Y E A S T S

A News Letter for Persons Interested in Yeast

November 1957 Volume VI, Number 2

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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 May 1958. 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.

Many thanks to those who have contributed financially to the Yeast News Letter during the past year. It would be appreciated if those, who have not sent in a contribution for some time, would send $0.50 to help finance the issues for 1958. Contributions, however, are voluntary.

The Editors

I. Soil Bureau Experimental Station, Department of Scientific and Industrial Research, Eastern Hutt Road, Lower Hutt, New Zealand. Communicated by Dr. Margaret di Menna.

The following papers have been accepted for publication and will be appearing shortly in the Journal for General Microbiology: "The Isolation of yeasts from soil" and "Two new species of yeasts from New Zealand".

One of the new species described is Candida muscorum, mentioned in Yeast News Letter, November 1956. The second is a red yeast which occurs in great numbers on the leaves of pasture grasses in summer. It is proposed to call it Rhodotorula graminis. A shortened description is as follows: Pinkish red fluid cultures on solid media. Oval cells. No mycelium observed. No fermentation.

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

Potassium nitrate assimilated.

The species is very constant in morphology. It produces a great deal of intra- and extra-cellular fat, the composition of which is now being examined by Fats Research Laboratory, D.S.I.R., N. Z.

II. University of Kentucky, Department of Zoology, Lexington, Kentucky. Communicated by Dr. John M. Carpenter.

Since our last note to you about a year ago (see Yeast News Letter May 1957), our staff working on the Drosophila-yeast problem has been increased to four graduate students and myself. Three of us were able to visit the excellent laboratory of Dr. Wickerham and his staff at Peoria, Illinois last July for consultation purposes and were amply rewarded, both from the standpoint of increasing our knowledge of yeasts and the techniques concerned with their classification and from the standpoint of hospitality.

Collections of wild yeasts were begun in the early spring and will be continued as far as possible during the winter months when warm spells make it possible to collect Drosophila. At present we have in stock close to 350 strains of yeasts isolated from Drosophila crops and we began in October a concentrated program of identification of these strains. We expect to report on these results in April at the meetings of the Southeastern Association of Biologists and in August at the meetings of the American Institute of Biological Sciences.

III. Communicated by Professor A. Sanchez - Marroquin Miami 40, Mexico 18, D.F., Mexico.

Last May I went to Montevideo to attend a meeting on the "State of Mycology in Latin-America" under the sponsorship of UNESCO. Mycologists from Argentine, Brazil, Uruguay, Mexico, Venezuela and Chile were present for the discussions. Several recommendations were made in order to improve teaching and research of mycological problems in Latin American countries.

These recommendations will be published by Unesco, and sent to the main institutions related to Education and Research in those countries. Besides, it was decided to establish a Training Center for Mycology in Montevideo and a Latin-American Type Culture Collection in Mexico City.

My present work on yeasts is: a)Synergistic actions of some antibiotics on several Candida species; b)Taxonomic considerations regarding some Candida species and c)Action of some antifungal agents on pathogenic yeast-like fungi.

I have just published 2 papers on Candida parapsilosis, (with an English summary): Ciencia (Mex.) 15 (6-8): 129-135 and 15 (6-8): 136-140, 1955, and another one on the amino acid content of Chlorella as compared with Candida utilis, C. parapsilosis and a Torulopsis from "pulque" Ciencia 16: 129-135, 1957. The amino acid content of some other Candida species is now under study.

We are now organizing a Latin-American Congress of Microbiology to be held in Mexico City in October, 1958. Please extend an invitation to subscribers of "Yeast News Letters" to attend this meeting and present papers at the Mycological Section. Further information will be sent upon request. I am in charge of these affairs: Dr. A. Sanchez-Marroquin. Asociacion Mexicana de Microbiologia Melchor Ocampo 146-17. Mexico 4, D.F. I'll be very glad to supply all the information requested.

IV. Istituto Di Microbiologia, Agraria E Tecnica, Universita Di Perugia, Italy. Communicated by Professor T. Castelli.

I am presenting summaries of 6 publications by myself and my coworkers of work which we have been performing for 30 years on wine fermentation agents of the Mediterranean basin. These investigations have been brought to an end in nearly all wine-growing places of Italy.

1) T. Castelli and E. Del Giudice

"Gli agenti della fermentazione vinaria della Sicilia occidentale"
Rivista di Viticoltura e di Enologia - Conegliano: 10-12 (1953)

SUMMARY

In the microbiological exaimination of 27 musts coming from some places of western Sicilia and taken under examination in three different phases of the fermenting process, we have found totally 375 yeast cultures which have now been identified.

The identification showed the presence of:

Sacch. ellipsoideus	present	in	27	musts-namely	in	100.0%	of	the	musts
Sacch. oviformis	"	"	20	"	"	74.0%	"	"	"
Sacch. mangini	"	"	19	"	"	70.4%	"	"	"
Hans. guilliermondii	"	"	14	"	"	51.8%	"	"	"
Sacch. carlsbergensis	"	"	14	"	"	51.8%	"	"	"
Kloeckera apiculata	"	"	13	"	"	48.1%	"	"	"
Sacch. byanus	"	"	11	"	"	40.7%	"	"	"
Sacch. italicus	"	"	8	"	"	29.6%	"	"	"

Sacch. chevalieri	present	in	8	musts-namely	in	29.6%	of	the	musts			
Sacch. globosus	"	"	7	"	"	"	25.8%	"	"	"		
Torulaspora rosei	"	"	4	"	"	"	14.8%	"	"	"		
Sacch. urarum	"	"	4	"	"	"	14.8%	"	"	"		
Hans. apuliensis	"	"	4	"	"	"	14.8%	"	"	"		
Torulopsis pulcherrima	"	"	3	"	"	"	11.1%	"	"	"		
Zygosacch. florentinus	"	"	3	"	"	"	11.1%	"	"	"		
Sacch. exiguus	"	"	3	"	"	"	11.1%	"	"	"		
Torulaspora fermentati	"	"	2	"	"	"	7.4%	"	"	"		
Sacch. sp.	"	"	1	"	"	"	3.7%	"	"	"		

2) T. Castelli and E. Del Giudice

"Gli agenti della fermentazione vinaria nella regione Etnea"
Rivista di Viticoltura e di Enologia - Conegliano: 4-5 (1955)

SUMMARY

In the microbiological examination of 24 musts coming from places very different in altitude near the volcano Etna and taken under examination in three distinct phases of the fermentation process, we have isolated and completely identified 355 yeast cultures. The table below lists the isolated species, their frequency percentages and the number of strains of each species.

Sacch. ellipsoideus	present	in	24	musts-namely	in	100%	of	the	musts	with	125	strains
Hans. guilliermondii	"	"	14	"	"	"	58%	"	"	"	"	47	"
Kloeckera apiculata	"	"	12	"	"	"	50%	"	"	"	"	42	"
Sacch. oviformis	"	"	16	"	"	"	67%	"	"	"	"	35	"
Sacch. chevalieri	"	"	18	"	"	"	75%	"	"	"	"	25	"
Sacch. italicus	"	"	12	"	"	"	50%	"	"	"	"	19	"
Sacch. carlsbergensis	"	"	7	"	"	"	29%	"	"	"	"	10	"
Torulaspora rosei	"	"	6	"	"	"	25%	"	"	"	"	8	"
Sacch. elegans	"	"	4	"	"	"	16%	"	"	"	"	4	"
Sacch. unisporus	"	"	2	"	"	"	8%	"	"	"	"	4	"
Sacch. fructuum	"	"	2	"	"	"	8%	"	"	"	"	3	"
Zygosacch. marxianus	"	"	2	"	"	"	8%	"	"	"	"	3	"
Candida pulcherrima	"	"	2	"	"	"	8%	"	"	"	"	3	"
Sacch. rouxii	"	"	2	"	"	"	8%	"	"	"	"	2	"
Torulaspora fermentati	"	"	1	"	"	"	4%	"	"	"	"	2	"
Sacch. heterogenicus	"	"	1	"	"	"	4%	"	"	"	"	1	"

Sacch. bisporus	present	in	1	musts-namely	in	4%	of	the	musts	with	1	strains
Candida utilis	"	"	1	"	"	"	4%	"	"	"	"	1	"

3) T. Castelli and B. Inigo Leal

"Los agentes de la fermentacion vinica en la region manchega y zonas limitrofes"
Annali della Facolta di Agraria dell'Universita di Perugia: vol. XIII (1957)

SUMMARY

In the microbiological examination of 29 musts taken from wine-growing places of a region of Spain, the Mancha, we have isolated totally 430 yeast cultures on which we have performed the identification study. In the table below our results are listed.

Species of yeasts isolated	No. of musts yielding a species	Per cent	No. of strains	Per cent	Minimum & maximum alcohol production in % by volume	
Sacch. ellipsoideus	29	100	171	40	8.75	15.37
Kloeckera apiculata	25	86.2	84	19.5	0.37	6.50
Sacch. mangini	17	58.6	46	10.7	10.75	15.75
Torulaspora rosei	11	37.9	18	4.1	7.50	10.80
Sacch. oviformis	10	34.4	17	3.9	8.87	15.30
Sacch. italicus	8	27.5	10	2.3	11.00	13.75
Sacch. veronae	7	24.1	17	3.9	6.75	9.75
Kloeckera magna	6	20.6	8	1.8	4.50	8.20
Sacch. elegans	6	20.6	7	1.6	5.50	11.25
Sacch. fructuum	5	17.2	12	2.8	5.50	11.15
Sacch. chevalieri	5	17.2	8	1.8	12.00	15.00
Sacch. exiguus	5	17.2	9	2.0	12.25	15.00
Sacch. willianus	4	13.8	6	1.4	9.75	12.50
Sacch. pastorianus	3	10.3	5	1.1	8.50	10.30
Candida pulcherrima	3	10.3	4	0.9	0.50	1.75
Torulaspora fermentati	2	6.9	6	1.4	7.00	8.65
Candida mycoderma	1	3.4	1	0.2	0.30	
Sacch. rouxii	1	3.4	1	0.2	14.15	

4) T. Castelli and B. Inigo Leal

"Los agentes de la fermentacion vinica en la region de la Rioja"
Annali della Facolta di Agraria dell'Universita di Perugia: vol. XIV° (1958)

SUMMARY

In the microbiological examination of 24 musts coming from different Spanish places of the Rioja taken under examination in three distinct phases of the fermentation process, we have isolated and identified 352 yeast cultures.

The table below lists our results.

Species Isolated	No. of musts in which present	%	No. of strains obtained	%	Minimum & Maximum production of alcohol % in volume	
Sacch. ellipsoideus	24	100.0	142	40.34	8.50	15.00
Kloeckera apiculata	22	91.6	95	26.99	1.14	7.50
Torulaspora rosei	14	58.3	48	13.63	4.00	8.50
Candida pulcherrima	12	50.0	24	6.81	0.10	0.75
Sacch. pastorianus	7	29.2	17	4.85	5.00	12.50
Sacch. oviformis	5	20.8	9	2.84	10.87	12.85
Sacch. mangini	5	20.8	8	2.55	10.00	13.25
Sacch. italicus	4	16.6	4	1.13	10.00	12.50
Sacch. chevalieri	3	12.5	3	0.85	11.25	13.75
Sacch. bisporus	1	4.2	1	0.28	8.75	
Torulaspora delbrueckii	1	4.2	1	0.28	8.00	

5) T. Castelli

"Fermentazione e rifermentazione nei paesi caldi"
X° Congreso Internacional de Industrias Agricolas - Madrid (1954)

SUMMARY

Researches on the agents for the fermentation of wine have been conducted usually under exclusively natural conditions, and the few that have been done, lacked coordination and systematization. After recording briefly the investigations carried out in various wine producing countries, the author dwells at length on the researches that for more than 20 years have been carried out at the Institute of Agrarian and Technical Biology of the University of Perugia. Using always the same technique, microbiological analyses have been carried out on the various phases of the fermentation processes of not less than 500 musts from which over 5,000 pure cultures of yeasts have been isolated and identified. The author and his students have taken into consideration localities of Central Italy (Umbria-Toscany-Lazio-Marche-Abruzzi) moving on to Southern Italy (Puglia-Calabria-Sicily) and Northern Italy (Veneto-Trentino Alto-Adige). Investigations outside of Italy (The State of Israel and the Bordeaux Region) were also covered.

Many facts have been derived, which can be summarized as follows:

In the musts of grapes during fermentation, many species of yeasts are encountered some of which are found regularly present and must be considered to play the dominant role in the transformation of the must into wine, while there are many other yeasts whose occurrence may be considered as somewhat casual.

Many other species with high fermentative power, as well as those with low or medium fermentative power, are found with a medium frequency and for this reason their participation in the fermentation of grapes, quite naturally, cannot be excluded.

Profound differences have been brought into evidence between areas with a cold climate and localities with a hot or very hot climate. It has

been noticed for example, that the yeasts that initiate the fermentation are always those with apiculate forms. While, however, those isolated in cold or slightly warmer zones are all non-spore forming types that can be referred to the genus Kloeckera - Janke, those found in warm localities are apiculates also, but definitely spore forming, and to be referred to the genus Hanseniaspora-Zikes. The latter predominate completely in localities with a very hot climate.

Thus, it is shown that the action exercised by the climate on the agents of fermentation may be considered from the presence and from the frequency of the various species as well as from the chemical transformation by strains of the same species.

Noteworthy differences have been found between strains related to the same species and it has been noted that cultures of high fermentative power are found particularly in hot localities.

After the chemical transformation by the various species isolated, the author refers to fermentation tests carried out at various temperatures. He also discusses the processes of refermentation and the arresting of fermentation as so often happens in localities with a hot or a very hot climate.

From what has been said it is evident that today in Italy one can speak not only of pure selected yeasts, but more directly of yeasts from surroundings that correspond perfectly with the production of common wines. The vast demand made annually by industrialists and vintners for these particular strains of yeasts to be used in fermentation and refermentation give ample proof of their usefulness. The use, in fermentation and refermentation and in "stuck" fermentations, of some cultures isolated in Southern Italy and Sicily, has given the best results in hot areas of Italy as well as outside of Italy.

6) T. Castelli

"Climate and agents of wine fermentation"
Meeting of the Society of the American Enologists (1956)

You can find this publication in the review of the American Enologists.

At present we are working on 310 yeast cultures isolated from 16 musts taken from the wine-growing places around Verona producers of Soave, Valpolicella and Bardolino wines.

This work will come out in April 1958 and will be published in the "Rivista Di Viticoltura e Di Enologia di Conegliano".

TRAVELS

In 1950 I was invited by the Research Council of Israel to perform researches on grape-musts.

In 1955-1956, invited by the "Departamento de Fermentaciones In-

dustriales del Patronato "Juan de la Cierva" de Madrid" I performed some researches on the musts of Manche and Rioja.

For the vintage 1958 I have been invited by the "Office du Vin" in order to execute microbiological researches on the musts of Greece.

V. Istituto Di Microbiologia, Agraria E Techica, Universita Di Perugia, Italy. Communicated by Dr. A. Capriotti.

Papers published in 1956-1957.

1) "Gli agenti della fermentazione vinaria della Rufina"
Atti della Accademia Italiana della Vite e del Vino - vol. VIII° (1956)

SUMMARY

The author made microbiological researches on 16 samples of grape-must (seven fermented with SO_2 and nine without SO_2) of several areas of the Rufina (near Florence) and on a previously fermented wine of the same place. Altogether during three distinct analyses at the beginning, in the intermediate phase and at the end of the fermentation process of the musts 312 pure cultures have been isolated and identified. In the musts fermented without SO_2 we have found 138 pure cultures, of which 73 represent sporogenous species (Saccharomyces ellipsoideus, Saccharomyces italicus, Saccharomyces bayanus, Saccharomyces oviformis, Saccharomyces mangini, Torulaspora rosei) and 65 are represented by five asporogenous species (Kloeckera apiculata, Torulopsis pulcherrima, Torulopsis stellata, Cryptococcus albidus, Aureobasidium pullulans).

From the musts fermented with SO_2 we have isolated 174 pure cultures of which 73 belong to ten sporogenous species (Sacch. ellipsoideus, Sacch. bayanus, Sacch. italicus, Sacch. pastorianus, Sacch. mangini, Sacch. exiguus, Sacch. chevalieri, Torulaspora rosei, Hansenula subpelliculosa) and 43 asporogenous species belonging to 8 species (Kloeckera apiculata, Kloeckera magna, Torulopsis bacillaris, Torulopsis pulcherrima, Torulopsis stellata, Torulopsis famata, Candida mycoderma, Aureobasidium pullulans).

Moreover, we have noted for the first time the presence of Sacch. pastorianus in the refermentation process of a white one year old wine.

2) "I lieviti della maturazione del formaggio Limburgo"
Il latte: vol. XXXI°, N. 4-5 (1957)

SUMMARY

The author took under examination some "Limburger" cheese samples and isolated and counted the yeasts which developed every other day during the ripening process. Debaryomyces subglobosus (Zach.) Lodder and Kreger-Van Rij is the widest spread species. Its growth curve is a parabola with a top of about 3×10^9 of cells per cm^3 of cheese material taken away from an angle (2 x 2 cm of surface). Moreover, we have found several species of Trichosporon, Torulopsis, Rhodotorula and even Saccharomyces.

When the Trichosporon content exceedes 30% of the total yeasts count the ripening is abnormal. The author studied for some strains of the isolated species the NaCl resistance, the behavior in milk, gelatin, fat of milk, lactose, lactic acid and Na lactate.

The author joins the conclusion that the most important species of yeasts in the Limburger cheese ripening is Debaryomyces subglobosus.

3) "New Blastomycetes isolated from soils of Spain"
I- Schwanniomyces castellii nova species
Archiv fur Mikrobiologie, Bd. 26, 434 (1957)

SUMMARY

Description

Growth in malt extract. After 3 days at 28°C., the cells are round to oval (3,5-7,5) x (4-8) microns, single or in pairs or in little groups. After one month at 17°C., a sediment, ring and transparent liquid are formed.

Growth on malt-agar. After 3 days at 28°C., the cells are round and also oval (3,5-10) microns, single or in pairs. In the middle of the cells there is an oil globule of a varying size which can attain 4 microns. The streak culture is white-cream colored, abundant, rather glistening, somewhat soft, smooth. After one month, it is cream-coloured and later ochraceous.
Slide culture: No pseudomycelium.
Sporulation: In rather old cultures, there are many cells which present a typical protuberance perhaps in the attempt at a conjugation which seems not to have occurred. We have never observed conjugation processes but, instead, parthogenetical production of ascus which contain generally one spore and, rarely, also two. The spores are Saturn-shaped, round, warty, with a ledge in the middle.

Fermentation:

glucose	+		lactose	-	
galactose	+	(rather weak)	raffinose	+	(1/3)
maltose	+	(very weak)	inulin	-	
saccharose	+		dextrine	+	(weak)

Sugar assimilation:

glucose	+	saccharose	+
galactose	+	lactose	+
maltose	+	raffinose	+

Assimilation of N substance. Potassium nitrate -; ammonium sulphate +; asparagine +.
Ethanol as sole source of carbon. Very weak
Splitting of arbutine. Positive.

Travels

Continuing the researches on soil yeasts performed in 1952 in Holland, in 1953 in Italy, in 1955 and 1956 in Sweden, the A. in August-September took a trip to Finland in order to collect some samples of soil and execute on them microbiological analysis for the yeasts isolation.

Altogether from 27 soil samples he has isolated 310 yeast cultures that are now studied in order to execute their taxonomical identification.

PUBLISHED WORKS before 1957

1) CAPRIOTTI, A. and C. CANTARELLI
"Gli agenti della fermentazione vinaria della provincia di Treviso"
Rivista di Viticoltura ed Enologia di Conegliano: No. 6-7-8 (1952)

2) CAPRIOTTI, A.
"Gli agenti della fermentazione vinaria nella Calabria"
Annali della Facolta di Agraria di Perugia: vol. VIII° (1952)

3) CAPRIOTTI, A.
"I lieviti dei fiori" I°
Rivista di Biologia: vol. XLV°, fasc.3°, pag. 369 (1953)

4) CAPRIOTTI, A.
"Gli agenti della fermentazione vinaria nella Venezia Tridentina"
Atti Accademia Italiana della Vite e del Vino: vol. V° (1953)

5) CAPRIOTTI, A.
"Recherches sur les levures de la fermentation vinarie en Italie"
Antonie van Leuwenhoek: 20, 374 (1954)

6) CAPRIOTTI, A.
"Indagini microbiologiche sulle carni insaccate"
Archivio veterinario Italiano: vol. V°, fasc.2°, 113 (1954)

7) CAPRIOTTI, A.
"Yeasts in some Netherlands soils"
Antonie van Leeuwenhoek: 21, 145 (1955)

8) CAPRIOTTI, A.
"Intorno al saggio di assimilazione degli zuccheri da parte dei lieviti"
Biochimica applicata: vol. II°, No. 1, 31 (1955)

9) CAPRIOTTI, A.
"I lieviti di alcuni terreni dell'Italia centrale"
Rivista di Biologia - Perugia: vol. XLVII°, fasc. 2°, 209 (1955)

10) CAPRIOTTI, A.
"Analisi microbiologiche su alcuni terreni olandesi"
Annali della Facolta di Agraria-Universita di Perugia: vol. X° (1955)

11) CAPRIOTTI, A.
"I lieviti dei fiori" II°
Rivista di Biologia-Perugia: vol. XLVII°, fasc. 3°, 343 (1955)

12) CAPRIOTTI, A.
"intorno al saggio di fermentazione del saccarosio, in presenza di altri zuccheri, da parte di Saccharomyces italicus - Castelli"
Annali della Facolta di Agraria dell'Universita di Perugia: vol. XI° (1955)

VI. 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:

1. McClary, D. O., Williams, M. and Lindegren, C. C. Nuclear changes in the life cycle of Saccharomyces. J. Bacteriol. 73, 754 (1957).

2. Shult, E. E. and Lindegren, C. C. Orthoorientation: A new tool for genetical analysis. Genetica. Accepted for publication.

3. Lindegren, C. C. Gene control of fermentation in Saccharomyces without control of permeability. J. Bacteriol. Accepted for publication.

4. Lindegren, C. C. The integrated cell. Cytologia. Accepted for publication.

5. Shult, E. E., and Lindegren, C. C. The localized crossover and a new hypothesis of chromosomal interference. Experientia. Accepted for publication.

The following talks were given by Carl C. Lindegren since the last publication of the Yeast News Letter:

May 16, 1957. A talk entitled "Gene-Controlled Carbohydrases in Saccharomyces" was given before members of the Abbott Signa Xi Club in Chicago.

August 21, 1957. A talk entitled "Yeast Genetics" was given before members of the Microbiology Department at the University of Denver.

October 25, 1957. A talk entitled "The Differential Effects of Various Poisons in the Inhibition of Cell Division and the Induction of Respiratory Deficiency" was given at the S.I.B. meeting in Peoria.

November 3, 1957. Dr. Lindegren appeared on the NBC "Outlook" television program in an interview on "The Problem of Anti-Intellectualism".

VII. University of Wisconsin, Department of Bacteriology, Madison, Wisconsin. Communicated by Dr. H. O. Halvorson.

1. During the past two years we have examined the stability of proteins and nucleic acids in growing and resting yeast cultures. In the former case these are irreversibly synthesized and in the latter turnover rates of about 1 per cent per hour were found. The results of the findings have been accepted for publication by the Biochem. Biophys. Acta.

a) Studies on Protein and Nucleic Acid Turnover in Growing Cultures of Yeast by H. O. Halvorson.
b) Intracellular Protein and Nucleic Acid Turnover in Resting Yeast Cells by H. O. Halvorson.

2. Mr. Jake Duerksen has begun a Ph.D. thesis dealing with the induction and properties of β-glucosidase in yeast. This enzyme in yeast foam is induced by alkyl β-glucosides but not by aromatic β-glucosides, while

the aromatic but not alkyl glucosides are good substrates of the enzyme. Enzyme induction follows the differential rate characteristic of β-galactosidase in E. coli. The enzyme is particulate but can be solubilized. We are presently purifying the enzyme and studying its properties.

3. Dr. George Cohen, of the Pasteur Institute, Paris, is spending a year in our laboratory. We have just finished a study on the properties of the amino acid accumulating system in Saccharomyces cereviseae. In contrast to E. coli the specificity is broad and requires only the presence of an α-amino acid group. Also, exogenous amino acids are incorporated into proteins in preference to the expandable free amino acid pool, indicating the probable presence of several types of such pools. These results are in press in the Ann. Inst. Pasteur. "Incorporation comparée des acides aminés endogenes et exogenes dans les proteins de la levure" par H. O. Halvorson and G. N. Cohen.

We are presently examining the phenomenon of linear growth of yeast in the presence of C^{14} labeled amino acid antagonists and the incorporation of these antagonists in growing and resting yeast..

VIII. Illinois Institute of Technology, Technology Center, Chicago 16, Illinois. Communicated by Dr. L. R. Hedrick

Papers recently published

Chesbro and Hedrick, "Studies on the suspension stability of some yeasts and bacteria". Applied Microbiology 5(3), 145-148 (1957).

Abstracts of recent work

Forney, C. E. and Hedrick, "The effect of Candida krusei and aureomycin on the survival of embryonated eggs". Buffered aureomycin in doses from 100 to 400 μg and washed Candida krusei cells in concentrations from 10 to 50,000 cells per mm^3 were separately and simultaneously inoculated onto the chorioallantoic membrane of 10 day old chick embryos. The injected volume was never greater than 0.15 ml, and the influence of this added volume was determined in a saline control series as was the effect of the glycinate buffer present in the antibiotic preparation. The aureomycin separately caused a 25% average decrease in the number of survivors, a portion of the percentage being attributed to the glycinate buffer accompanying the antibiotic. The Candida krusei inoculations produced a 24% average decrease in the number of survivors. However, when various combinations of aureomycin and C. krusei cells were used, the percentage range of survivors was 55 to 89%. The specific values with the combinations were found by statistical methods to be relatively independent of the cell concentration. The results obtained with the combined inoculations could not be accounted for by merely the additive influences of all the factors involved (namely antibiotic, yeast cells, and saline control). A potentiating effect between the aureomycin and the Candida krusei cells is considered responsible for the greater decrease in the number of survivors.

Ferlin, H. J. and Hedrick. "Agglutination of some Hansenula yeasts involving methylene blue, metallic ions and acidity." Methylene

blue is quickly absorbed by living Hansenula yeasts, but the rate and total amount absorbed depends upon several factors, one of which is the species. Sussman and Lowery, J. Bact. 70, 675 (1955) reported for Neurospora ascospores that the heavy metal ions could be arranged in a specific order of effectiveness as to their ability to elute the methylene blue. For the Hansenula yeasts we have shown that the factor influencing this elution is not the metallicions as such, but the normality of the acid associated with the solution of the salts of such metallic ions as Fe, Al, Ni, etc. It was observed that cells that had absorbed methylene blue were greatly agglutinated with the metallic ion solutions. This total effect was shown to be an additive effect of the dye in the presence of acid plus the action of the metallic ion complexes. Furthermore, by reciprocal adsorption experiments, it may be demonstrated that the binding sites on the cell surface for the methylene blue and of ferric or aluminum ion groups are different. A large percentage of cells of H. schneggii and Hansenula sp. 2154 when incubated for one to two days clumped with the $FeCl_3$ solution, but only a small percentage of the cells incubated four to five days were so agglutinated. With methylene blue plus acid, the degree of agglutination was independent of the length of incubation time in the growth medium.

IX. National Research Council, Canada, Prairie Regional Laboratory, Saskatoon, Sask. Communicated by Dr. Willard A. Taber.

Dr. Vining and myself have recently reported at the S.A.B. meeting in Detroit a presumably new anti-yeast antibiotic produced by a species of Streptomyces. We have named it AMIDOMYCIN. It consists of 4 molecules of D(-)-valine and 4 molecules of α-hydroxy isovaleric acid connected alternately by amide and ester bonds. Under our conditions of testing it has limited or no activity against filamentous fungi or the yeast-like filamentous fungi and is inactive against the bacteria tested. It is active toward Candida albicans and certain other yeasts in microgram quantities, and certain concentrations are either lethal or they permanently prevent proliferation. Two papers have been submitted for publication:

(1) "Amidomycin, a new antibiotic from a Streptomyces species. Production, isolation, assay and biological properties" by W. A. Taber and L. C. Vining, submitted to the Canadian Journal of Microbiology.

(2) "Amidomycin, a new antibiotic from a Streptomyces species. Chemical properties" by L. C. Vining and W. A. Taber, accepted for publication in the Canadian Journal of Chemistry.

X. The Ohio State University, Department of Botany and Plant Pathology, Columbus 10, Ohio. Communicated by Dr. William D. Gray.

Mycology Area, Department of Botany.

1. Dr. Norman D. Davis completed his work for the doctorate in August (dissertation: A study of pathways of carbon metabolism in

Hansenula anomala) and has joined the staff of the Department of Botany, University of Georgia.

2. Miss F. F. Och has continued with her attempts to separate species of Hansenula on the basis of their behavior on media containing single amino acids. She is interested in receiving cultures of film-forming yeasts (other than Hansenula) from any investigator who has such yeasts in culture.

3. Carl Sova is conducting studies on the molecular CO_2--glucose ratios in Hansenula anomala with the hope of more fully understanding the metabolism of this yeast.

4. Dr. John A. Schmitt, Jr. (medical mycology) is investigating the nutrition of Geotrichum spp.

5. Dr. William D. Gray and Carl Sova are continuing their investigation of the effects of alcohol on the yeast cell.

XI. University of California at Davis, Department of Food Technology. Communicated by Dr. H. J. Phaff.

1. Mr. M. W. Miller will be completing his doctoral dissertation this semester on the subject "A comparative study of the apiculate yeasts". Some of his results are as follows:

Three species of Hanseniaspora are recognized: H. valbyensis Kloecker, H. uvarum Niehaus and H. osmophila Niehaus. H. apuliensis Castelli 1948 was found to be identical with H. valbyensis. H. valbyensis forms 4 hat-shaped spores, each of which, upon isolation, produces diploid sporulating cultures. Diploidization is believed to occur directly during germination of the ascospores. H. uvarum and H. osmophila produce usually only a single spherical spore per ascus. Upon isolation of these spores with the aid of a micromanipulator, they are found to germinate directly into diploid sporulating cultures. The vegetative cells of H. valbyensis and of H. uvarum, when exposed to X-rays, show a survival curve typical of diploid cells.

Careful morphological studies of the species of Kloeckera, now recognized by Lodder and Kreger van Rij, indicate that K. magna and K. corticis are so similar that maintaining them as separate species does not seem justified. The same applies to K. antillarum, K. javanica and K. jensenii which must be considered synonymous.

All species and strains of Hanseniaspora and Kloeckera investigated have the same vitamin requirements, i.e. an absolute requirement for inositol and pantothenic acid and a relative requirement for thiamin, niacin, pyridoxine and biotin. The cell wall composition of H. valbyensis and of H. uvarum is nearly identical to that of S. cerevisiae.

2. Mr. M. Shifrine has completed his doctoral dissertation entitled "A study of the genus Saccharomycopsis Schiönning.

The prinicpal findings include a simple procedure for the isolation andpropagation of pure cultures of Saccharomycopsis guttulata. Cultures were isolated from fecal matter of rabbits. The cultures grow in yeast carbon base (Difco) to which 1% proteose peptone (Difco), 1% yeast autolysate (Albimi) or 1% trypticase (BBL) has been added. It was also found possible to grow the yeast in a synthetic medium consisting of minerals (including trace elements), glucose, 21 amino acids, Ca-pantothenate, thiamin , niacin and inositol. The most rapid growth occurs at pH 4.5. It requires a temperature between 35° and 40°C. The yeast ferments glucose, sucrose and raffinose 1/3. It assimilates these sugars and in addition citrate (weakly). None of 31 other substrates tested was assimilated. Sporulation occurs best on YM agar (Difco) at 18°C. usually 2 spores per ascus, but also 1, 3 or 4. One ascus with 5 spores was seen. On germination of ascospores , at 37°C, an exosporium was observed.

No conjugation prior to sporulation. The cell wall composition of S. guttulata. is distinctly different from that of S. cerevisiae. The cultures are short lived. The best procedure for storage is to place a spore preparation in a liquid growth medium at about 5°C. A comparison was made between the properties of the genera Saccharomyces and Saccharomycopsis and it was concluded that Saccharomycopsis constitutes a valid genus. The results are being submitted for publication.

XII. Carlsberg Laboratorium, Physiological Department, Copenhagen, Valby, Denmark. Communicated by Dr. C. Roberts.

Professor Winge left Copenhagen on October 3 for a 2 months' lecture tour in the United States. Besides holding a number of lectures on the east coast, Professor Winge also delivered the Hitchcock Lectures at the University of California. He is expected back in Copenhagen at the beginning of the New Year.

In September Mr. A. T. Ganesan from the Indian Agricultural Research Institute in New Delhi arrived at the Carlsberg Laboratorium, where he is to work for half a year or more on a Rask-Ørsted Fellowship. Since his arrival Mr. Ganesan has continued his work on the cytology of yeasts and will later turn his attention to studies in yeast genetics. In India he worked out a very satisfactory method for the staining of yeast nuclei. The procedure will be published in "Stain Technology".

Recent publications:

Winge, O. and Roberts, C. Remarks on irregular segregation in Saccharomyces. Genetica 28:489-496. 1957.

XIII. Detroit Institute of Cancer Research, Detroit 1, Michigan. Communicated by Dr. Caroline Raut Hebb.

Note on a Method

A 40% albumin solution (Fraction V, Armour and Co.) was found to eliminate the halos and to greatly increase the clarity of the structures visible in yeast cells viewed with the phase contrast microscope. It also resulted in minimum swelling of cell contents when cells were broken in this medium, as compared with a number of solutions including a wide range of

sucrose concentrations such as are effective in preserving liver mitochondria. A note regarding this method has been sent to the Microbial Genetics Bulletin and it is also included in one of the papers in press.

The following papers are in press in Experimental Cell Research:

Caroline Raut Hebb and Joan Slebodnik. "The Effect of Prior Growth Conditions on the Kinetics of Adaptive Enzyme Formation in Yeast".

Caroline Raut Hebb, John D. Montgomery, and Joan Slebodnik. "Particles Exhibiting Oxidative Enzyme Activity in Yeast".

The two following papers were presented at the S.A.B. meetings in Detroit this May:

Caroline Raut Hebb, Joan Burman, and John D. Montgomery. "Cell Particles in Yeast".

Robert J. Doyle. "Independence of Ultraviolet-produced Lethality and 'Petite' Formation in Yeast".

XIV. Brief News Items.

1. The Editor announces, with regret, the death of Dr. H. W. Schoenlein, Director of Research of Difco Laboratories, Detroit, Mich.

2. Dr. Brigette R. Mehnert, Tierhygienisches Institut, University of Munich, Germany, writes:

During my stay in Boston, Mass. at the Joslin Clinic this year I was looking, together with my husband Hellmut Mehnert M.D., for the incidence of yeasts in urine and saliva of diabetic and nondiabetic patients. We examined concerning this question specimens of 300 patients by new method favouring the growth and identification of such yeasts which can be optionally pathogenic inside the human body. A description of the method and the results will be given in the Journal "Diabetes".

3. Dr. P. K. C. Austwick, Central Veterinary Lab., New Haw, Weybridge (Surrey) England, writes:

Two outbreaks of Moniliasis in antibiotic fed piglets have been reported from experimental farms. One was associated with severe stomach lesions from which Candida albicans was isolated and the other with oral and oesophageal lesions which gave a number of different but as yet undetermined species of yeast.

4. Dr. Freeman Weiss, Curator of the American Type Culture Collection, Wash. D. C. writes:

Dr. S. E. Windisch, of the Institute fuer Gaerungsgewerbe, Berlin, Germany, visited the American Type Culture Collection, Washington 7, D. C. recently. He particularly wants to obtain a culture of Spermophthora gossypii.

5. Dr. David Hendlin of Merck Sharp and Dohme, Rahway, N.J. writes that he received a request from Dr. Kazuo Uchida of the University of

Tokyo for adenine dependent strains of Schizosaccharomyces pombe. It would be appreciated if those of our readers, who have such strains and are willing to distribute them, would contact Dr. Uchida.

6. Dr. C. Ramirez, Madrid, Spain has informed us that a description of Debaryolipomyces lutetiensis and of D. heimi in Microbiologia espagnola (see Yeast News Letter May 1957) will be postponed, pending further studies on these species.

7. Dr. Anthony H. Rose, Birmingham, England is spending a year at the Fermentation and Enzymology Section, Division of Applied Biology, National Research Council, Ottawa, Canada. He is working on mold metabolism with Dr. S. M. Martin, but expects to return to the yeast field after his return.

LETTERS TO THE EDITOR

Dear Sir:

A most interesting yeast has recently been described by Juan Santa Maria in the Anales Instituto Nacional de Investigaciones Agronomicas at Madrid, volume 5, number 2, pages 151-162, 1956. The title of Santa Maria's paper is "Hansenula matritensis nov. spec." The ability of this species to strongly assimilate nitrate, to produce not more than four spores per ascus, and to produce a gaseous fermentation of sugars certainly suggests Hansenula as the correct genus for this new species. However, its usual production of one, occasionally two, rough-appearing round ascospores without rings, in an ascus that does not rupture when the spores are mature, is more suggestive of Debaryomyces than of Hansenula. Hansenula matritensis does not produce esters although it ferments both glucose and sucrose; all of the known species of Hansenula that ferment sucrose, except H. matritensis, produce esters.

It is true that H. matritensis is diploid, though the species is usually found in nature as the haploid. Debaryomyces contains mainly haploid species, though we have isolated some that are diploid. Thus the fact that H. matritensis is diploid should not exclude it from the genus Debaryomyces.

The ability to assimilate nitrate would seem to exclude H. matritensis from the genus Debaryomyces. Several years ago I found that strongly nitrite-assimilating strains of Debaryomyces could readily be isolated from lunch meats. These strains did not assimilate nitrate. Whether this has any bearing on the taxonomic position of H. matritensis remains to be seen. I have no convictions regarding the placement of this species, but I believe its phylogenetic relationships will be of much interest when they are clearly established.

Sincerely,
(signed)
Lynferd J. Wickerham, Zymologist
Culture Collection Unit
Fermentation Section
Agricultural Research Service
U. S. D. A.
Peoria, Illinois