davenport, Long Ashton Research Station, University of Bristol, Bristol, England
7	Sake Yeasts	K. Kodama, Kodama Brewing Co., Iitigawa, Akita Prefecture, Japan.
8	Food Yeasts	H. J. Peppler, Universal Food Corporation, Milwaukee, Wisconsin, U.S.A.
9	Yeasts as Spoilage Organisms	J. C. Ayres, Department of Food Science, University of Georgia, Athens, Georgia, U.S.A. and H. W. Walker, Department of Dairy and Food Industry, Iowa State University, Ames, Iowa, U.S.A.
10	Miscellaneous Products from Yeast	J. S. Harrison, The Distillers Co. Ltd., Epsom, Surrey, England

VIII Brief News Items

1a. The Editor announces with regret the death of Mr. E. Ditlevson, Carlsberg Laboratory, Copenhagen Valby, Denmark, on March 12, 1969.

b. Associate Editors Leslie R. Hedrick and Cecil G. Dunn are retiring July 1, 1969. We extend to them our best wishes and thanks for their contributions to the Yeast News Letter. Dr. Anna Kocková-Kratochvílová (Bratislava, Czechoslovakia) and Dr. Richard Snow (Davis, California) have agreed to serve as Associate Editors in their place.

c. Dr. E. M. Mrak, first Editor of the Yeast News Letter, and for the past 11 years Chancellor of the Davis Campus of the University of California, is retiring July 1, 1969. He plans to continue an active participation in areas of food science and technology at Davis and in various important commissions of the federal government. We extend to him our very best wishes.

2. Dr. M. Yoneyama, Hiroshima University, Japan will participate in study and collection of yeasts associated with grapes and wines in Afghanistan and Pakistan during the summer of 1969.

3. Institute of Microbiology, Federal University of Rio de Janeiro, Avenida Pasteur, 250 ZC 82, Rio de Janeiro, Brazil

The following paper has been published in Sabouraudia: 7:15-19, 1969.

I. Roitman, L. R. Travassos, H. P. Azevedo and A. Cury. Choline, trace elements, and amino acids as factors for growth of the enteric yeast, Candida slooffii, at 43° C.

Abstr. A strain of the "thermophilic" enteric yeast Candida slooffii grew in simple defined media at 43° C if given a supplement of choline (or mono- or N,N-dimethylethanolamine), Fe, Mn and V. Leucine, only stimulatory at 37° C, was required absolutely at 43° C. (Note: This paper was prepared at the Haskins Laboratories, New York in cooperation with Dr. Seymour H. Hutner).

4. Dr. Leland H. Hartwell, Department of Genetics, J205 Biochemistry-Genetics Bldg., University of Washington, Seattle, Washington 98105 writes:

I am preparing a review for the Annual Review of Genetics on the Biochemical Genetics of Yeast. I would like to include all gene-enzyme relationships that have been established and other cases in which genetic studies have been correlated with physiological or biochemical studies. I would greatly appreciate a reprint of each of the contributions which have appeared in this general area, if such are available, and also would appreciate hearing of any available recent information. Thank you for your help.

5. Dr. Norval A. Sinclair, Department of Microbiology, University of Arizona, Tucson, Arizona 85721, writes:

The following paper has recently been published:

Nash, C. H., D. W. Grant and N. A. Sinclair. 1969. Thermolability of protein synthesis in a cell-free system from the obligately psychrophilic yeast Candida gelida. Can. J. Microbiol. 15:339-343.

Mr. William Lafferty, a predoctoral student, and I have been investigating the yeast flora of copper-bearing water from the extraction or leaching of low-grade copper ores. Four pigmented and one non-pigmented yeast have been routinely isolated. The identification and physiological properties of these isolates are currently being investigated.

6. Dr. L. R. Batra, Mycology Investigations, Crops Research Division, ARS-USDA, Beltsville, Md. 20705, U.S.A., inquires if there are any readers of the Yeast News Letter who might have translated the following articles into English:

Windisch, Siegfried. 1951. Zur Biologie und Systematik des Milchschimmels und einiger ähnlicher Formen. I. Der Milchschimmel (Endomyces lactis) und Endomyces Magnusii; II. Milchschimmel ähnliche Pilze. Beiträge Z. Biol. d. Pflanzen 28:69-130, 143-170.

7. Professor L. R. Hedrick writes:

After June, 1969, I will be Emeritus Professor of Microbiology at Illinois Institute of Technology. However, I plan to continue research and writing, especially in the fields of yeast ecology and nutrition. Much of this research will be conducted in my home, as this home has a laboratory equipped for the above type of research.

The address of our new home is:

Leslie R. Hedrick
14225 S.W. 150th Avenue
Tigard, Oregon 97223

8. The following is taken from the June 1969 Newsletter of the Canadian Soc. for Microbiology.

Labatt Breweries of Canada Limited have a vacancy in their Research Laboratories in London, Ontario, for a person who possesses or shortly expects to receive a Ph.D. in Microbiology, and has had training in Biochemistry or Chemistry at a lower level. Post doctoral experience, especially in aspects of yeast microbiology, would be advantageous.

The incumbent will undertake a long-term study of Biological and Biochemical factors involved in yeast metabolism which are of interest in the brewing process. Some travel will be involved.

Relocating expenses for the successful candidate and family will be borne by the company.

Please forward your personal resume to Dr. B. Shelton, Research Manager, Labatt Breweries of Canada Limited, P. O. Box 5050, London, Ontario, Canada.

9. Carcinogens from Fungi Pathogenic for Man, Cancer Research 28, 2276-2281, November 1968. F. Blank, O. Chin, G. Just, D. R. Meranze, M. B. Shimkin, and R. Wieder. Skin and Cancer Hospital and Fels Research Institute, Temple University Health Sciences Center, Philadelphia, Pennsylvania 19140.

Cells of Candida parapsilosis were extracted sequentially with different organic solvents. The sodium carbonate wash of the methanol extract showed carcinogenic activity in mice as demonstrated by the appearance of 6 sarcomas at the site of injection in a group of 16 animals. Suggestive carcinogenic activity in the appearance of subcutaneous sarcomas and increased frequency of leukemias and pulmonary tumors was observed with lipid extracts of species of the genera Microsporum, Trichophyton, Epidermophyton, and Scopulariopsis.