Y E A S T

A news Letter for Persons Interested in Yeast

May 1960

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The Editor takes pleasure in thanking all those who have contributed to this issue. Without this gratifying support the News Letter cannot fulfill its purpose. The Editors would like to invite others to send in contributions for future issues. It is planned to publish the next issue of the News Letter in November 1960. It would be appreciated if anyone would notify the Editor of additional people in our field who would like to receive the Yeast News Letter. Contributions to finance future issues are welcome. Many thanks to those who have recently contributed financially.

The Editors

I. Centraalbureau voor Schimmelcultures, Julianalaan 67A, Delft, Holland. Communicated by Mrs. N. J. M. Kreger-van Rij.

A new catalogue of cultures maintained in the C.B.S. is in preparation. In the Yeast News Letter VIII, page 17 (November 1959) line 9 the name Talice should be substituted for Guerra. 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.

Candida atmosphaerica Santa Maria (J. Santa Maria, Anales Inst. Nac Invest. Agr., 8, 799, 1959).
Candida fimetaria Soneda (M. Soneda, Nagaoa, 6, 1, 1959)
Candida krusei (Cast.) Berkh. var. saccharicola Santa Maria (J. Santa Maria, Anales Inst. Nac. Invest. Agr. 8, 781 1959)
Cryptococcus terricolus Pedersen (T.A. Pedersen, Compt rend. trav. lab. Carlsberg, 31, 93, 1958)
Hansenula coprophila Soneda (M. Soneda, Nagaoa, 6, 1, 1959.
Pichia minuscula Soneda (M. Soneda, Nagaoa, 6, 1, 1959)
Saccharomyces elegans Lodder et v. Rij var. intermedia Verona et Zardetto de Toledo (O. Veronae O. Zardetto de Toledo, Mycopathologia, 11, 103, 1959)
Schwanniomyces hominis Batista, Vieira et Coelho (A. Chaves Batista, J. Rego Vieira y R. Pessoa Coelho, Revista Eucuatoriana de Higiene y Medicina Tropical, 16, 136, 1959).
Torulopsis buchneri Graebner (K.E. Graebner, Z. Morph. Ökol. Tiere, 42, 471, 1954)
Torulopsis fujisanensis Soneda (M. Soneda, Nagaoa, 6, 1, 1959)
Torulopsis saccharini Santa Maria (J. Santa Maria, Anales Inst. Nac. Invest. Agr., 8, 781, 1959)

II. National Chemical Research Laboratory, Visagie Street Government Buildings, P. O. Box 395, Pretoria, South Africa. Communicated by Dr. J. P. van der Walt.

The wine industry research group has been moved from Stellenbosch to Pretoria at the above address.

The studies on the genus Brettanomyces are continuing and the following progress can be reported.

The claims of Custers that Brett. claussenii was capable of 'fermenting' unidentified compounds in yeastwater, other than carbohydrates, to ethanol without the concomitant production of carbon dioxide, were re-investigated. Fermentation balances for fermentations conducted in yeastwater-2% glucose gave alcohol: carbon dioxide ratios of 1.00 to 1.01 for Brett. claussenii and Brett. intermedius. Custers had reported ratios of about 1.23 for the same experimental conditions.

Studies on the taxonomy of this interesting genus have further lead to rather unexpected results. Checking a number of strains of Brettanomyces intermedius and Brettanomyces schanderlii isolated locally from wine cellars, ascospore-formation was observed. This was

confirmed in strains of Brett. schanderlii isolated by Peynaud and Domercq as well as in strains of Brett. intermedius isolated from Cape wines and which we had previously regarded as non-sporulating. Several strains of Brett. bruxellensis were then likewise found to be ascosporogenous. These species form 1-4 hatshaped spores which are liberated rather soon after maturation. These strains all appeared to be homothallic. Ascospore-formation has not been observed in the strains of Brett. claussenii and Brett. anomalus examined up to date.

As the type species of the genus appears to be sporogenous, it appears as if the entire genus should be transfered to the Endomycetaceae.

The above is being reported in forthcoming issues of Antonie van Leeuwenhoek.

New species: A new anascosporogenous species isolated from cellar equipment will be described in a forthcoming issue of Antonie van Leeuwenhoek.

Typical for this species is its very small cells. It is non-fermentative and assimilates nitrate, glucose, sorbose, ribose, mannitol, sorbitol, erythritol, glycerol and citrate; pseudomycelium is not formed nor is a pellicle produced on liquid media. We are naming this species Torulopsis domercqii for Dr. Simone Domercq.

III. United States Department of Agriculture, Agricultural Research Service, Northern Utilization Research and Development Division, Peoria, Illinois. Communicated by Dr. L. J. Wickerham

The following paper has been published recently:

L. J. Wickerham and R. G. Dworschack. "Extracellular invertase production by sexually agglutinative mating types of Saccharomyces kluyveri". Science 131, 985-986, 1960

Abstract. Unisexual strains of both mating types of Saccharomyces kluyveri produce exceedingly high yields of extracellular invertase. Yields generally increase with an increase in the number of sets of chromosomes possessed by the unisexuals. The bisexual forms give small amounts in comparison.

Our present work is still along the lines of biochemical phylogenetics. As you know, we have pointed out in Bulletin 1029 that primitive mucoid species of Hansenula are hydrophilic due to their capsular polysaccharide. The intermediate species produce glistening butyrous colonies with increasing degrees of hydrophobicity; and, the most recently evolved species produce mat, dry, highly hydrophobic colonies.

Dr. Morey Slodki has studied the polysaccharides of the primitive mucoid species and found them to comprise a family of phosphomannans in which the phosphomannan chains are crosslinked through phosphate groups. The ratio of phosphate groups to mannose units is constant for each species and apparently decreased as each succeeding species was produced. The genus of nitrate-negative,

predominately hat-spored yeasts evidently arose from the primitive species of Hansenula, and the primitive species of the former genus also produces phosphomannans. So, also, does Pachysolens tannophilus. Phosphomannans are produced free in the medium up to 40 per cent yields on the sugar consumed.

Dr. Frank Stodola and I have been working at the other end of this same phylogenetic line. Here also have been found new compounds not previously known to be produced in nature. Phosphomannans are probably largely responsible for the hydrophilic nature of the primitive species; the sphingolipides undoubtedly contribute to the marked lipophilic reactions of Hansenula ciferrii. Sphingolipides are found in plants and in nerve tissue of animals. They are characteristically bound to other molecules which makes their isolation and purification difficult. The sphingosines produced by H. ciferrii are unique, or nearly so, since they are produced as crystals in 24-hour cultures. One sex and bisexuals seldom produce the principal sphingosine, tetraacetylphytosphingosine; nearly all ascosporic isolates of the other sex produce it.

A series of papers will be published by Jeanes, by Slodki, and by Wickerham, on various aspects of the phosphomannans, and by Stodola and Wickerham on the sphingolipides, some of which will be in Mycologia, Journal of Bacteriology, and various chemical journals. See also Bact. Proceedings, 1960, Page 42.

IV. Southern Illinois University, Carbondale, Illinois. Communicated by Dr. Carl C. Lindegren.

Since the last publication of the Yeast News Letter, the following articles have been published or have been accepted for publication:

Lindegren, C. C. Genetical theory. Science 131: 1567 (1960)

Lindegren, C. C. The biological implication of survival. Phi. Kappa Phi Journal 37-39 (1959).

Lindegren, C. C. Radiation and genetics. The Indiana Nurse, 6-7 (November 1959)

Lindegren, C. C., Shult, E. and Desborough, S. The induction of respiratory deficiency by adaptational stress. Canadian Journal of Genetics and Cytology. Accepted for publication.

Ogur, M., Ogur, S., St. John, Ralph. Temperature dependence of the spontaneous mutation rate to respiration deficiency in Saccharomyces. Genetics 45: 189-194 (1960).

Shult, E. E. and Lindegren, C. C. A survey of genetical methodology from Medelian to tetrad analysis. Canadian Journal of Genetics 1: 189-201 (1959).

Dr. Lindegren attended the 1960 Spring meeting of the Society for General Microbiology which was held at the Royal Institution in London, April 11-13. He gave a paper on "The dimension of the turanose element of the MZ locus in Saccharomyces."

Mr. Robert Drysdale from the Department of Microbiology, University of Birmingham, England, is working in the Biological Research Laboratory for 3 months.

V. Cytogenetics Laboratory, Indian Institute of Science, Bangalore-12. Communicated by Dr. M. K. Subramaniam.

List of publications:

1. Subramaniam, M. K., Royan, S., Thyagarajan, T. R., Aswathanarayana, N. V. and Subramanyam, S.
"The Nuclear Membrane of Yeast"
Golden Jubilee Research Volume of the Indian Institute of Science. pp. 96-102. 1959.

2. Thyagarajan, T. R.
"Further Observations on the Nucleus of Living Vegetative cells and Zygotes of Saccharomyces carlsbergensis"
Golden Jubilee Research Volume of the Indian Institute of Science. pp. 88-95. 1959

3. Subramaniam, M. K.
"The Nucleus of Yeast"
Proc. Indian Acad. Sci. B. Feb. 1960

4. Saraswathy Royan, and Subramaniam, M. K.
"Differential Fluorescence of the Chromocenters and Nucleolar Equivalents of the Yeast nucleus in Acridine Orange." Awaiting publication in the Proc. Indian Acad. Sci.

VI. University of Miami, The Marine Laboratory, #1 Rickenbacker Causeway, Virginia Key, Miami 49, Florida. Communicated by Dr. Samuel P. Meyers.

Dr. N. van Uden, Dept. of Microbiology, University of Lisbon, Portugal, currently visiting at Scripps Institute of Oceanography, La Jolla, California, will be at the Marine Laboratory, U. of Miami, as a Visiting Research Scientist for this summer. Dr. van Uden will work with Dr. S. P. Meyers and Dr. F. J. Roth, Jr. on aspects of the marine yeast program, especially on studies related to the possible association of yeasts with marine animals.

Dr. S. P. Meyers wishes to invite applications from workers in the yeast field to work on phases of the marine yeast program. The facilities of the microbiology section have been expanded considerably and applications from graduate students in mycology or microbiology will be welcomed. Our emphasis in the yeast studies is on nutritional and ecological characteristics of this population. We are always anxious to hear from other workers concerned with yeast research.

Mr. J. Fell and Mr. Donald Ahearn are still continuing their studies on yeasts in the Dept. of Microbiology, University of Miami, where they are working towards the PhD degree under Dr. F. J. Roth, Jr. Mr. Milton Kolipinski of the Univ. of Buffalo has joined the microbiology section of the Marine Laboratory where he is working for his PhD degree on marine yeasts under Dr. S. P. Meyers. Miss Betty Ojeda of The Marine Laboratory has combined marriage and yeasts and is now Mrs. B. Brust.

VII. The University of Wisconsin, College of Agriculture, Department of Bacteriology, Madison 6, Wisconsin. Communicated by Dr. H. O. Halvorson.

During the past year we have continued to study the role of ribosomes in protein synthesis in yeast. Dr. R. J. Young and Mr. Kihara have examined in detail the kinetics of incorporation of C^{14} amino acids and of S^{35} into various cell fractions. They observed that the highest specific activity was associated with the ribosome fraction. When unlabeled amino acids (chaser) were added, a fraction of the radioactivity was displaced from the ribosome and appeared as soluble proteins. We are currently examining the kinetics of this process.

Mr. A. MacQuillan has also continued to study the control mechanism governing constitutive and inducible β-glucosidase synthesis in S. dobzhanskii and S. fragilis. One of the most interesting findings was that glucose, which inhibits enzyme synthesis at 10^{-3}M, serves as an inducer at 10^{-4}M. Examination of the several other carbohydrases indicates that the process is specific. The inhibition observed at high glucose levels cannot be reversed by inducer. It thus appears that at least two separate controls for β-glucosidase synthesis by glucose, or glucose products, are present.

Dr. Dean Cowie and I shall present a paper "Metabolic Pools of Amino Acids and Protein Synthesis in Yeast" at the International Symposium on Membrane Transport and Metabolism to be held in Prague in August 1960.

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

The following three projects on yeast are under study.

The first project is a continuation of the work regarding the utilization of inositol by Schizosaccharomyces pombe. In previous work, it was observed that this yeast required a specific amount of inositol and if an excess of this vitamin was supplied, the excess was left in the medium. It has been shown that in some yeasts, in brain tissue and soybeans, inositol is present as a part of the phospho-lipids. Our work, at present, is an attempt to determine the type or types of inositol-containing phospho-lipids in this yeast. Work indicates that not all the inositol can be removed by fat solvents. We hope to isolate, characterize, and if possible identify the various inositol containing compounds produced by this yeast.

A second project also deals with inositol but from a different standpoint. A yeast isolated and described by Phaff and named Torulopsis melibiosum has been shown to grow in synthetic ammonium medium with inositol as a sole source of carbon. Since inositol is a ring structure compound, we are interested in how the yeast breaks the ring and utilizes this compound. Preliminary work has indicated that the carbon from inositol is used to form cell structures, carbon dioxide, and in the culture medium we find small amounts of pyruvic acid and lactic acid. No other products have been detected, thus giving no hint as to the breakdown intermediates. An inositol dehydrogenase has been demonstrated in cells of Aerobacter aerogenes when it is grown with inositol as a carbon source. Following the technique proposed for obtaining the enzyme from this organism we are attempting to isolate an inositol dehydrogenase from this yeast. If this enzyme can be demonstrated in Torulopsis melibiosum it may give us a clue as to the initial attack on the inositol molecule with the possibility of obtaining some of the intermediate products in its utilization.

The third project involves the determination of p-aminobenzoic acid using Rhodotorula aurantiaca as the assay organism. The strain of the organism which we have requires thiamin and p-aminobenzoic acid. A good curve can be obtained by this organism with p-aminobenzoic acid over the range of 0 to .01 micrograms. Work to date has indicated that the response is dependent on the constituents present in the medium. If the response is to be to p-aminobenzoic acid alone, it has been found that adenine must be supplied in the medium. Certain amino acids, methionine, histidine and lysine, will also partially satisfy the requirement for this vitamin. The medium which has been used most successfully in this work contains asparagin and ammonium sulfate as nitrogen sources and these have been supplemented with norite treated peptone. Adenine is added at the rate of 2 milligrams per 100 milliliters of medium. Organic salts, thiamin, and dextrose complete the medium. Work is continuing on obtaining a more synthetic medium for this assay.

IX. Institut für Gärungsgewerbe, Mikrobiologische Abteilung, Seestr. 13, Berlin N 65 (West). Communicated by Dr. Siegfried Windisch:

In the framework of investigations on vegetative growth, the development of the yeast flora in a feed yeast installation was checked over an extended period. It was possible to establish what factors influence the increase or decrease of the components of the population (mainly Candida utilis and Candida mycoderma).

1. Im Rahmen vegetationskundlicher Untersuchungen wurde die Florenentwicklung einer Futterhefeanlage installation über längere Zeit kontrolliert. Es konnte ermittelt werden, von welchen Einflüssen die Zu- oder Abnahme der Standortspartner (hauptsächlich Candida utilis und C. mycoderma) abhängt. (S. Windisch: Zur Ökologie der Hefen. Zbl. Bakteriol. II 113, 107, 1959)

A thorough study has been published on aspects of vegetative

yeast growth in 132 Pilsen beers and 42 light beers.

2. Über die Ergebnisse vegetationskundlicher Analysen von 132 Pilsner Bieren und 42 hellen Bieren liegt ein eingehender Bericht vor. (S. Windisch: Proceedings European Brewery Convention, Rome, 1960, 266.)

Earlier investigations on trisaccharide fermentation led us to study the inheritance of maltotriose fermentation. We have found 3 genes in the yeasts investigated: The first gene governs only the fermentation of maltose; the second controls in addition maltotriose fermentation; the third gene controls fermentation of maltose, maltotriose and starch.

3. Die früheren Untersuchungen über Trisaccharidvergärung haben uns veranlaszt, die Vererbung der Maltotriosevergärung zu prüfen. Wir haben bei den untersuchten Hefen 3 Gene gefunden: Das erste steuert nur die Vergärung von Maltose, das zweite bewirkt ausærdem Maltotriosevergärung, und das dritte veranlaszt von Maltose, Maltotriose und Stärkeabbau. (S. Windisch und C. C. Emeis: Genetische Untersuchung über die Vergärung von Maltotriose. Monatsschrift für Brauerei 13, 2, 1960.)

Tetrad analyses of asci of a commercial baker's yeast yielded very complex results.

4. Die Erbanalyse einer technischen Backhefe ergab recht komplizierte Verhältnisse. (H. Gutz: Über das Erbverhalten eines Backhefestammes (Saccharomyces cerevisiae). Der Züchter 29, 251, 1959.

Note: A request is made to readers of the News Letter for strains of Saccharomyces fermentati (Saito) Lodder et Kreger-van Rij, 1923, which are needed for comparative studies.

X. Department of Agricultural Chemistry, Faculty of Agriculture, University of Tokyo. Communicated by Dr. M. Takahashi.

The following is a resumé of a series of papers published on the requirements of amino acids and vitamins by yeast (Jour. Agric. Chem. Soc. Japan). 28, 395 (1954); 28, 425 (1954); 30, 140 (1956); 30, 145 (1956); 33, 83 (1959); 34, 83 (1960) (all in Japanese)

The author confirmed that, when the nutritional requirements of yeast were investigated using a light inoculum, as 10^3 cells per ml, quite different results from the hitherto published papers were obtained. Present experiments have been done using a light inoculum.

Strains of Saccharomyces sake with ammonium phosphate as a source of nitrogen did not require any vitamins, but required pantothenate when a mixture of amino acids or casein hydrolysate were used as nitrogen sources.

When an amino acid mixture was added to ammonium sulphate-inorganic salts medium, the yeast strain failed to grow. The same results were also obtained with other groups of Saccharomyces.

These phenomena were proved to be due to inhibitory action of amino acids, particulary histidine.

Asparagine, a component of Hyduck's medium, also inhibited the growth of this strain.

Addition of pantothenate or B-alanine removed the inhibitory action of the amino acids mentioned above.

Amount of inoculum also had some relation to anaerobic growth of the yeast. Under anaerobic conditions, growth of the yeast did not occur when a light inoculum was used; in the case of a heavy inoculum, feeble growth was observed after a long lag period. It was suggested by the author that useful vitamins diffused from the yeast cells in sufficient quantities when heavy inocula were used, and these vitamins could carry out the role of oxygen.

The author next studied the nitrogen requirments of several strains of yeasts and observed that some of the yeasts could not utilize inorganic nitrogen instead of amino acids.

Pichia membranaefacience is of particular interest, because of its nutritive behavior to nitrogen, that is, it can utilize inorganic nitrogen but also the organic.

Then the author compared the cell components of Pichia membranaefacience with those of Saccharomyces sake. Pichia membranaefacience's cell contained B-alanine, but Saccharomyces sake contained none. Pantothenic acid, however, was found in cells of both these strains, which was confirmed by a histogram. (bioautography).

Since pantothenic acid is synthesized from B-alanine and pantoic acid, both of the yeasts must have the ability of synthesizing B-alanine.

But from the above experimental results, it is shown that the ability of synthesizing B-alanine should be very different between these two strains.

The author considered the phenomena as follows, in case of Saccharomyces sake, B-alanine is produced in such small amounts that the synthesized B-alanine is immediately utilized for synthesis of pantothenic acid.

On the other hand, Pichia membranaefacience produces such large amounts of B-alanine that the histogram showed the B-alanine.

XI. Syracuse University, Syracuse 10, New York, Department of Bacteriology and Botany. Communicated by Dr. Hamilton Niss.

We list the following current research projects that are under way in the department for the Yeast Newsletter.

1. A study of the biosynthesis of sterol in Saccharomyces

cerevisiae and the effect of a polyene antibiotic on the pathway. Alexander Perritt, graduate student. Dr. Arthur Phillips, supervising professor.

2. Comparative metabolic study of Candida albicans grown in liquid media, tissue culture and in the intestinal tract of germ free animals. Mr. Edward Balish, graduate student. Dr. Arthur Phillips, supervising professor.

3. Investigation of the biochemistry of the mating process in Hansenula anomala with the use of haploid mutants. Mr. Kenneth Bott, graduate student. Dr. Hamilton Niss and Dr. James Smith, supervising professors.

4. Ecological study of yeasts with special reference to starch hydrolysing strains. Factors influencing starch hydrolysing enzyme production in Sporobolomyces. Mr. Robert Broderick, graduate student. Dr. Hamilton Niss, supervising professor.

Paper given at the 60th annual meeting of the Society of American Bacteriologists. Philadelphia.

Metal Effects on the inhibition of acetate oxidation of Saccharomyces cerevisiae by pimaricin. F. C. Bach, A. W. Phillips, T. Robinson and H. R. Newcomb. Biological Research Laboratories, Bacteriology Department., Syracuse University, Syracuse. Bacteriological Proceedings (1960) 157

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

1. Dr. Yoneyama and I are working on the yeasts associated with species of the genus Scolytus (fir engraver bark beetles). Only a single species of yeast (a member of the genus Endomycopsis) appears to be present in large numbers (cf. Bacteriological Proceedings, 1960, page 42). Sporulation has been difficult. Fir frass appears to contain factors which stimulate sporulation. The yeast occurs as heterothallic mating types, both of which are found in the same tree. Recently we have isolated bisexual diploids by plating conjugating nutritionally deficient mutants on a minimal medium.

2. A second project (with Mr. H. Tanaka) deals with the enzymatic digestion of yeast cell walls with microbial enzymes. Purified cell walls were prepared from baker's yeast in a colloid mill. By using this as a substrate in agar media, we have isolated a number of molds, bacteria and Actinomycetes, which excrete enzymes able to hydrolyse cell walls and thus produce clear zones around the colonies on the plates. Complete and partial digestion of the walls has been observed. We are now characterizing the nature of the activity of the various enzymes.

3. Dr. G. K. York has been studying the effect of sorbic acid on the metabolism of yeast. Sorbic acid was found to inhibit oxidative assimilation of several microbes including S. cerevisiae. This inhibition of assimilation was observed to have been caused by an uncoupling of oxidative phosphorylation. Evidence

has been obtained that there is an additional site of inhibition involving fumarase. Fermentative assimilation by S. cerevisiae was also inhibited but higher concentrations of sorbic acid were required. This is believed to involve the inhibition of the synthesis of aspartate and possibly of glutamate because these amino acids partially reversed inhibition of growth and that aspartase perse was inhibited by sorbic acid. Cells of S. cerevisiae became tolerant to initially inhibitory concentrations of sorbic acid by adaptation and lost this resistance after one or two transfers on sorbic acid-free media. This behavior was different than that observed with bacteria which gave rise to stable mutants.

4. Publications.

H. J. Phaff, M. W. Miller and Wm. Bridge Cooke. A new species of Schwanniomyces: Schwanniomyces alluvius. Antonie van Leeuwenhoek 26, NO 2, 1960.

H. E. Snyder and H. J. Phaff. Studies on a beta-fructosidase (inulinase) of Saccharomyces fragilis. Antonie van Leeuwenhoek 26, 1960 (in press)

H. J. Phaff. The production of certain extracellular enzymes by microorganisms. Handbuch der Pflanzenphysiologie. Vol. XI, 76-116, 1959. Springer Verlag, Berlin.

5. During the spring of 1960 the following visitors spent one or more days in our laboratory. Dr. T. van Uden (Lisbon, Portugal); Dr. M. Ingram and Dr. Kitchell (Cambridge, England); Dr. K. Kitahara (Tokyo, Japan); Dr. T. Yoshida (Hokkaido University, Sapporo, Japan).

XIII. Institute of Fermentation, Yamanashi University, Japan. Communicated by Dr. S. Goto.

Publications:

Studies on film-forming wine yeasts. I.On film formation and distribution of wine yeasts. Jour. Ferm. Technol. 37, 384, 1959. II. Taxonomic studies of isolated wine yeasts. Ibid. 37, 390, 1959. III. On cultural conditions of pseudofilm-forming yeasts. Ibid. 37, 412, 1959.

The following are summaries of reports delivered before the Agric. Chem. Soc. Japan, Nov. 1959.

IV. On vitamin requirements:

The vitamin requirement of 87 selected strains of wine yeasts (isolated and studied in previous reports) was studied. Seventy-six strains of Saccharomyces sp. were divided into 7 types (and other yeasts into 4 types). Those 7 types required commonly biotin, pantothenate and pyridoxine as basal vitamin requirements but typical wine yeasts belonged to two types:

a..required essentially biotin and pantothenate, pyridoxine and inositol were stimulative..32 strains.

b...required essentially biotin and pantothenate, pyridoxine was stimulatory..33 strains.

Besides, pseudofilm and film-lacking strains required each different vitamins; the former belong almost all to "a" and the latter almost all to "b" type.

V. Effect of vitamins and amino acids on film formation of pseudofilm-forming yeasts.

The author studied the effect of vitamin and amino acids on pseudofilm-formation. A chemically defined medium was employed. Vitamins were effective factors for pseudofilm-formation. The effect was shown by biotin and so it may be one of pseudofilm-forming factors. Pantothenate showed also a slight effect, and a pseudofilm was very well formed on biotin plus pantothenate. Amino acids had no notable effect generally, although arginine, proline, aspartic and glutamic acid (or B-alanine) showed a slight effect.

XIV. Institute of Microbiology, New Brunswick, New Jersey.

Dr. Walter J. Nickerson has sent in the following publications:

Gian Kessler and Walter J. Nickerson, Glucommannan-Protein Complexes from Cell Walls of Yeasts, The Journal of Biological Chemistry, Vol. 234, No. 9, September 1959.

Bartnicki-Garcia, S., and Walter J. Nickerson. The Yeast-like Form of Mucor rouxii, Proceedings of the IXth International Botanical Congress, Montral, p. 22 (1959)

Nickerson, Walter J., Nutritional Control of Morphogenesis in Yeast-like Fungi, Proceedings of the IXth International Botanical Congress, Montreal, p. 282 (1959)

Walter J. Nickerson, Giuseppe Falcone, and George Strauss, Electron Transfer by Glutathione-Menadione Complex (Thiodione) in Terminal Reductions, Federation Proceedings, Vol. 19, p. 35 (1960)

S. Bartnicki-Garcia and Walter J. Nickerson, Thiamin and nicotinic acid: anaerobic growth factors for Mucor rouxii, Bacteriological Proceedings, p. 163 (1960)

Giuseppe Falcone and Walter J. Nickerson, Enzymatic reduction of selenite (by Candida albicans), Bacteriological Proceedings, p. 152 (1960).

Walter J. Nickerson, Biochemistry of Morphogenesis, A Report on Symposium VI, Fourth International Congress of Biochemistry, Vol. XIV, transactions of the Plenary Sessions, Pergamon Press.

G. Falcone and Walter J. Nickerson, Enzymatic Reactions Involved in Cellular Division of Microorganisms, Fourth International Congress of Biochemistry. Vol. VI--Biochemistry of Morphogenesis, Pergamon Press.

XV. Miscellaneous news items

1. Dr. Moshe Shifrine, Department of Avian Medicine, School of Veterinary Science, University of California, Davis, writes:

"I shall spend the month of July in Dr. Hutner's laboratory, New York City. We want to look into the metobolic oddities which makes enteric "thermophilic" yeasts, such as Saccharomycopsis guttulata grow only between 35 and 41° C. Special emphasis will be given to the identification of

"temperature factors"—nutrients essential for growth below or above the limit permitted in ordinary culture media.

We shall also study the nutritional requirements of other thermophilic yeasts.

2. Dr. Beneke, (Michigan State University at East Lansing) left for Brazil in February and will return in September. He can be reached by writing the Escola Superior De Veterinaria, Universidade Rural Do Estado De Minas Gerais, Caixa Postal 567, Belo Horizonte-Minas Gerais, Brazil. While there, he is inaugurating a course in medical mycology at the above-mentioned institution as well as conducting research on pathogenic fungi in that particular area.

3. Dr. R. C. Artagaveytia-Allende (Universidad de la Republica, Cerrito 73, Montevideo, Uruguay) writes:

Miss D. Bracho and I are studying the occurrence of yeasts in plant materials (bark of trees, normal and altered leaves, and other plant materials) and we have found the following species: Candida catenulata, C. guilliermondii, C. parapsilosis, Geotrichum sp., Rhodutorula flava, Rh. glutinis, Rh. mucilaginosa, Rh. rubra, Saccharomyces cerevisiae, Torulopsis famata and Trichosporon sericeum. The investigations are being continued with other lots of materials. Miss D. Bracho came back to this laboratory after studying the biochemistry of microorganisms at the University of Curitiba, Brasil.

4. Dr. K. Kodama, Laboratory Kodama Brewing Co. Ltd., Iitagawamachi, Akita Prefecture, Japan, has the following request to readers of the Yeast News Letter.

"I am studying film-forming yeasts isolated from decaying fruit samples and from soil. I would very much appreciate receiving 5 - 10 g samples of soil and decaying fruit parts (e.g. the rind removed aseptically) from workers in other countries. It is best to airmail samples in plastic envelopes or small vials to my laboratory, indicating the source of the sample. Your cooperation is much appreciated."

5. The Department of Fermentation Technology, Osaka University, Osaka, Japan has recently (1959) issued a catalogue (74 pages) of bacteria, fungus and yeast cultures maintained in their institution. The Director is Professor G. Terui.

6. Professor R. Ciferri (Pavia, Italy) has sent the Editor 50 copies of a publication by Verona and Montemartini, "Synopsis of yeasts described from 1952-1958." The publication contains the published descriptions of new species of yeast described during the above period. Copies will be sold for $1.00 to those who write to the Editor of the Yeast News Letter. Proceeds will be used to help finance the News Letter, which operates at a deficit.

7. Miscellaneous publications received for inclusion in the News Letter.

1. T. Hasegawa, I. Banno, S. Yamanchi (Institute for Fermentation, Osaka, Japan) A taxonomic study of the genus

Rhodotorula - 1. The subgenus Rubrorhodotorula, Nov. Subgen. Jour. Gen. Appl. Microbiol. 5, 200-212, 1960. (English).

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