

β -ALANINE AND "BIOS"

Sir:

The recent discovery in our laboratory that synthetic β -alanine is highly potent as an agent for stimulating yeast growth has made it possible for the first time in history to grow yeast rapidly from a small seeding on a medium containing only well-recognized pure chemicals.

Investigations in the "bios" field may for our present discussion be placed in two groups: those in which a "sugar and salts" medium is basal, and those in which the basal medium also contains asparagin. Asparagin has been used in the senior author's laboratory because it was early recognized (1920) to be beneficial, and since it was likely to be present in extracts to be tested it was desired to eliminate the effects of all but the unknown factors. The use of asparagin media led to the discovery of "pantothenic acid," its universal occurrence and importance as a "growth substance" for protozoa and green plants as well as yeasts. The importance of pantothenic acid could not have been discovered in an asparagin-free medium because in such a medium pantothenic acid alone is relatively ineffective. On the other hand, the presence of asparagin in a medium (in the usual concentrations) masks the effect of at least one agent, *i. e.*, β -alanine, which is strikingly effective only in the absence of asparagin.

Some of the results obtained with β -alanine are shown in the accompanying table. The basal medium contained 5 mg. of inositol per liter in addition to sugar and salts. "Old process" yeast responded similarly to those listed except

that vitamin B₁ is a necessary supplement. Pantothenic acid is also necessary for maximum growth.

YEAST CROPS
(MG. MOIST YEAST PER CULTURE)

Yeast	Control	1 γ β -alanine added (to 12 cc. culture)	0.75 mg. aspartic acid added	1 γ β -alanine and 0.75 mg. aspartic acid added
Wildiers	0.49	0.55	0.80	2.16
"Gebrüder Mayer"	.28	1.08	.28	1.62
W. Lash Miller	.32	0.92	.58	3.20
"Rasse M" (Kögl)	.42	1.74	.49	3.00

The importance of aspartic acid as a yeast nutrient (which is apparent from the results) is to be discussed in a separate paper from this Laboratory. It will be noted that the concentration of β -alanine used was only one part in 12 million parts of culture medium. At *very* high dilutions β -alanine may be slightly inhibitory, depending apparently upon the physiological state of the yeast. This in itself is not so remarkable because "growth substances" have previously been shown to be inhibitory under some conditions, but the small concentration which can be detected in this way is indeed striking. In a large number of tests we have observed a distinct inhibitory effect when 0.0001 γ was added to a 12-ml. culture. On this basis one gram of our synthetic material would be enough to dose detectably 120,000 tons of medium.

The discovery of the yeast stimulating action of β -alanine raises many interesting questions which are being investigated.

DEPARTMENT OF CHEMISTRY
OREGON STATE COLLEGE
CORVALLIS, OREGON

ROGER J. WILLIAMS
EWALD ROHRMAN

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NEW BOOKS

The Chemistry of the Synthetic Resins. By CARLETON ELLIS, Industrial Research Chemist. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., 1935. Volumes I and II. 1615 pp. 15.5 × 23.5 cm. Price, \$19.50.

The first edition of this valuable compilation appeared in 1923 under the title "Synthetic Resins and their Plastics." Since then the number of such products has increased by leaps and bounds, and is still gaining with steadily mounting velocity. Practically every issue of *Chemical Abstracts* records a long list of new ones. The need for such a new edition, therefore, was urgent and insistent, and the author has handled the enormous mass of

pertinent literature in his usual masterly way. Even a hasty glance at the volumes, with their wealth of literature citations, graphic formulas, tables, charts and illustrations, will impress any one with the magnitude of the task and the painstaking care and thoroughness with which it has been carried out.

The author explains that the change of title does not indicate any change in the field covered, but is a recognition of our advancing knowledge of the causes and nature of resinification. This does not mean any neglect of plastics and plastic molding, for their status is likewise brought as fully up to date as is practicable in an undertaking of this size and scope. All subjects are handled from both their