ported the preparation of the same α-ethylthioglucopyranoside and its tetraacetate. These authors proposed to use glucose ethylmercaptal for disaccharide synthesis and mixed the mercaptal in 22% hydrochloric acid with glucose. Instead of the desired disaccharide Brigl and co-workers obtained this α-ethylthioglucopyranoside in an apparently undetermined yield. As to the mechanism of the reaction the authors stated that the mercaptal lost one mercaptan residue which was partly transferred to the admixed glucose, the whole process being represented by the following two-stage reaction:

(a) $C_6H_{12}O_5(SC_2H_5)_2 = C_6H_{11}O_5(SC_2H_5) + C_2H_5SH$
(b) $C_2H_5SH + C_6H_{12}O_6 = C_6H_{11}O_5(SC_2H_5) + H_2O$

Since we had reasons to believe that this mechanism might not be the correct one, we repeated Brigl's experiment with the modification that we *omitted* glucose. From the reaction mixture we obtained α-ethylthioglucopyranoside in about 20% minimum yield. Also, we obtained the same compound but in somewhat smaller yield (15%) from the reaction of equimolecular quantities of glucose and ethylmercaptan in 22% hydrochloric acid. In our first experiment there was but a mere trace of glucose present in the acetone insoluble residue consisting mainly of barium chloride, whereas in the second experiment, when glucose was used as starting material, the acetone insoluble salt contained a fairly large quantity of unchanged glucose. In both instances the lower rotating component of the reaction mixture represented probably the acid resistant β-ethylthioglucopyranoside, since in neither case could we find glucose ethylmercaptal. These results seem to indicate that the formation in 22% hydrochloric acid of α-ethylthioglucopyranoside from the mercaptal on one hand, and from glucose and mercaptan on the other, are two distinct and independent reactions.

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RECEIVED JUNE 20, 1939

VITAMIN B_6, A GROWTH PROMOTING FACTOR FOR YEAST

Sir:

The rate of proliferation of *S. cerevisiae* in purified solutions is known to be profoundly affected by a group of substances known as bioses. The multiple nature of bios is firmly established and further evidence of the multiplicity of bios was found in the discovery of the bios action of thiamine [Schultz, Atkin and Frey, THIS JOURNAL, **60,** 490 (1938)].

We have now found that crystalline vitamin B_6 has the properties of a bios factor. This substance acts on the yeast types A and B in an advantageous manner. The work with crystalline B_6 was made possible by the gift of a few milligrams by Merck and Company.

TABLE I

TWENTY-FOUR HOUR GROWTH OF YEASTS A AND B AS INFLUENCED BY VITAMIN B_6, ETC.

Total volume in each case: 30 ml. (seeded with 1 mg. of moist yeast and rocked at 30° for 24 hours). Crop × 4.54 gives mg. of moist yeast. Supplements: inositol (1) 1 mg.; β-alanine (IIA) 0.005 mg.; bios IIB 0.13 mg.; thiamine 0.01 mg.; vitamin B_6 (VI) 0.05 mg.

Ingredients of bios tests: all c. p. sugar, salts, buffer, I and IIA, plus	24-Hour crop Type A	Type B
Nil	Trace	40
II B	15	210
II B plus thiamine	100	120
Vitamin B_6 (VI)	Trace	40
II B plus Vitamin B_6	150	200
II B plus B_6, plus thiamine	170	200

The properties of crystalline B_6 are: (1) stimulation of Type A yeast to produce a 24-hour crop of 100–120; (2) removal of the inhibition imposed on Type B yeast by thiamine; (3) stimulation of Type A yeast to give a high 24-hour crop in the absence of thiamine.

Crystalline vitamin B_6 was found to have a certain activity as a fermentation accelerator under the conditions of our fermentation test [Schultz, Atkin and Frey, THIS JOURNAL, **59,** 2457 (1937)]. The stimulation is of about the same type as the nicotinic acid effect [Schultz, Atkin and Frey, *ibid.*, **60,** 1514 (1938)] and may be overcome in the same way, *i. e.*, by adding about 0.05 mg. of B_6 to each test.

There are indications that the growth method may be useful as a method for the determination of vitamin B_6. A growth test in which all factors except B_6 are present in excess will respond to solutions or concentrates in proportion to their B_6 content as indicated by rat curative tests which were made by R. F. Light and L. J. Cracas of our Laboratory.

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