

Y E A S T

A News Letter for Persons Interested in Yeast

November 1966

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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 May 1967. 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.

The Editors

The Editor extends to the readers of the Yeast News Letter his warmest wishes for a happy and productive new year ahead.

H. J. Phaff

I. Centraalbureau voor Schimmelcultures, Julianalaan 67a, Delft, The Netherlands. Communicated by Miss W. Slooff.

The following new species, for which a description has been published, have been received and placed in the C.B.S. collection:

Candida benhamii Novák et Vitéz

Novák, E. K. and I. Vitéz, Zentralbl. Bakteriologie Parasitenk. I orig. 193: 127, 1964.

Candida beverwijkii Novák et Vitéz

Novák, E. K. and I. Vitéz, Zentralbl. Bakteriologie Parasitenk. I orig. 193: 127, 1964.

Rhodotorula glutinis var. rufusa Iizuka et Goto

Iizuka, H. and S. Goto, J. Gen. Applied Microbiology 11: 331, 1965.

Rhodotorula slooffii Novák et Vörös-Felkai

Kísérl. Orvostud. 12, 188, 1960.

Sporobolomyces japonicus Iizuka et Goto

Iizuka, H. and S. Goto, J. Gen. Appl. Microbiol. 11: 331, 1965.

Torulopsis kestoni Scarr et Rose

Scarr, M. P., and D. Rose, J. Gen. Microbiol. 45: 9, 1966.

Torulopsis mogii Vidal-Leiria

Vidal-Leiria, M., Antonie van Leeuwenhoek 32: 312, 1966.

Torulopsis westerdijkii Novák et Vitéz

Novák, E. K., and I. Vitéz, Zentralbl. Bakteriologie Parasitenkunde I orig. 193: 127, 1964.

II. American Type Culture Collection, 12301 Parklawn Drive, Rockville, Maryland 20852. Communicated by Dr. Roger D. Goos, Curator of Fungi.

The following list of yeast and yeast-like fungi represents acquisitions by the American Type Culture Collection during the past seven months.

Cultures received from Mr. Philip F. Dupont, Illinois Institute of Technology, Chicago:

	<u>ATCC No.</u>
<u>Hansenula angusta</u>	16749
<u>Hansenula anomala</u>	16750
<u>Hansenula beijerinckii</u>	16751
<u>Hansenula californica</u>	16752
<u>Hansenula capsulata</u>	16753
<u>Hansenula coprophila</u>	16754
<u>Hansenula fabianii</u>	16755
<u>Hansenula bimundalis</u>	16756
<u>Hansenula bimundalis</u> var. <u>americana</u>	16757
<u>Hansenula bimundalis</u> var. <u>americana</u>	16758
<u>Hansenula mrakii</u>	16759
<u>Hansenula minuta</u>	16760
<u>Hansenula petersonii</u>	16761
<u>Hansenula saturnus</u>	16762
<u>Hansenula schneegii</u>	16763

	<u>ATCC No.</u>
<u>Hansenula silvicola</u>	16764
<u>Hansenula suaveolens</u>	16765
<u>Hansenula subpelliculosa</u>	16766
<u>Hansenula wickerhamii</u>	16767
<u>Hansenula silvicola</u>	16768

Cultures received from Dr. William B. Cooke, Robert A. Taft Sanitary Engineering Center, Cincinnati.

<u>Aureobasidium mansonii</u>	16621
<u>Aureobasidium pullulans</u>	16622
<u>Aureobasidium pullulans</u>	16623
<u>Aureobasidium pullulans</u>	16624
<u>Aureobasidium pullulans</u>	16625
<u>Aureobasidium pullulans</u>	16626
<u>Aureobasidium pullulans</u>	16627
<u>Aureobasidium pullulans</u>	16628
<u>Aureobasidium pullulans</u>	16629
<u>Aureobasidium pullulans</u>	16630
<u>Aureobasidium pullulans</u>	16631
<u>Prototheca moriformis</u>	16522
<u>Prototheca moriformis</u>	16523
<u>Prototheca moriformis</u>	16524
<u>Prototheca moriformis</u>	16525
<u>Prototheca moriformis</u>	16526
<u>Prototheca stagnora</u>	16527
<u>Prototheca stagnora</u>	16528
<u>Prototheca wickerhamii</u>	16529
<u>Prototheca wickerhamii</u>	16531
<u>Prototheca zopfii</u>	16532
<u>Prototheca zopfii</u>	16533

III. University of Miami, Institute of Marine Science, Miami, Florida 33149.
Communicated by Dr. Samuel P. Meyers.

Following our recent U.S.-Japan Seminar in Marine Microbiology held in Tokyo, Japan, August 15-19, 1966, I had an opportunity to visit with Drs. K. Tubaki and T. Hasegawa at the Institute for Fermentation in Osaka. While there I was able to talk with Dr. Isao Banno and discuss his extremely interesting work on Rhodotorula and the existence of mating types in certain strains. The facilities of the Institute are quite impressive and the culture collection is both large and well represented.

While in Europe, I spent a delightful day in Delft with Miss Slooff of the Centraalbureau voor Schimmelcultures and had the chance to meet Dr. Kreger van Rij in Groningen. I am looking forward to the Yeast Congress which I understand will be held in Delft in 1969.

I spent two weeks with Dr. W. Gunkel in Helgoland, Germany in conjunction with our cooperative studies of the yeasts of the North Sea. We made one cruise aboard the vessel R/V UTHORN collecting yeasts from the mouth of the Elbe River to Helgoland. Dr. Gunkel has considerable evidence for the occurrence of interesting "blooms" of yeasts in the North Sea. We are attempting to evaluate these populations in relation to the biological and physical characteristics of the locality. We hope to have a short preliminary communication on these studies prepared early in 1967.

From our laboratories, Dr. Fell is continuing his Antarctic yeast collections and Drs. Ahearn and Roth are compiling the vast amount of data they have accumulated on the ecology of yeast and molds from the Everglades and adjacent localities. These latter studies should permit an extremely interesting insight into successional patterns of yeasts in aquatic systems, especially as affected by organic pollution. The mycological data from the Black Sea are in final stages of preparation and early in 1967 we hope to publish this extensive study of the yeasts and molds of this environment.

Dr. D. H. Ahearn will leave the University of Miami at the end of the current year to join the Dept. of Biology, Georgia State College, Atlanta, Georgia, as an Assistant Professor. Dr. Ahearn will continue his yeast studies in cooperation with our program here in Miami.

IV. Universita di Pisa, Istituto di Patologia Vegetale e di Microbiologia Generale e Agraria, Pisa, Italy. Communicated by Professor O. Verona.

The following is a summary of two studies carried out in our Institute:

"ISTITUTO DI MICROBIOLOGIA AGRARIA E TECNICA" - Direttore: O. Verona.

- A. A. Lepidi: Ancora sulla presenza di alcuni lieviti e di alcuni funghi a micelio nella pasta legno e sulla loro attività cellulolitica. (Further researches on the presence of yeasts and fungi on pulpwood and their cellulolytic activity).
L'Agr. Ital. No. 1, 45 (1966).

SUMMARY

During two particular phases of the pulp-wood processing, numerous strains of yeasts and fungi have been isolated. Among these last, two species referable to Tilachlidium and Tilletiopsis are described. In extending the research on the cellulolytic activity of Tr. capitatum and Pen. ianthinellum, a method for detecting enzymatic fractions is described. These organisms are active on sodium-carboxymethylcellulose and responsible for terminal selective hydrolysis.

Fractions were separated by Sephadex chromatography and assayed in terms of the reducing sugars produced after coagulating the Na-CMC by $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$. Such a method permitted to demonstrate two enzymatic fractions in Tr. capitatum and three in Pen. ianthinellum.

- A. A. Lepidi: Azione di alcuni composti antifungini sullo sviluppo di lieviti isolati da pasta legno. (Fungicidal action exerted by some compounds on the growth of yeasts isolated from pulp-wood). L'Agr. Ital. No. 3, 2 (1966).

SUMMARY

Some inhibitory substances (sodium-orthophenylphenate, sodium p-chlorometacresolate, pentachlorophenol, thin antislime) were assayed with 12 yeasts (Sacch. cerevisiae v. ellipsoideus, Kl. apiculata, Hansenula minuta, Debaryomyces klockeri, Cryptococcus albidus, Rhodot. mucilaginosus, Cand. melinii (2 strains), Cand. guilliermondii, Tr. capitatum, Tr. pullulans and Geotr. candidum) isolated from pulp-wood. The inhibitory action was revealed by an increase of the lag-phase dependent on the substances as well as on the microorganisms.

V. Institute of Brewing of the Ministry of Finance, 2-6, Takinogawa, Kita-ku, Tokyo, Japan. Communicated by Dr. S. Sugama.

The following are some abstracts of work conducted in our Institute (note: the abstracts originally published in French have been somewhat condensed by the editor).

Studies of yeast involving sake manufacture. IV. Succession of yeast floras in the starters during the course of the production. J. Soc. Brewing, Japan, 61, 66 (1966).

Over a 2 year period we have examined on a continuous basis the rate of contamination of 30 starter cultures with wild yeasts. During the course of manufacture, starters were contaminated with as little as 0.5% to a maximum of 38% wild yeasts. We have isolated at the same time 93 cultures of wild yeasts from 30 starters and we have identified them as Saccharomyces cerevisiae. These isolates were placed into 15 types. Some strains were characterized "highly infectious", because of the rapid rate of growth, whereas others were of low infectivity. Again other strains were considered as normal and innocuous contaminants. We have shown that the starters are contaminated by numerous wild yeasts during the season of manufacture and that the rate of increase of contamination is determined by the quality and type rather than by the quantity of wild yeasts which are introduced in the starter as compared to the cultivated yeast.

V. The yeast floras of ceilings and floors of the factories. J. Soc. Brewing 61, 71 (1966).

We have examined the changes in yeast population in the factory during a year in the following areas: ceilings of the Koji chamber, starter chamber and various other processing rooms. In general the yeast population increases suddenly with the start of the manufacturing process. In some of the processing rooms and the filling rooms, where nutrients of yeasts are continually available, the yeast population remains at a relatively high level during the off season. In 2 factories near Tokyo, we have studied the yeast floras of various factory rooms just before the beginning of the manufacturing process. We have isolated 165 strains and placed them in the following genera: Endomycopsis (5 strains), Hansenula (93), Pichia (32), Debaryomyces (1), Candida (20), Torulopsis (2), Rhodotorula (9), Trichosporon (3). Outside of the manufacturing season the yeast flora resembles that of garden soil. But in areas where the walls have been soiled by sake, more than 95% of the yeasts belong to Hansenula.

VI. Selected media for the isolation of Saccharomyces cerevisiae. J. Soc. Brewing, Japan, 61, 164 (1966).

The isolation of S. cerevisiae from natural samples is very difficult as the population of this species is relatively rare in nature. In order to isolate S. cerevisiae it is necessary to inhibit the growth of the dominant yeast, such as for example, Pichia or Hansenula. We have examined selective inhibitors for the growth of Pichia and Hansenula and have found that ethyl acetate in a concentration of 2.5% is very effective in extending the lag of growth for these yeasts. Furthermore we have found that S. cerevisiae develops much more rapidly than Pichia and Hansenula if the quantity of oxygen is partially limited in the gaseous environment. The authors then describe a defined medium at

pH 4 (adjusted with acetic acid) in petri dishes sealed with vinyl tape in order to reduce the evaporation of ethyl acetate. After incubation at 30° for 2 or 3 days, colonies of Saccharomyces cerevisiae can be expected. Another technique is described which makes use of a complex medium adjusted to pH 4 with HCl. This is incubated in the presence of alkaline pyrogallol to establish more or less anaerobic conditions. The first colonies to appear are usually S. cerevisiae.

VI. Louisiana State University, Department of Botany and Plant Pathology, Baton Rouge, Louisiana 70803. Communicated by Dr. James B. Sinclair.

The following items may be of interest to the readers of the Yeast News Letter.

1. Kirk, B. T. 1966. Ultrastructure studies of Geotrichum candidum. M.S. Thesis, Louisiana State University Library, Baton Rouge, 67 p.

2. Kirk, B. T. and J. B. Sinclair. 1966. Plasmodesmata between hyphal cells of Geotrichum candidum. Science 153: 1646.

Electron microscope studies of three plant isolates and one human isolate of Geotrichum candidum showed the fine structure to be similar to other closely-related yeastlike fungi. Structures were observed similar to plasmodesmata present in higher plants. This is the first time that plasmodesmata were observed in fungi.

3. Kirk, B. T., (and J. B. Sinclair). 1966. Ultrastructure of Geotrichum candidum. Phytopathology 56: 885. Abstr.

G. candidum is pathogenic to a wide range of plants and has been implicated in some diseases in man and other animals. The ultrastructure of young and mature mycelia of four isolates of the test fungus was examined with an electron microscope. The fine structure of G. candidum was very similar to that reported for closely related organisms. The cell wall was single-layered in young cells and double-layered in mature cells. The plasma membrane exhibited the typical unit-membrane structure. Nuclei were spherical to lobulate and enclosed by a nuclear envelope composed of two-unit membranes, interrupted by pores at irregular intervals. Mitochondria and cristae were typical of those in higher plants. Strands of endoplasmic reticulum were found in all isolates and showed an unusual arrangement in some instances. Ascomycetous-like septa containing plasmodesmata were observed. Two types of storage granules were found. Vacuoles limited by a single-membraned tonoplast were observed in all instances. Possible Golgi bodies were observed in two isolates and a pellicle was present in a third isolate.

4. El-Tobshy, Z. M., and J. B. Sinclair. 1966. Bioassay of plant and animal isolates of Geotrichum candidum on the chorioallantoic membrane of embryonated chick. Phytopathology 56: 877. Abstr.

The window method for virulence assay using the chorioallantoic membrane of 10-day-old embryonated chicken eggs was used. The LD₅₀ of embryos was determined 3 days after inoculation for five plant and two animal isolates. Membranes were most susceptible to human isolate CH and citrus isolate LA-2 (86,000 arthrospores/ml.) and least to citrus isolate ATCC-7019 (1,350,000/ml.). The LD₅₀ for

the other four isolates, LA-1 and C-125 (citrus), WR (carrot) and B-446 (tortoise), fell in between these two extremes. Infection by all isolates was found in the membranes after 3 days by in vivo examination and recovery of the test fungus in pure culture from minced membranes. The membrane thickened and formed grayish yellow to light brown lesions in response to infection after 5-7 days in stained smears of the fluid within the artificial air-sac over the membrane. This is the first reported use of this technique to measure virulence of a plant parasite and of a plant parasite infecting animal tissue.

5. Sinclair, J. B., R. J. Bonck, and Z. M. El-Tobshy. 1966. Pathogenicity of plant and animal isolates of Geotrichum candidum recovered from injected turtles. Phytopathology 56: 901. Abstr.

A modification of the Ivens-Seabury technique developed at the Louisiana State School of Medicine was used for this study. A 1.0 ml. normal saline suspension (ca. 1 million arthrospores/ml.) of each of five plant isolates (citrus and carrot) and two animal isolates (human and turtle) were injected into the pleuro-peritoneal cavity of two turtle species (Chelydra serpentina serpentina and Pseudemys scripta elegans). All isolates were recovered from 10 of 14 turtle tissues of both species plated on potato-dextrose-tomato juice agar. The turtles were incubated at 31°C for 2 weeks after injection. The seven isolates recovered from turtle tissues retained their pathogenicity on ripe fruit of orange, lemon, and tomato. A-1 isolates presumably were pathogenic to turtle, since they survived for 2 weeks in turtle tissues. No gross symptoms of infection in turtle were observed. Further work is needed to establish this relationship.

- VII. Indiana University, Department of Microbiology, Jordan Hall 438, Bloomington, Indiana 47401. Communicated by Prof. T. D. Brock.

SEX-SPECIFIC AGGLUTINATION FACTORS FROM HANSENULA WINGEI

Marjorie Crandall and Thomas D. Brock

Recent progress includes the partial purification and characterization of the two complementary sex-specific factors responsible for the agglutination reaction of the two opposite mating-types of this yeast. One of the factors (from strain 5) is an agglutinin and is a mannan-protein complex (T. D. Brock, PNAS 54, 1104, 1965). The second factor (from strain 21) is not an agglutinin but the biological activity can be measured by inhibition of the agglutination caused by the 5-factor. The basic assumption is that the 5-factor complexes with the 21-factor in a manner analogous to that of an antibody-antigen reaction. Then after complex formation the 5-factor can no longer agglutinate activated 21 cells. That this inhibition is sex-specific is shown by the following experiment: if 21-factor is first adsorbed to either 5 cells or 21 cells and then the supernatant assayed as described above, all the inhibitor activity is removed by the 5 cells, none by the 21 cells. A more sensitive assay for the 21-factor is based on the inhibition of radioactive 5-factor adsorption to 21 cells. 21-factor activity is found in cytoplasmic extracts, but more concentrated preparations are obtained by digesting 21 cells with trypsin. Originally, it was proposed (T. D. Brock, J. Bact. 76, 334, 1958) that the 5-factor was not a protein since the agglutination of 5 cells is unaffected by trypsin and that the 21-factor was protein since 21 cells are

inactivated by trypsin. Recent work has demonstrated the protein nature of the 5-factor since 5-factor preparations are sensitive to trypsin. Furthermore, the inactivation of 21 cells by trypsin is now known to be due to release of 21-factor rather than to its inactivation on the cell surface.

The diploid (strain Y-2340) is normally not agglutinative although it contains the genes for both agglutination factors. With the availability of the assays described above it is possible to determine whether the nonagglutinability is due to the lack of synthesis of the factors or the presence of a neutralized complex. When the 5-factor:21-factor complex is prepared in vitro and treated with base, it dissociates, the 21-factor is inactivated and 5-factor activity is recovered. When a diploid extract is treated similarly no 5-factor is recovered suggesting the 5-factor is not synthesized in the diploid. However, late stationary cultures of the diploid become slightly agglutinative with 21 cells and 5-factor activity is detectable even though the culture remains diploid. This suggests that during aging the regulation mechanism is inoperative and 5-factor is synthesized.

VIII. University of Bern, Institute of General Microbiology, Bern, Switzerland. Communicated by Dr. U. Leupold.

Allele specific suppressor mutations in Schizosaccharomyces pombe
(Ph.D. Thesis, Bern 1966; Genetica, in print)

By comparing the intragenic distribution of suppressor sensitive mutants in fine structure maps, 13 allele specific suppressor mutations (isolated from revertants in adenine dependent mutants of constitution ad₇) have been analyzed for their allele specific patterns of action in three different groups of mutants blocked in adenine biosynthesis. The 13 suppressor mutations, which have resulted from mutations at seven different suppressor loci, are characterized by four different suppression patterns. Three of these patterns, which partially overlap, are not locus specific since they include sensitive mutants at each of the three loci ad₇, ad₆ and ad₁ studied. The relative frequency of mutants sensitive to one or the other of the suppressors of this type, the absence of osmotic - remedial strains among the suppressor sensitive mutants, and the polarized complementation behavior of one suppressible ad₆ mutant and two suppressible ad₁ mutants capable of interallelic complementation, suggest that the suppression mechanism involves misreading of a mutant triplet of the nonsense type.

IX. University of Strathclyde, Department of Applied Microbiology and Biology, Royal College, George Street, Glasgow C 1, Scotland.
Communicated by Dr. John Johnston.

Research in yeast genetics in this Department is at present concentrated upon:

- (a) Investigation of the genetic stability of diploid, triploid and tetraploid cultures during vegetative growth and fermentations. Emphasis is being placed upon behavior during continuous growth and fermentation.
- (b) Kinetics and genetics of drug resistance in various yeasts, with particular reference to nystatin resistance.

The following is an abstract of the paper "Mitotic segregation of *ad8* in diploid and tetraploid *Saccharomyces*" by J. R. Johnston and J. M. MacKinnon read at the Yeast Symposium in Bratislava:

"The rates of mitotic segregation of *ad8* in diploid and tetraploid strains of yeast were measured under various conditions. In yeast extract-peptone medium with 40 mg/l additional adenine, the frequency of diploid recombinants (*ad8ad3*) was estimated as 6.7×10^{-4} per cell per generation. The corresponding rate for the tetraploid strain was too low to be measured by the technique used. In synthetic complete medium with additional adenine, the apparent rate was 1.3×10^{-4} per cell per generation but the difference in this rate and that in extract medium was shown to be due principally to selection against *tr4* (tryptophanless) recombinants in synthetic medium. The markedly reduced rate of mitotic segregation in the tetraploid strain suggests the use of tetraploid rather than diploid strains in processes involving the prolonged growth of yeast. Surprisingly, a higher frequency of half-selected colonies was induced in the tetraploid strain than in the diploid by low doses of ultraviolet light."

X. Institute of Plant Physiology, Eötvös University, VIII. Múzeum-körút 4/a, Budapest, Hungary. Communicated by Dr. Z. Böszörményi.

I would like to inform the readers of the Yeast News Letter on a regular basis about yeast-research in Hungary.

Lectures about physiological and biochemical processes of yeasts were given at the annual congresses of two Hungarian biological societies.

The Annual Congress of Hungarian Chemists (5-7 September 1966, Debrecen) was devoted completely to biochemistry this year because of the 10th anniversary of the foundation of the Biochemical Section in this Society.

Lectures from the program:

- E. K. Novák: Saccharose and maltose hydrolyzing enzymes of yeasts.
- T. Deák and E. K. Novák: Effect of sorbic acid on the carbohydrate metabolism of yeasts.
- E. Cseh et al.: Comparative studies on the amino acid absorption by different organisms.

The text of the lectures are published in Hungarian with abstracts in English. They are available from the Hungarian Chemical Society (Budapest V.Szabadság ter 17).

The Annual Congress of the Hungarian Microbiological Society (5-7 September 1966, Debrecen).

Lectures from the program:

- E. K. Novak and T. Perényi: Qualitative differences in the utilization of oligosaccharides by yeasts.
- T. Deák and M. Tüske: Comparative studies on the inhibitive effect of sorbic acid on yeasts.
- L. Ferenczy and F. Kevei: Actions of antifungal steroid-glucoalcaloides.

The abstracts of the papers (in English) will be published in *Acta Microbiologica Acad. Sci. Hungarica*.

XI. Rutgers - The State University, Institute of Microbiology, New Brunswick, New Jersey 08903. Communicated by Dr. J. O. Lampen.

The following papers have recently appeared, or are in press, from our laboratory:

1. An Enzyme which Degrades the Walls of Living Yeast. Nagasaki, S., et al. Biochem. Biophys. Res. Commun., 25: 158, 1966.

This enzyme (obtained from Bacillus circulans strain 63-7) is part of the complex required to form protoplasts. It can act directly on the intact yeast cell although the precise linkages cleaved are not known. Its major effect appears to be the release of much of the mannan and invertase from the cell.

2. Formation of Invertase by a Yeast Mutant Not Repressed by Hexoses. Symington, E. G., and Lampen, J. O. IX. Internatl. Congr. Microbiol., Moscow, p. 147, 1966.

3. Purification and Properties of Yeast Invertase. Neumann, N. P., and Lampen, J. O. Fed. Abst. 25: 588, 1966. Submitted to Biochemistry.

Invertase has been isolated in a homogeneous form and shown to be a glycoprotein containing approximately 50 per cent mannan and 3 per cent glucosamine.

4. Invertase Biosynthesis and the Yeast Cell Membrane. This paper was presented at the Symposium on Organizational Biosynthesis (Institute of Microbiology, September 8-10, 1966). It will be published in May or June of 1967. It summarizes the work embodied in the first three papers and outlines our studies on the mechanism of secretion by yeast protoplasts and on the relevant control mechanisms.

XII. Research Laboratories of the State Alcohol Monopoly (Alko), Helsinki, Finland.

Dr. Heikki Suomalainen reports the following publications which have appeared during 1965 and 1966 from his laboratory.

- T. Nurminen, E. Oura and H. Suomalainen. Preparation of protoplasts from baker's yeast. Suomen Kemistilehti B 38, 282-285 (1965).
- M. Burger, E. Oura and H. Suomalainen. The synthesis of α -glucosidase by baker's yeast protoplasts. Suomen Kemistilehti B 38, 285-289 (1965).
- H. Suomalainen, A.J.A. Keränen and J. Kangasperko. Production of spirit vinegar by the quick process with a pure culture of Acetobacter rancens Beijerinck. J. Inst. Brewing LXXI (1), 41-45 (1965).
- H. Suomalainen, A. Björklund, K. Vihervaara, and E. Oura. Nicotinic acid and nicotinamide adenine dinucleotide contents of baker's yeast in changing culture conditions. J. Inst. Brewing LXXI (3), 221-226 (1965).
- H. Suomalainen, T. Nurminen, K. Vihervaara, and E. Oura. Effect of aeration on the synthesis of nicotinic acid and nicotinamide adenosine dinucleotide by baker's yeast. J. Inst. Brewing LXXI (3), 227-231 (1965).

- H. Suomalainen, E. Oura, and T. Linnahalme. Extractability of vitamin and nucleotide compounds from dried yeast and vitaminized dried yeast. *J. Inst. Brewing* LXXI (4), 330-336 (1965).
- H. Suomalainen, A.J.A. Keränen, and J. Kangasperko. Yeast growth method for assay of biotin activity. *J. Inst. Brewing* LXXI (6), 515-518 (1965).
- L. Nykänen, E. Purutti, and H. Suomalainen. Gas chromatographic determination of tyrosol and tryptophol in wines and beers. *J. Inst. Brewing* LXXII (1), 24-28 (1966).
- H. Suomalainen and T. Linnahalme. Metabolites of α -ketomonocarboxylic acids formed by dried baker's and brewer's yeast. *Arch. Biochem. Biophys.* 114 (3), 502-513 (1966).
- N. Ellfolk, R. Lindbohm and H. Suomalainen. Disintegration of yeast cells in the preparation of subcellular fractions. *Suomen Kemistilehti B* 39, 30-32 (1966).
- H. Suomalainen. The structure and function of the yeast cell. *Alkon Keskuslaboratoric Report* 6099, June 24, 1965.
- XIII. Bundesanstalt für Fleischforschung, Institut für Bakteriologie und Histologie, 8650 Kulmbach, Blaich 4, West Germany. Communicated by Professor L. Leistner.

We have published recently some data (June 1966) on yeasts in cured and aged meats:

- Leistner, L., J. C. Ayres, and D. A. Lillard. Occurrence and significance of fungi in cured meats. *Proceedings of the 4th Symposium of the World Association of Veterinary Food-Hygienists. Lincoln, Neb., U.S.A., July 25-30, 1965. pp. 262-268.*

Since I returned to Germany I have started a research project on yeasts in fermented sausages. In a way, it is an extension of my work at Iowa State, but now we would like to look more closely into the correlation of yeasts to the water activity, redox-potential and flavor of meats. Furthermore now we will use the thesis (1964) of Dr. Kreger-van Rij as reference for the identification of the isolated yeasts.

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

Publications

- 1) Kleyn, J. G. Dwarf Cell Formation in Some *Saccharomyces* and other Yeasts. *Wallerstein Lab. Comm.* 29: 37 (1966).
- 2) Kleyn, J. G. and Vacano, N. L. Some effects of soybeans on yeast growth and beer flavor. *The Brewers Digest* 61: 95 (1966).

Current Research Interests

- 1) Survey of yeast flora present in Puget Sound.
Principal Investigator: Vincent Kokich
- 2) Analysis of the ergosterol content of yeast ascospores.
Principal Investigator: Carole Ralph
- 3) Evaluation of the yeast dwarf cell system as a microbial model for studying cancer.
Principal Investigator: John Kleyn

- 4) Evaluation of the antitumor potential of highly aerobic yeast strains and other highly aerobic microorganisms.

Principal Investigator: John Kleyn.

XV. The Research Laboratory, A. Guinness Son & Co. Ltd., St. James's Gate, Dublin 8, Ireland. Communicated by Dr. R. B. Gilliland.

The following papers have been published recently from this laboratory:

An Acetobacter lethal to yeasts in bottled beer. R. B. Gilliland and J. P. Lacey. *J. Inst. Brewing* 72, 291 (1966).

SUMMARY: A strain of Acetobacter killed yeasts in bottled beer and so prevented natural conditioning from taking place. This ability to kill yeasts, which was not shared by other strains of Acetobacter, could not be divorced from the simultaneous presence of Acetobacter and yeasts. The active principle could pass through a dialysis membrane but was very quickly destroyed and was not isolated. The activity of the Acetobacter was lost if the bacteria were killed by heat or chemicals; it was maintained if they were killed by streptomycin. The lethal activity against yeasts was increased with rising temperature, it was counteracted by oxygen, it was enhanced by alcohol, and it was strongest at pH 3.5 - 4.5 and absent above pH 5. The active strain closely resembled Acetobacter rancens and was similar to an authentic culture of A. rancens although the latter had no anti-yeast activity. Many species of yeasts were killed by this strain of Acetobacter; lactobacilli were also killed but pediococci were not.

Saccharomyces diastaticus - a starch fermenting yeast. R. B. Gilliland, *J. Inst. Brewing* 72, 271 (1966).

SUMMARY: Work on the yeast tentatively named Saccharomyces diastaticus has justified the separation of starch-fermenting Saccharomyces into a separate species. The name Saccharomyces diastaticus was therefore validated.

The microbiology of desirable food flavours. Flavour in beer. R. B. Gilliland, and G.A.F. Harrison, *J. Appl. Bacteriol.* 29 244 (1966).

The role of sulphur in yeast growth and in brewing. G. A. Maw, *Wallerstein Lab. Comm.* 28, 49 (1965).

Incorporation and distribution of ethionine-sulphur in the protein of ethionine-sensitive and ethionine-resistant yeasts. G. A. Maw, *Arch. Biochem. Biophys.* 115, 291 (1966).

Phospholipids of yeast. 1. Improvements in analysis by two-dimensional chromatography. *E. Letters, B.B. Acta* 116, 482 (1966).

Phospholipids of yeast. 2. Extraction, isolation and characterization of yeast phospholipid. *R. Letters, B.B. Acta* 116, 489 (1966).

XIV. The Stroh Brewery Company, Detroit, Michigan 48226. Communicated by Dr. John R. Wilmot.

Curtis C. Scheifinger has recently joined the Laboratory of the Stroh Brewery Company, Detroit, Michigan, as Research Microbiologist. Mr. Scheifinger completed both his undergraduate and graduate studies at the University of Southern Illinois, Carbondale, Illinois, and received his

M.A., under the direction of Prof. Maurice Ogur, in Microbiology in June, 1966. His graduate thesis was entitled "The Genetic and Metabolic Control of Aconitase and Homoaconitase Biosynthesis in Yeast."

He has presented the following papers:

1. Aconitase and Homoaconitase Activity of Glutamicless and Lysineless Yeast Mutants. Illinois Society of Microbiologists - 1965.
2. Genetic and Metabolic Control of Homoaconitase Biosynthesis. Federation of American Societies for Experimental Biology, April 1966.
3. Mechanical Deaggregation and Disruption of Haploid Yeasts by Sonication. Illinois State Academy of Science, April 1966.

The following papers have been accepted for publication:

1. Studies on the T.C.A. Cycle of Macracanthorhynchus hirudinaceus (Acanthocephala). J. Comp. Biochem. & Physiol.
2. Studies on Glycolytic Enzymes from Macracanthorhynchus hirudinaceus (Acanthocephala). J. Parasitol., August 1966.

At the Stroh Brewery Company, Mr. Scheifinger will be developing a yeast research program in the general area of yeast metabolism as it is related to the production of beer.

XVII. Falstaff Brewing Corporation, 1920 Shenandoah Ave., St. Louis, Missouri 63104. Communicated by Dr. C. Akin.

Dr. J. Delente of our bioengineering laboratory presented a paper at the Society for Industrial Microbiology meeting at College Park, Maryland, August 14-18, 1966. Following is an abstract of the paper:

Effect of maltose-glucose ratios on fermentation
by Saccharomyces carlsbergensis

Dr. Jacques Delente

Fermentation of mixtures of maltose and glucose by a strain of Saccharomyces carlsbergensis was studied by manometric techniques and at larger scale level.

- 1) When yeast is grown on maltose, the initial rate of fermentation is higher for a mixture of maltose and glucose than for either of the sugars alone, the total sugar concentration being the same in all experiments. However, the total fermentation time is longer for a mixture than for each single sugar.
- 2) When yeast is grown on glucose, glucose is fermented at a higher rate than maltose or any mixture of the sugars. The higher the maltose level, the longer the fermentation time.
- 3) Deadaptation of maltose fermentation by glucose is not instantaneous (that is, a yeast grown on maltose is able to ferment a small amount of maltose in presence of a high glucose level).
- 4) Glucose is fermented at a higher rate by a yeast grown on glucose.

XVIII- Brief News Items

1. From Dr. J. Boidin, Laboratoire de Biologie Végétale 43 Boulevard du 11 Novembre 1918, 69 Villeurbanne, France

The manuscript "Contribution à l'étude de l'assimilation de quelques substances organiques par les levures", by F. Jacob and F. Abadie was accepted in Feb. 1966 by Mycopathol. et Mycologia Applicata.

S. Poncet will submit soon to Antonie van Leeuwenhoek the manuscript "Etude taxométrique des Pichia à spores en chapeau".

J. B. Fiol is completing a study on l'Intérêt systématique des tests de croissance en milieux déficients en vitamines pour les genres Kluyveromyces et Pichia.

2. Professor A. Chaves Batista, Universidade do Recife, writes:

Prof. Rolf Singer received last month the highest distinction award of Professor Honoris Causa granted by the Brazilian Federal University.

3. Professor Edward D. DeLameter, formerly Chairman of the Department of Microbiology, New York Medical College, has been appointed Dean of the College of Science and Mathematics in Boca Raton, Florida.

4. Dr. R. C. Artagaveytia-Allende, Montevideo, Uruguay, writes:

"Not being able to attend the International Yeast Symposium in Bratislava I wish to thank all my colleagues present at that meeting for the lovely card of good wishes which they so kindly sent me.

5. Dr. L. R. Hedrick, Illinois Institute of Technology, Chicago 60616, attended the Second International Symposium on Yeasts in Bratislava, Czechoslovakia and presented a paper entitled: "The effects of 3-methylene-oxindole and indole-3-acetic acid on Hansenula subpelliculosa". He also attended the International Congress of Microbiology in Moscow.

A paper entitled "Effect of tryptophan on growth and morphology of Hansenula schneegii" by M. Sundhagul and L. R. Hedrick was published in the Journal of Bacteriology 92: 241-249. "Energy requirement for L-glutamate uptake and utilization by Hansenula subpelliculosa cells" by K. Z. Shieh and L. R. Hedrick has been accepted for publication and will be in the December issue of the Journal of Bacteriology.

6. Dr. Magnus Pyke, Scottish Grain Distillers Ltd., Glenochil Research Station, Menstrie, Clackmannanshire, Scotland, writes:

My colleague, Mr. Norman Merritt, is developing an interesting series of studies into the factors affecting the relative degree to which yeast grows, ferments or produces glycerol and higher alcohols under anaerobic conditions when the environment is subjected to selected changes.

A recently published article is entitled "The influence of temperature on some properties of yeast" by N. R. Merritt. J. Inst. Brewing 72, 374-383, July-Aug. 1966.

7. Dr. N. J. W. Kreger-van Rij (Oosterweg 98E, Haren, Holland) reports the publication of the following article: "Kluyveromyces osmophilus, a new yeast species" in *Mycol. Mycopathol. applic.* 29, 137, 1966. The following two articles will appear in the Proceedings of the International Yeast Symposium in Bratislava: "Taxonomy of the genus Pichia" and "Some features of yeast ascospores observed under the electron microscope".

8. Professor H. Iizuka, Institute of Applied Microbiology, University of Tokyo, Bunkyo-ku, Tokyo, has an article in *J. Gen. Appl. Microbiol.* 12, 119, 1966 on the oxidation of n-decane by Candida rugosa (isolated from aircraft fuel). This yeast, growing in a mineral medium on n-decane as the sole carbon source, produces a series of acids which have been identified as decanoic, decanedioic, octanedioic, adipic and succinic acids. The intermediate oxidation products of decane have been isolated by resting cell experiments and identified as decylalcohol and decylaldehyde. The degradation pathway of decane is discussed.

9. Harvard University Press, 79 Garden St., Cambridge, Mass., U.S.A. has published in the fall of 1966 "THE LIFE OF YEASTS -- THEIR NATURE, ACTIVITY, ECOLOGY, AND RELATION TO MANKIND" by H. J. Phaff, M. W. Miller, and E. M. Mrak (Harvard Books in Biology, 186 pp).

Although many biologists and biochemists use yeasts in their studies of cell biology and physiology, most have little familiarity with the vast number of yeast species known today, or with the fascinating diversity of their metabolic, biochemical, nutritional, and genetic properties. This book was written mainly for the non-specialist in biology who wishes information about an important group of microorganisms without referring to complex technical treatises.

The authors discuss the history of our knowledge of yeasts from ancient times to the present. They next consider the morphology of yeast cells, the ways in which yeasts propagate vegetatively or asexually, their cytology, and the sexual reproduction of yeasts through the formation of ascospores. The conditions under which yeasts live and propagate in nature is described in detail since it is their ecology that is least understood by the nonspecialist. A discussion of yeast as food spoilage organisms is followed by an account of the uses which have been made of yeast in industry. The authors conclude with a description of yeast taxonomy.

XIX. Letters to the Editor

Dear Sir:

BioSciences Information Service of Biological Abstracts announces the publication of a monthly abstract journal, "Abstracts of Mycology". Beginning in January 1967 the first of three trial issues of this journal will be circulated to individual scientists with known interests in this specialized field of study. The three-month trial or announcement phase is expected to indicate in general the value of such an information tool to individuals in a limited sub-field of a major discipline and to ascertain in particular whether the users of mycological information will be receptive to this customized type of information service.

"Abstracts of Mycology" is being produced by BioSciences Information Service as the first of a series of similarly specialized journals under consideration. The three-month trial publication is made possible by a National Science Foundation grant. Support from NSF stems from the Foundation's interest in the development of specialized information tools, derived from an existing sizeable and comprehensive parent source of information.

"Abstracts of Mycology" will make available all abstracts dealing with fungi which now appear in the semimonthly "Biological Abstracts", which in 1967 is scheduled to include some 125,000 abstracts. Literature in 6900 journals emanating from 91 countries provides the source for this material. The new mycology journal will represent studies of fungi in all subfields of biology including biochemistry, cytology, genetics, microbiology, and pathology. A sample survey of 18 issues of "Biological Abstracts" published in 1963 revealed a total of 3,170 abstracts of mycology papers from 651 different journals. It is expected that in 1967 at least 5000 mycology abstracts will be available for publication.

Publication of this journal is being undertaken after consultation with and on the advice of a committee of leading U.S. mycologists, chaired by Dr. Chester R. Benjamin, President of the Mycological Society of America. (Members of this committee have remained as the journal's editorial advisory board.) The committee emphasized the need for a publication of this type in the field of mycology, not only for mycologists, but for investigators in related fields as well. The journal will provide a distillation of the current mycological literature and will enable pathologists, microbiologists, biochemists to be aware of the total work in progress in this field.

The abstracts will be printed with 3" x 5" frames, on one side of the page only, three frames per page forming a 5" x 9" page. This format is designed especially for individuals who maintain a personal reference file of abstracts pertinent to their interests. An Author Index, Biosystematic Index and Subject Finder will accompany each issue of "Abstracts of Mycology". A Cumulative Author, Biosystematic and Subject Index will be provided.

"Abstracts of Mycology" subscription rate will be \$30.00 per year; however, the introductory price for 1967 is \$22.50. For additional information, or to order a subscription, please address:

"Abstracts of Mycology"
Professional Services and Education Department
BioSciences Information Service of Biological Abstracts
2100 Arch Street
Philadelphia, Pennsylvania 19103
U.S.A.

XX. Special Report of the Second International Symposium on Yeasts held in Bratislava, July 16-21, 1966.

A highly successful International Yeast Symposium was organized in Bratislava by a committee under the chairmanship of Dr. Anna Kockova-Kratochvilova. The success of the well organized meeting was due in large measure to the inspiring leadership of Dr. Kockova and her hard working committee. The housing and meals in local hotels as well as the meeting facilities were excellent. Since no concurrent sessions were scheduled the 150 participants were able to attend any session they desired. Besides the scientific sessions, visits to nearby institutes and laboratories were organized in addition to excursions on the Danube River and to a large brewery and wine producing area further in the interior of Czechoslovakia. A welcome dinner offered by the Slovak Division of the Czechoslovak Chemical Society in Bratislava opened the meetings and a "Zivanka" picnic with music and barbecued food in the beautiful lower Carpathian Mountains concluded the Symposium.

The four days of scientific sessions were divided into the following subject areas: Taxonomy, Ecology, Cytology, Immunology and Pathogenicity, Biochemistry, and Genetics. The meeting was concluded with a round-table discussion in which the highlights of each session were summarized or commented upon by the chairmen of the various sessions. A complete list of all of the 150 participants (representing 22 countries) and the text of the papers presented will be published in the Proceedings of the Symposium. Further details of the publication schedule will appear in the spring issue of the Yeast News Letter

RESOLUTIONS OF THE SECOND INTERNATIONAL SYMPOSIUM ON YEASTS
HELD IN BRATISLAVA
July 16-21, 1966

Participants of the Second International Symposium on Yeasts meeting in Bratislava July 16-21, 1966 have adopted the following resolutions:

It is a general observation that the importance of yeasts has been increasing progressively over the years. The great importance of yeasts and yeast-like organisms according to their purpose is seen in various spheres, e.g. in the classical fermentation industries of beer, wine, sake, baker's yeast production, etc. in the preparation of fine biochemical compounds and medical preparations, e.g. enzymes, nucleic acids, vitamins, antigens, etc. in production of fodder yeast for animals; in scientific research as models for investigations of biological processes; in public health as causative organisms of human and animal diseases, etc.

The periodic organization of symposia as proposed by the Czechoslovak scientists in 1964 proved to be extremely useful in stimulating international cooperation. Hence, in order to increase the attendance at future meetings, it is recommended that in as many countries as possible a selected person shall be responsible for compiling a list of those working on yeasts, their particular interests and of the institutions with which they are affiliated. The list shall be kept in Bratislava and copies will be distributed to interested people.

We intend to explore affiliation with the International Association of Microbiological Societies (IAMS), and to ask UNESCO for funds. Money would be used to pay for clerical help, for the preparation of future meetings,

for certain travel expenses and to facilitate cooperation between yeast workers. It is recommended that national microbiological societies send to UNESCO letters of support for our request for financial assistance.

It is recommended that a Council of prominent yeast workers be set up. The Council will consist of the members of the present Resolution Committee and the chairmen of the Symposium sections. At the next International Symposium the Council will be reconstituted. The Council will initially consist of the following members:

Chairman: Kocková-Kratochvílová A., Institute of Chemistry of
the Slovak Academy of Sciences, Bratislava, Dúbravská
cesta, Czechoslovakia

Secretary: Minárik E. (CSSR)

Members: Beran K. (CSSR) Robinow C. F. (Canada)
Eddy A. (Great Britain) Suomalainen H. (Finland)
Elinov N. P. (USSR) Tsuchiya T. (Japan)
Klaushofer H. (Austria) Wickerham L. J. (USA)
Kudrjavcev N. I. (USSR) Wikén T. (Holland)
Leupold U. (Switzerland) Windisch S. (German Federal Rep.)
Müller R. (German Democratic Republic)
Nagai S. (Japan)
Necas O. (CSSR)
Phaff H. J. (USA)

All correspondence should be sent to the address of the chairman.

The "Yeast News Letter", edited by H. J. Phaff of the University of California will (by Dr. Phaff's kind consent) serve as a means of communication for the actions and decisions of the Council.

The Council will coordinate the international cooperation in the following ways:

1) To standardize and unify all methods used in work on yeasts and yeast-like organisms. Because taxonomy uses information from all aspects of yeast research and on the other hand, other researches are based on correct taxonomical designations, it is recommended that taxonomists should make wider use of such methods as hybridization, DNA and RNA analysis, immunological reactions, electron micrography, ecological studies, statistical and numerical approaches to taxonomic evaluations, etc. Such approaches should prepare a basis for establishing a Nomenclatural Committee.

It is suggested that a series of committees be set up for standardization of methods for working on yeasts.

2) In connection with a world-wide tendency of a modern concept of organization and activity of pure culture collections, which is in the plan of UNESCO, the Council should prepare a basis for the organization of Yeast Collections. This organization will serve to provide information about strains of specific interest to research workers and to facilitate the exchange of strains.

As a first step towards an international catalogue of yeast cultures a list of permanent culture collections shall be made available at the next Symposium (1969) as well as a form on which strain characteristics should be entered.

Authors of new species should deposit their new species in as many Type Culture Collections as is possible.

The proposal was adopted to hold the Third International Yeast Symposium at Delft, Holland, in 1969, under the chairmanship of Professor T. Wiken.

Members of the Resolution Committee

Elinov N. P. (USSR)	Necas O. (CSSR)
Klaushofer H. (Austria)	Phaff H. J. (USA)
Kocková-Kratochvílová A. (CSSR)	Wickerham L. J. (USA)
Leupold U. (Switzerland)	Wiken T. (Holland)
Minárik E. (CSSR)	Windisch S. (German Federal Republic)
Müller R. (German Democratic Republic)	

Bratislava, July 21, 1966

QUESTIONNAIRE

(A similar questionnaire is being mailed to all registered participants of the Symposium. It is also mailed with the News Letter in order to reach a greater number of persons.)

After filling in, please return to: Dr. A. Kocková-Kratochvílová
Chemický ústav SAV
Dúbravská cesta
BRATISLAVA, CSSR

1. Addresses of Institutes and scientists permanently engaged in the study of yeasts (Y) and yeast-like organisms (YO) in your Country or State:
2. Addresses of Institutes and scientists permanently engaged in the study of Y and YO in the following countries: Norway, Greece, Rumania, Turkey, United Arab Republic, India, China, Indonesia, and other countries in Asia, Cuba, Mexico, Argentina, Brazil, and other countries in South America; countries of Africa. (Subscribers of the Yeast News Letter in these countries can be especially helpful here and may wish to volunteer as a contact person in his country.)
3. Addresses of regional Collections of Y and YO in your country. Do these Collections possess a list of cultures?
4. Do you want to cooperate on the standardization of methods used in the field of Y and YO? On which aspect?
5. Which points do you want to coordinate?
6. Whom would you propose as a member of the future Nomenclatural Committee?