of 0.3% were obtained, as in the Ca and PO_4 analyses. When one-tenth this amount of Mg was taken for analysis, as in the case illustrated in the table, the same absolute accuracy in milligrams was obtained; the per cent error was of course 10 times as great for a precipitate of 0.03 gm. as for one of 0.3 gm.

TABLE I.
Analysis of Known Solutions.
pH of Ca pptn. = 3.0.

Constituent	calc.	Pure Solution wt. of ppt.	dev.	Mixture of Ca, Mg, PO_4 wt. of ppt.	dev.
	gm.	gm.	gm.	gm.	gm.
Ca	0.3924	0.3915	—0.0003	0.3927	—0.0010
		0.3907	—0.0011	0.3923	—0.0004
		0.3931	+0.0013	0.3946	+0.0009
				0.3939	+0.0002
		0.3918	±0.0009	0.3936	—0.0001
				0.3941	+0.0004
				0.3937	±0.0005
Reproducibility =		0.2%		0.1%	
Accuracy =		0.2%		0.3%	
PO_4	0.3723	0.3721	+0.0009	0.3711	0.0000
		0.3704	—0.0008	0.3716	+0.0005
		0.3710	—0.0002	0.3705	—0.0006
		0.3712	±0.0006	0.3711	±0.0004
Reproducibility =		0.2%		0.1%	
Accuracy =		0.3%		0.3%	
Mg	0.0299	0.0296	0.0000	0.0304	+0.0002
		0.0296	0.0000	0.0300	—0.0002
		0.0295	—0.0001		
		0.0296	±0.0000	0.0302	±0.0002
Reproducibility =		0.0%		0.7%	
Accuracy =		1.0%		1.0%	

When proteins were present in the solution, even in small amount, results of this degree of accuracy were not obtainable.

6007

Increased Growth of a Population of Yeast Obtained with Inosite.

OSCAR W. RICHARDS. (Introduced by L. L. Woodruff.)

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Following Eastcott's[1] identification of Bios I as inactive inosite it seemed desirable to determine whether or not the medium used in

[1] Eastcott, E. V., *J. Phys. Chem.*, 1928, **32**, 1094.

the investigation of the growth of a population of yeast[2] might be improved by the addition of this substance. This was done with William's medium[3] and slightly increased growth (106-116% of that of the control) was obtained with the addition of 0.1-0.4 mg./cc. of inosite, but decreased growth (down to 75% of the control) was found on the addition of 1.0-1.6 mg./cc. of the culture medium.

This increased growth is definite and contrasts with the experiments of Williams, Warner and Roehm[4] and Narayanan,[5] who find that the addition of inosite did not increase their yield of yeast. It is difficult to understand this result as Williams *et al* used the same medium and the same culture of yeast as was used in my experiments. The only difference was that my strain of yeast comes from a *single* cell of yeast No. 2335 (Am. Type Culture Coll.)[6] and that we are probably not using the same brands of chemicals in the medium. Later Williams and Bradway[7] obtained a transfer of the yeast used in Miller's laboratory by Miss Eastcott and found that this transfer gave increased growth when 1 mg. of inosite was added to 12 cc. of their medium.

The findings of Williams and myself emphasize the difference between one strain of a species of yeast and a pedigreed strain obtained from an isolated single cell of the same species. The following experiments point out a resolution of this dilemma.

Other experiments have also given increased growth when small amounts of inosite have been added. Adding inosite to the culture medium without asparagine gave the following increases in growth expressed as percentages of the control (no added inosite): for the equilibrium number of cells of the first cycle of population growth 0.1 mg./cc. 192%, 0.5 mg. 103%, and 1.0 mg. 90%; for the equilibrium of the second cycle of growth 0.1 mg./cc. 113%, 0.5 mg. 109%, and 1.0 mg. 104%. Adding inosite to the medium containing Eimer and Amend's asparagine the increases are for the equilibria growth of the first and second cycles respectively 0.1 mg./cc. 131%, and 128%, and for 0.5 mg. 164% and 118%. When the

[2] Richards, O. W., *J. Gen. Physiol.*, 1928, **11**, 525; 1932, to be published.

[3] Williams, R. J., *J. Biol. Chem.*, 1920, **42**, 259; Wilson, J. L., and von der Ahe, F. H., *Ibid.*, 1927, **49**, 227.

[4] Williams, R. J., Warner, M. S., and Roehm, R. R., *J. Am. Chem. Soc.*, 1929, **51**, 2764.

[5] Narayanan, B. T., *Biochem. J.*, 1930, **24**, 6.

[6] Furnished to me through the courtesy of Prof. F. W. Tanner. The isolation was made in 1928 (Richards, O. W., *J. Phys. Chem.*, 1928, **32**, 1865, and [2]).

[7] Williams, R. J., and Bradway, E. M., *J. Am. Chem. Soc.*, 1931, **53**, 783.

medium contains Merck's asparagine the differences in the amount of yeast present at the end of the second growth cycle are for 0.1 mg./cc. 135%, and for 0.5 mg. 115%. These figures come from series 86 and are in addition to the data given above for series 91. The inosite added was obtained from the Eastman Kodak Co., who list it as ash-free. This increase in yield seems to be the result of a stimulant rather than the addition of an essential substance because the rate of growth is greater and the retarding influences appear earlier when this material is present. These differences depend on the kind of asparagine in the medium and indicate that the different brands of asparagine contain a substance which has a much greater effect on the growth of this yeast than does inosite. The isolation and identification of this substance will be published elsewhere.[8]

The recent studies of Williams[9] and his co-workers suggest again the conclusions of Henneberg[10] and Tanner[11] that different yeasts have different nutritional requirements and material serving as a "Bios" for one yeast need not do so for another. These authors indicate that they know of the existence of some 7 *"nutrilites"* (including inosite) as they choose to call these substances[12] which stimulate the growth of yeast. The rapidly increasing list of these yeast foods indicate that such a *special name* for them is unnecessary.

6008

Studies on Transmissible Lymphadenosis of Mice.*

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A new transmissible strain of malignant lymphadenosis isolated at the Henry Phipps Institute has been observed to possess the following properties.

[8] In mms. to be published.

[9] Williams, R. J., and Truesdale, J. H., *J. Am. Chem. Soc.*, 1931, **53**, 4171.

[10] Stated by Tanner, F. W., *Chem. Rev.*, 1925, **1**, 397.

[11] Tanner, F. W., Devereux, F. W., and Higgins, E. D., *J. Bact.*, 1926, **11**, 45.

[12] Williams, R. J., *Science*, 1928, **67**, 607.

* This investigation has been supported by a Fund for the Study of Leucemia and Related Diseases.