

Y E A S T

A News Letter for Persons Interested in Yeast

May 1961

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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 November 1961. A contribution of \$0.50 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.

I. Centraalbureau voor Schimmelcultures, Yeast Division, Delft, Holland.  
Communicated by Mrs. N. J. W. Kreger-van Rij.

The following new species (for which a description has been published) have been received by the C.B.S. since publication of the last issue of the Yeast News Letter.

1. Candida bogoriensis Deinema  
(M.H. Deinema, Mededel. Landbouwhogeschool Wageningen, 61: 1, 1961)
2. Debaryomyces artagaveytiae Batista, Silveira et Coelho  
(A. Chaves Batista, J.S. Silveira and R. Pessoa Coelho, Mycopathologia, 14: 19, 1961)
3. Debaryomyces coudertii Saez  
(H. Saez, Bull. mens. soc. linneenne Lyon, 29: 288, 1960)
4. Endoblastomyces thermophilus Odinzowa  
(E.N. Odinzowa, Mikrobiologie, 16: 4, 273, 1947)  
strain obtained from Prof. W.I. Kudriavzev
5. Endomycopsis clamitans Batista et Coelho  
(A. Chaves Batista, R. Pessoa Coelho, Instituto de Micologia, Universidade de Recife, Publicacao No. 242)
6. Endomycopsis dermatensis Batista, Campos et Coelho  
(A. Chaves Batista, S.T.E. Campos, R. Pessoa Coelho, Instituto de Micologia, Universidade de Recife, Publicacao No. 178)

I. Centraalbureau voor Schimmelcultures, Yeast Division, Delft, Holland.  
Communicated by W.I. Kudriavzev, Die Systematik der Hefen, Akademie Verlag, Berlin, 1960

The following new species (for which a description has been published) have been received by the C.B.S. since publication of the last issue of the Yeast News Letter.

8. Saccharomyces caestuarii Fell  
(J.W. Fell, Antonie van Leeuwenhoek, 27: 27, 1961)
  9. Saccharomyces coreanus Saito  
(K. Saito, Centr. Bakt. Parasitenk., Abt. II, 26: 369, 1960).  
strain obtained from Prof. W.I. Kudriavzev.
  10. Saccharomyces prostoserdovi Kudriavzev  
(W.I. Kudriavzev, Die Systematik der Hefen, Akademie Verlag, Berlin, 1960) . 14: 19, 1961)
  11. Torulopsis halonitratophila Onishi  
(H. Onishi, Report of the Noda Institute for Scientific Research, No. 4, 1, 1960)
  4. Endoblastomyces thermophilus Odinzowa  
(E.N. Odinzowa, Mikrobiologie, 16: 4, 273, 1947)
  12. Trichosporon figueirae Batista et Silveira  
(A. Chaves Batista and J.S. Silveira, Mycopathologia, 12: 196, 1960)
  5. Endomycopsis clamitans Batista et Coelho  
(A. Chaves Batista, R. Pessoa Coelho, Instituto de Micologia, Universidade de Recife, Publicacao No. 242)
- Publication: N. J. W. Kreger-van Rij: Taxonomy of Cryptococcus neoformans and its variety uniguttulatus. Antonie van Leeuwenhoek 27, 59-64, 1961.
6. Endomycopsis dermatensis Batista, Campos et Coelho  
(A. Chaves Batista, S.T.E. Campos, R. Pessoa Coelho, Instituto de Micologia, Universidade de Recife, Publicacao No. 178)

II. Istituto di Microbiologia Agraria e Zoologica dell' Universita' di Pisa, Italy. Communicated by Prof. Dr. G. Verona.

1. G. Verona and A. Rambelli isolated from flowers of Eucalyptus one yeast which is described as a new species, with the provisional name of Candida magnifica. Such a species is particularly interesting as it presents the same physiological behavior and, moreover, the same morphological aspect as Candida pulcherrima. It undoubtedly differs, however, by the shape and dimensions of the chlamydo-spores. These are in fact of constant elliptical shape and are about 7.8 - 15.6  $\mu$ .
2. In this Institute is now working, under a fellowship, Prof. E. Aquarone of the Faculty of Pharmacy of the University of S. Paolo in Brazil. He is studying some characteristics of the osmophilic yeasts and is carrying out researches using Saccharomyces melleus and Saccharomyces glaucus var. intermedia. He is particularly studying the course of the fermentative process as related to a) osmotic pressure; b) temperature; and c) pH. Growth requirements are also being studied.
3. G. Picci studied the yeasts isolated from some cheeses from Greece. The sporogenic yeasts were more abundant than the asporogenic ones. Saccharomyces fragilis, S. lactis, Debaryomyces subglobosus, Pichia fermentans, etc; and, among asporogenous species, Candida krusei, C. parapsilosis, C. pseudotropicalis, etc. Most isolates were auxoheterotrophic for biotin and thiamine; they showed low lysozymic activity, but remarkable phosphatase activity was found.

G. Picci (1961) - Sopra i lieviti presenti in alcuni formaggi greci. Annali Facolta Agraria, Univ. Pisa, vol. 21, 149-160.

III. Institute of Fermentation, Yamnashi University, Kitashin-Machi, Kofu, Japan. Communicated by Dr. S. Goto.

I am classifying the Japanese wine yeasts according to a new taxonomic key (for cultural and physiological properties). The first report of this classification was reported at a meeting of Nippon Nogei-Kagakukai, Nov. 12, 1960.

I described a new variety (Sacch. cerevisiae var. pelliculosa) of Sacch. cerevisiae Hansen (see below)

I am also studying a classification of cheese yeasts and soil yeasts.

Saccharomyces cerevisiae Hansen  
var. pelliculosa nov. var.

Growth in malt extract: After 3 days at 25°C. cells are round and oval to long-oval, 3,5<sup>2</sup>-8<sup>2</sup> $\mu$ , (3,5-6,5)X(5,5-9,5) $\mu$ , single, in pairs or in chains or groups.

Slide cultures: No pseudomycelium.

Liquid culture and pellicle formation: A spotty ring is formed in malt extract: a pseudo-film is formed after 1-2 days on yeast-extract-ethanol medium.

Sporulation: Protuberances resembling conjugation tubes are present, asci also formed without conjugation. 1-4, round to oval ascospores are formed in the ascus.

Streak culture: After one month at 20°C. brownish yellow, umbonate, entire, moist, shiny to radiant rays, rough at the surface.

Fermentation: Glucose +, Galactose +, Sucrose +  
Maltose +, Lactose -, Raffinose + 1/3.

Sugar assimilation: Glucose +, Galactose +, Sucrose +,  
Maltose +, Lactose -.

Assimilation of KNO<sub>3</sub>: Negative.

Growth in ethanol medium: Moderately.

Splitting of arbutin: Negative.

Vitamin requirements: Usually, Biotin is essential as well as pantothenate; inositol and pyridoxine are stimulative.

IV. Muséum National D'Histoire Naturelle, Laboratoire D'Ethologie, Parc Zoologique, Paris XII. Communicated by Dr. Henri Saéz.

Publications:

Debaryomyces coudertii, nouvelle espèce de levure isolée chez un Manchot royal (Aptenodytes patagonica Miller) Bull. Sté Linn. de LYON, 1960, 29, 10, pp. 288-289.

Champignons isolés du Poumon de quelques Mammifères sauvages morts en captivité. Parasitologia (Roma) 1960, 3, pp. 353-358.

In this work we report in the lung of a chimpanzee the presence of a yeast and parasites (Acaridae) of the respiratory system. Acaridae (ambulant parasites) may very well play an important role in the transmission of microorganisms from the pharynx to the lung. On this subject we have also send a note to a symposium held in April 1961 in Cologne "On several fungi isolated from a dead chimpanzee kept in the Zoological Garden of Paris".

Publications:

Flore levuriforme de l'enfant sain - Rev. Mycol.

Un champignon souvent isolé dans des prélèvements d'origine animale: l'Aspergillus candidus Link. Bull. du Museum.

V. Laboratoire de Microbiologie et Mycologie, Faculté des Sciences de Lyon, 16, Quai Claude-Bernard, Lyon, France. Communicated by Dr. J. Boidin.

Dr. J. Boidin writes:

Earlier and present activities of our Laboratory for Microbiology

and Mycology include yeast work directed by Professor J. Boidin. Although the laboratory has been specialized for a long time in the study of saprophytic Basidiomycetes, studies on the microflora of tanning liquors have been carried out since 1948, in collaboration with the "Institut de Recherches pour les Industries du Cuir de Lyon". The following publications resulted from this study.

Boidin et Abadie, Bull. Soc. Mycol. France 70 (4), 353-383, 1954.

Boidin et Adzet, *ibid.*, 73 (4), 331-342, 1957.

Adzet, J. J. La Microflore des liqueurs tannantes végétales (Thèse, Lyon Mai 1959).

After an interruption of more than a year, the activities of the laboratory have become once more reoriented toward yeasts thanks to the return to Lyon of Miss F. Abadie as an officer of the National Center of Scientific Research. She has recently published the following note.

"Intérêt systématique de la recherche de l'uréase chez les levures et Organismes levuriformes". Compt. Rendu Acad. Sciences Paris 252, 2122-2124, Avril 1961 (reprints available).

For the rest several students have conducted or are conducting research in ecology (yeasts associated with Basidiomycetes, yeast from the Cameroun, and studies of the colorless algae belonging to the genus Prototheca). These studies will be published in due time.

Professor J. Boidin invites colleagues to exchange publications with him in the area of taxonomy, ecology and biochemistry of yeasts.

VI. The Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Food, New Haw, Weybridge, Surrey, England. Communicated by Dr. P. K. C. Austwick.

#### Candida tropicalis in experimental bovine abortion

In July 1959 in collaboration with Mr. J. R. Lawson, five pregnant cows were inoculated with cells of Candida tropicalis. The strain, No. A49, had been isolated in 1955 from a case of mycotic abortion. Four of the cows were given doses varying from 10 million to 4,000 million cells intravenously and one was given 2,000 million killed cells. On abortion or calving 1-2 months later, the yeast was present in and isolated from the placentae, uteri and foetal stomach contents from the four cows receiving live cells. The cow receiving killed cells calved down normally with an uninfected placenta. The only other yeast so far identified from spontaneous bovine mycotic abortion has been Candida pulcherrima, but 14 cases of abortion apparently associated with undetermined yeasts have been reported in the last six years.

Last month we had a brief visit from Dr. Seymour Hutner of C. J. Haskins Laboratories, New York, during his whirl-wind trip to Great Britain to address the Society for General Microbiology.

I. F. Keymer and myself have now published our account of "Moniliasis in Partridges, Perdix perdix", Sabouraudia 1: 22-29 (1961).

VII. Institute of Animal Genetics, West Mains Road, Edinburgh 9, Scotland.  
Communicated by Dr. Colin H. Clarke.

The following are some of the results which I have obtained in reverse mutation experiments with two adenine-1 auxotrophs of Schizosaccharomyces pombe. The two adenine mutants, ad 1-3 and ad 1-40 have been tested both in the single strains and in double strains combined with the mutable methionine marker met 4-D19.

Spontaneous reversions. Spontaneous revertants of ad 1-3 and ad 1-40 occur less frequently in the ad<sup>-</sup> met<sup>-</sup> double strains than in single strains.

HNO<sub>2</sub>-induced reversions. ad 1-3 does not respond to nitrous acid treatment in either single or double strains. ad 1-40 responds in both single and double strains, though the frequency of induced revertants is lower in the double strain.

Since ad<sup>+</sup> revertants are scored on minimal medium with the single strains, and on minimal medium + methionine with the double strains, it seemed possible that the methionine in the plating medium was suppressing the expression of spontaneous and of HNO<sub>2</sub>-induced revertants. Tests were made with the ad 1-3 and ad 1-40 single strains of the influence of methionine in the plating medium on survival and expression of revertants. No effect was found upon survival after mutagenic treatment, nor, in reconstruction experiments, on the growth of a few ad<sup>+</sup> cells added to a population of ad<sup>-</sup> cells into visible colonies on adenine deficient medium. Methionine, however, had a definite effect in suppressing spontaneous revertants of both ad 1-3 and ad 1-40, and the HNO<sub>2</sub>-induced reversions of ad 1-40.

The lessened mutagenic response of these two ad-1 auxotrophs in the ad<sup>-</sup> met<sup>-</sup> strains is thus due largely to the presence of methionine in the plating medium on which the reversions are scored. Further experiments, designed to show at what stage in the mutagenic process methionine acts, indicate that methionine inhibits the residual divisions which ad<sup>-</sup> cells undergo when plated on medium lacking adenine. Delaying the addition of methionine to the minimal plates on which revertants of the ad<sup>-</sup> single strains are scored results in a progressive loss of ability to suppress revertant colony formation, i.e. the ad<sup>+</sup> reversions are phenotypically expressed and no longer inhibited by methionine.

Di-epoxybutane (D.E.B.). Neither ad 1-3 nor ad 1-40 show a response to DEB treatment in single strains, but both respond in the ad<sup>-</sup> met<sup>-</sup> double strains. In addition the met 4- D19 marker, which responds extremely well in single strain, shows in the double strains a lessened response to DEB.

I am reporting some of these results in a talk, "The influence of the plating medium on spontaneous and induced adenine revertants in fission yeast", at the April meeting of the Society for General Microbiology in London. In the autumn I hope to be visiting Dr. H. Heslot, who is also working on chemical mutagenesis in Schiz. pombe, for a ten day period.

VIII. Department of Food Science & Technology, University of California, Davis.  
Communicated by Dr. H. J. Phaff.

1. Dr. Lidia do Carmo-Sousa presents preliminary results of the species of yeast found in the crops of species of Drosophila occurring in

a hill area west of the Sacramento Valley.

Periodical collections of *Drosophila* flies were made at a small hill canyon near a lake since November 1960.

The main species found at this location was *D. pseudoobscura*. So far, the yeast flora associated with the feeding habits of these flies shows that they are preferably attracted by substrates where *Saccharomyces veronae*, apiculate yeast (mainly *Hanseniaspora osmophila* - *Kloeckera corticis*) and *Candida pulcherrima* are the most abundant yeast species.

*Saccharomyces montanus*, *S. cerevisiae* var. *tetrasporus*, *S. drosophil-  
arum* and *Hansenula angusta* which were commonly isolated in the Yosemite region of California were isolated only once each in the present survey.

Simultaneously with the above, collections of *Drosophila* were also made in a peach orchard located at the west edge of the Sacramento Valley. Here again *D. pseudoobscura* was the main species during the winter. Apiculate yeasts (mainly *Hanseniaspora uvarum*) were the most common in the crops of these flies. *Pichia kluyveri* and *Candida pulcherrima* were present during the late autumn and are showing up in the late spring, but were not found during the winter. *Rhodotorula* spp. and *Cryptococcus* spp. were present during the winter.

Other yeast species were incidentally isolated. The available data suggest that during the cold months the preferred substrates are not abundant enough to supply the needs of the flies and they have to look for food elsewhere.

2. A research project dealing with the release of nitrogenous substances by brewer's yeast, formed the subject of a Master of Science thesis by Mr. A. L. Delisle under the guidance of Professor H. J. Phaff. A summary of the work follows:

The excretion of nitrogenous compounds by pregrown cells of *Saccharomyces carlsbergensis* was determined under a number of storage conditions. Nitrogen excretion was followed by determining in the supernatant liquid changes in total nitrogen, alpha-amino nitrogen, and optical densities at 260 and 280  $\mu$ .

Yeast was stored in distilled water at 1°, 13°, and 21°C for 12 days. At the two higher temperatures a sudden increase in the rate of excretion was noted between 12 and 14 days of storage. No such increase in rate was noted at 1°C up to 19 days of storage. Excretion upon storage in 1 per cent  $\text{KH}_2\text{PO}_4$  or  $\text{NaH}_2\text{PO}_4$  at 13°C was quite comparable to that in water.

Storage in water containing 5 per cent glucose greatly stimulated nitrogen excretion of young cells as well as aged cells over that in distilled water. Immediately upon mixing yeast (aged for 11 days in distilled water) with glucose solution, a large increase in the nitrogen content of the supernatant liquid was noted. This nitrogen represented both alpha-amino nitrogen and nucleotide nitrogen. Within 30 minutes after the addition of glucose the level of alpha-amino nitrogen had dropped to or below the original level due to reabsorption of amino acids by the yeast. This was followed by a further absorption of alpha-amino nitrogen during

the next several hours to a minimal level after which the concentration showed only a slight increase during the final period of the glucose fermentation (5 days at 13°C). Nucleotide nitrogen showed much smaller changes upon addition of glucose. Only a minor fraction appeared to be reabsorbed by the yeast after which excretion of nucleotide nitrogen was resumed at a significant rate until the end of the fermentation. Addition of a nonfermentable sugar, lactose, showed a behavior of the yeast analogous to that in water.

During growth in the presence of ammonium sulfate the yeast excreted almost six times as much organic nitrogen as during fermentation in the absence of an inorganic nitrogen source. This organic nitrogen represented both nucleotide nitrogen and non-nucleotide nitrogen.

The nucleotide nitrogen and non-nucleotide nitrogen could be separated on a column of Dowex-1 ion exchange resin. The non-nucleotide nitrogen excreted in distilled water was examined by paper chromatography and was found to consist of at least 13 amino acids and 3 unidentified compounds.

3. The work on enzymatic digestion of yeast cell walls by Mr. H. Tanaka and Mrs. L. W. Higgins is being continued.

IX. Dr. Kenkichi Kodama (Iizuka, Iidagawa, Showa Machi, Akita Prefecture, Japan) has sent in the following paper.

Kawakami, Noboru, Takeo Nehira and Kenkichi Kodama. Electron Microscopy of Fungi. X. Spore Forms of the Genus Pichia. Reprinted from "Memoirs of the Faculty of Engineering, Hiroshima University, Vol. 1, No. 4", March, 1961.

Because of the limited circulation of this journal an abstract of the work follows.

Our results are not inconsistent with the former suggestion by Kawakami and Nehira that the spore forms can be applied in the classification of sporogenous yeasts. The spore form is available so far as the electron microscopical level is concerned and should be considered at a different level from the light microscopical observations of Stelling-Dekker or Kodama.

At the light microscopical level, the physiological taxonomy of Lodder and Kreger-van Rij is actually important, because sporulated colonies of P. bovis, P. pastori, P. terricola, etc. were not obtained during this experiment. Kodama attached importance to some light microscopical characteristics, but such characteristics could not be used in this electron microscopical report, because, for instance, the angular form was also observed in P. membranaefaciens var belgica (Fig. 4) as in case of P. membranaefaciens var. mandshurica (Fig. 7), and it was also difficult to distinguish an artifact which occurred during the preparation of specimens for electron microscopy from the true aspect of the spore.

In case of using the electron microscopical observation in the classification, the aspect of spore ledge (or rim), whether it is "Helmet" or "Hat" shape, is considered to be the most remarkable characteristic in this genus. So far as the strains of the genus Pichia used in this paper are concerned, the authors divided them into five groups from the view point of electron microscopical spore forms by section.



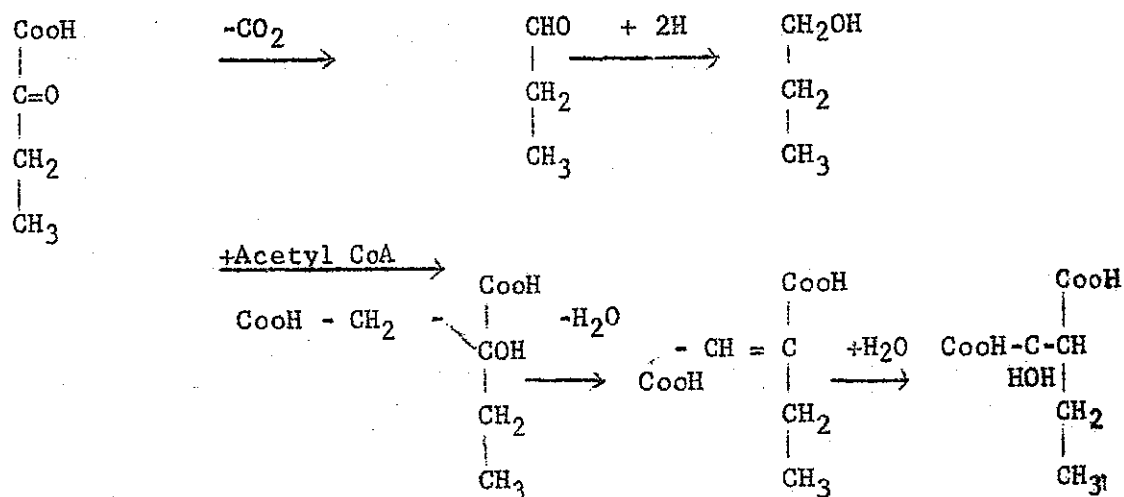
It was suggested, however, that nine strains called P. membranaefaciens var mandshurica were divided into two groups, one of which has the typical "Helmet" shaped spore as P. membranaefaciens (original) and P. membranaefaciens var belgica, and the other of which has no typical ledge.

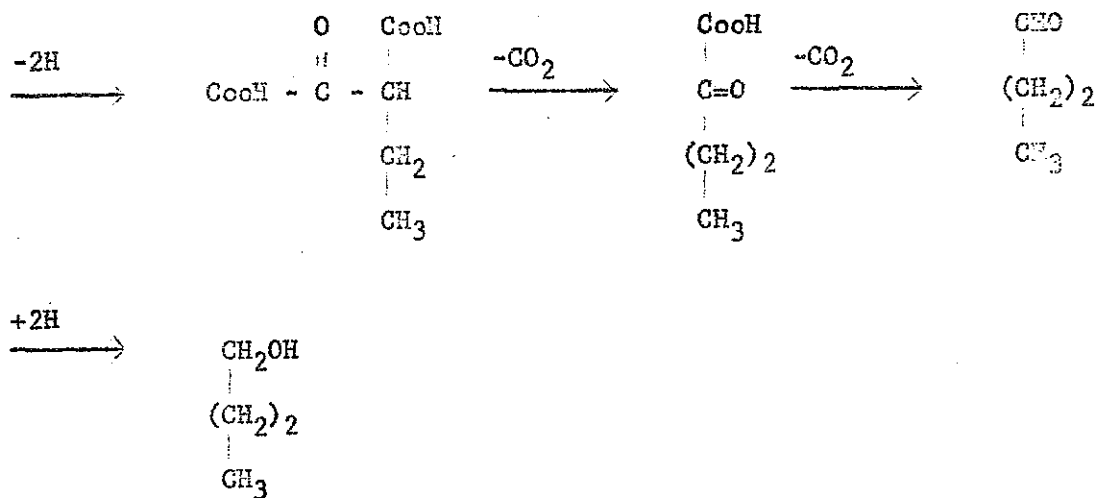
On the other hand, P. membranaefaciens defined by Lodder and Kreger-van Rij according to physiological properties are also divided into two groups from the view point of electron microscopical morphology. Therefore five electron microscopical groups mentioned above suggest some differences from species at the light microscopical level.

X. Department of Viticulture and Enology, University of California, Davis.  
Communicated by Dr. John Ingraham and James F. Guymon.

For the past 2 years we have been studying the formation of higher molecular weight aliphatic alcohols (fusel oil) by yeasts. Part of this work has been published (Arch. Biochem. & Biophysics 88, 157-66, 1960) and more will be submitted to the same journal. We have concerned ourselves with the pathways of formation of these alcohols by resting-cell fermentations of glucose in the absence of added amino acids. We have found a direct relationship between the ability of yeast cells to form a given fusel alcohol and their nutritional requirement for the corresponding amino acid, i.e. leucine-requiring mutants were found to be incapable of producing isoamyl alcohol, isoleucine-requiring mutants do not produce active amyl alcohol, and valine-requiring mutants do not produce isobutyl alcohol. It appears therefore that even under growing conditions in grape juice media an appreciable amount of the fusel oils mixture (probably about 75%) is formed from the carbon source by the same route by which corresponding amino acid is formed.

In the course of these studies we obtained a mutant (from Dr. Robert Mortimer, University of California, Berkeley) which required both isoleucine and valine for growth. As expected, resting-cell glucose fermentation by this organism produced no isobutyl, isoamyl, or active amyl alcohols; but, unexpectedly, it produced large amounts of n-propyl and n-butyl alcohols. Using appropriate labeling experiments we have obtained evidence consistent with the following pathways of formation of these two alcohols from  $\alpha$ -ketobutyric acid, an intermediate in isoleucine synthesis.





If resting-cell fermentations of this mutant are provided with a source of  $\alpha$ -keto-n-valeric acid (norvaline), n-amyl alcohol is produced in addition to n-propyl and n-butyl alcohols. Tracer studies indicate that this alcohol is produced from  $\alpha$ -keto-n-valeric acid by a pathway completely analogous to that which produces n-butyl alcohol from  $\alpha$ -ketobutyric acid.

It appears, therefore, that all the higher molecular weight alcohols formed by yeasts in significant quantities are products of overflow metabolism of valine, leucine, isoleucine synthesis.

XI. University of Wisconsin, College of Agriculture, Department of Bacteriology.  
Communicated by Dr. H. O. Halvorson.

During the past year we have concentrated upon the mechanism controlling  $\beta$ -glucosidase synthesis in yeast. Miss Alberta Herman, working with heterothallic strains of Saccharomyces lactis, has identified a number of unlinked control genes. These include (1) a modulator gene which in a series of alleles controls the level of constitutive synthesis, (2) a gene controlling inducibility by  $\beta$ -methyl glucoside and (3) a gene(s) controlling glucose inducibility. Current experiments are in progress to identify the structural gene.

Mrs. F. Rudert has just completed her M.S. thesis on gene dosage relationships involved in  $\alpha$ -glucosidase synthesis. Analysis of the M genes from the Carlsberg Laboratory as well as U.S. stocks show that although the gene product,  $\alpha$ -glucosidase is probably identical - the differential rate of enzyme synthesis ( $\Delta E/\Delta$  protein) varies with the M gene employed. From analysis of haploids and diploids,  $\Delta E/\Delta$  protein is strictly additive with gene addition. The significance of this to the control mechanisms operation are under current investigation.

Dr. H. Okada, from Osaka University, Japan, has just joined our group. Together with Mr. John Gorman we hope to examine the permeability controlling  $\alpha$ -methyl glucoside utilization in yeast.

Mr. Al Cline, from New Highlands University, has joined our group and is assisting Dr. Kihara and Dr. Hauge, from Oslo, Norway on the analysis of ribosomal bound enzymes in yeast. This summer Dr. A. S. L. Hu and Mr. Ray Epstein will join this group.

Recent publications from this laboratory.

1. H. O. Halvorson. The induced synthesis of proteins. *Adv. Enzymol.* 22, 99 (1960).
2. A. S. L. Hu, R. Epstein, H. O. Halvorson and R. M. Bock. Yeast  $\beta$ -glucosidase: Comparison of the physical-chemical properties of purified constitutive and inducible enzyme. *Arch. Biochem. Biophys.* 91, 210 (1960).
3. H. K. Kihara, A. S. L. Hu and H. O. Halvorson. The identification of a ribosomal-bound  $\beta$ -glucosidase. *Proc. Natl. Acad. Sci. U. S.* 47, 489 (1961).

XII. Department of Microbiology, University of Illinois, 127 Burrill Hall, Urbana, Illinois. Communicated by Dr. F. M. Clark.

I would like to report two projects on yeasts being carried on in our laboratory at the University of Illinois.

1st: We have continued our work on the phosphoinositides in Schizosaccharomyces pombe. Chromatographic studies on the chloroform-methanol extract of cells of this yeast have indicated the possibility of two or three different phosphoinositides. Studies on the one present in greatest amounts indicates presence of glycerol; inositol and phosphate in a 1 to 1 ratio; and gas chromatography has indicated the presence of oleic and palmitic acids in the ratio of approximately 3 to 1 respectively. Further work is being done on a larger batch of cells to check these results and ratios. Despite exhaustive extraction with chloroform-methanol there still remains in the cells a small amount of some compound or compounds containing inositol that appear to be insoluble in the above solvents. We do not know the nature of this material.

2nd: The capsular material produced by Torulopsis melibiosum has been of interest to us. On a glucose peptone yeast extract medium a large amount of this material is produced. Tests on this capsular material for starch or starch-like compounds has been uniformly negative, as was reported by Prof. Phaff. When grown on a synthetic medium containing ammonium salts and known vitamins with glucose, capsular material is produced but not in amount comparable to the non-synthetic medium. When Inositol is substituted for glucose in synthetic medium capsular material is produced but in smaller amounts than with the other two media. Extraction of the capsular material from glucose non-synthetic medium has indicated on hydrolysis presence of reducing sugar. Identification of the sugar or sugars is not as yet complete. We hope to determine if the same type of capsular material is produced when different carbon sources are supplied.

XIII. Brief News Items.

The Editor regrets to inform you that Robert Errol Wright passed away on November 3, 1960. At the time of his death he was attached to the C.S.I.R.O. Staff at Canberra, A.C.T. Australia.

A paper "Classifying yeasts on punch cards" has been accepted for publication by Antonie Van Leeuwenhoek. The advantages of such a method are: great speed in both filing and retrieving information; ease of recording data; cards of yeasts with common characteristics can easily

retrieved. Translation of information from punch card onto IBM cards (the method of the future) is simple.

Two projects with yeasts are underway: (1) Nutritional Studies with Pityrosporium ovale and (2) Isolation of Yeast from Chicken Intestinal Tract.

We would appreciate receiving cultures of P. ovale - for comparison with our strains.

Dr. Moshe Shifrine  
Department of Avian Medicine  
School of Veterinary Medicine  
University of California  
Davis, California

Studies on the fine structure of pathogenic yeasts are being continued at this laboratory. Results with Blastomyces (Paracoccidioides) brasiliensis have shown that this organism has very well developed endomembrane systems and many nuclei per cell which resemble our previous findings for B. dermatitidis. The "cryptosporulation" state was not confirmed. The data on the electron microscopic studies of this fungus will be published elsewhere.

Dr. Mercedes R. Edwards  
State of New York  
Department of Health  
Albany 1, New York

Dr. Carl C. Lindegren has been invited to attend the 5th International Congress of Biochemistry in Moscow, Russia, August 10-16, 1961. He will present a paper on the "Mechanism of gene action and the possible relationship of environmental modifications to Mendelian genes."

An article on "Electron microscopy of mitochondria in Saccharomyces" by Tadashi Hirano and Carl C. Lindegren has been accepted for publication in the Journal of Ultrastructure Research.

Dr. Carl C. Lindegren, Director  
Biological Research Laboratory  
Southern Illinois University  
Carbondale, Illinois

Dr. E. M. Mrak, Chancellor of the Davis Campus of the University of California will visit Japan from about June 25 - August 25, 1961. He will be accompanied by his wife. The trip, sponsored by the Rockefeller Foundation, will include visits to a large number of food manufacturing plants. Dr. Mrak also hopes to visit as many researchers in yeast as his schedule will permit.

Dr. James A. Barnett writes:

Dr. Anna Kockova-Kratochvilova, who previously wrote a book on yeasts "Kvasinky" (1957), is bringing out another "Atlas kvasinek a kvasinkovitych mikroorganismu".

Her address is:

Dr. Anna Kockova-Kratochvilova  
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Two recent papers deal with yeasts from Antarctica.

Special Publications from the Seto Marine Biological Laboratory. Biological Results of the Japanese Antarctic Research Expedition 15. On Some Yeasts from the Antarctic Region by Masami Soneda, Nagao Institute, 380, Mishuku, Setagaya-Ku, Tokyo. Sirahama, Wakayama-Ken, Japan, March 1961.

(1) Five species of yeasts were isolated from soily materials of the Antarctic region, collected by members of the 3rd and 4th Japanese Antarctic Research Expedition.

(2) Cryptococcus laurentii and Rhodotorula mucilaginosa seem to be dominant species among them and can grow at lower temperature as far as tested.

Yeasts from Antarctica. Margaret E. di Menna. Soil Bureau, Department of Scientific and Industrial Research, Wellington, New Zealand. J. Gen. Microbiol. (1960) 23, 295-300.

The yeast flora of moss from Granite Harbour and of soils from Wright Dry Valley in the McMurdo Sound region of Antarctica was examined. There were 75,000 yeasts/g. on the moss; species recovered were Cryptococcus laurentii, C. albidus and Rhodotorula minuta. Yeasts were isolated from 8 of the 12 soil samples in numbers up to 5000/g. Strains of Candida scottii, whose maximum growth temperature was 15°C., were the predominant soil yeasts.

#### Miscellaneous publications:

Hiroshi Onishi (Noda Inst. for Scientific Res., Noda City, Noda, Chiba Prefecture, Japan): Studies on Osmophilic Yeasts. VII. Production of polyalcohols by Saccharomyces rouxii in the concentrated media of sodium chloride and sugars, and identification of polyalcohols produced. VIII. Polyalcohol production by various genera and species of yeasts. IX. Isolation of a new obligate halophilic yeast and some consideration on halophilism. X. Influence of the environmental factors on the change of microflora during the ripening process of soy-mash. Bull. Agr. Chem. Soc. Japan, Vol. 24, No. 2.

C. Roberts and J. P. van der Walt (Physiological Department, Carlsberg Laboratory, Copenhagen, Denmark): Investigations on maltose utilization in Saccharomyces. I. The acquisition of maltose fermentative ability by S. capensis. Compt. rend. trav. Lab. Carlsberg 32 (2): 19-34. Illus. Copenhagen 1960.

Contributions from the Prairie Regional Laboratory, National Research Council, Saskatoon, Saskatchewan.

J. F. T. Spencer and P. A. J. Gorin. The biosynthesis of erythritol and glycerol by Torulopsis magnoliae. Studies with C<sup>14</sup>-labelled glucose. Can. J. Biochem. Physiol. Vol. 38 (1960).

P. A. J. Gorin, J. F. T. Spencer, and A. P. Tulloch. Hydroxy fatty acid glycosides of sophorose from Torulopsis magnoliae. Can. J. Chem. Vol. 39 (1961).

- P. A. J. Gorin, R. H. Haskins, and J. F. T. Spencer. Biochemistry of the ustilaginales. XIV. Bioassimilation of L-erythrulose into 4-O- $\beta$ -D-Mannopyranosyl-D-Erythritol. Can. J. Biochem. Physiol. Vol. 38 (1960).
- M. E. di Menna (Soil Bureau, Department of Scientific and Industrial Research, Wellington, New Zealand): Yeasts from soils under forest and under pasture. N. Z. J. Agric. Res. 3, 623-632 (1960).
- Tadayo Hashimoto, Philipp Gerhardt, S. F. Conti, and H. B. Naylor. (Department of Bacteriology, University of Michigan Medical School, Ann Arbor, and Laboratory of Bacteriology, Cornell University, Ithaca): Studies on the fine structure of microorganisms. V. Morphogenesis of nuclear and membrane structures during ascospore formation in yeast. J. Biophysic. and Biochem. Cytol., Vol. 7, No. 2, pp. 305-310.