TECHNICAL METHOD

A SIMPLE METHOD FOR THE ESTIMATION OF PEPSIN IN GASTRIC JUICE

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The albumin method of estimating pepsin is slow and crude, while the more modern haemoglobin methods (Anson and Mirsky, 1932; Bucher, Grossman, and Ivy, 1945) are too technical for the average laboratory. Apart from its simplicity, the method described below has the advantage that the sample of gastric juice is diluted sufficiently to obviate the action of pepsin inhibitors in the juice (Bucher and Beazell, 1941). The method is particularly suitable for the determination of low values of pepsin concentration.

Principle

Pepsin changes edestin into edeston. A saturated solution of sodium chloride produces an opalescence when mixed with a solution of edestin but not with a solution of edeston.

Stock Solutions

Stock Pepsin Solution.—Pepsin, 50 mg., is dissolved in 100 ml. N/10 HCl, and kept in the ice chest.

Stock Edestin Solution.—Edestin, 0.5 g., is dissolved in a mixture of 150 ml. N/10 HCl and 350 ml. distilled water by warming and stirring. The solution is filtered and kept in the ice chest.

Stock pepsin and edestin solutions should be used only when fresh.

Also required are saturated NaCl and N/10 HCl.

Method

To 1.0 ml. stock edestin solution 1.8 ml. N/10 HCl and 0.2 ml. stock pepsin solution are added and the mixture is incubated at 37° C. At intervals of two minutes a few drops of the mixture are withdrawn into a saturated solution of NaCl. The absence of

opalescence means that digestion of edestin to edeston is complete. The time taken for complete digestion, usually 10 to 15 minutes, is noted.

The above procedure is repeated with the following alterations: (a) Test gastric juice, 0.2 ml., is used in place of the stock pepsin solution and filtered. (b) Incubation is for *exactly* the time required for complete digestion by the stock pepsin solution. (c) When incubation is complete 3 ml. saturated NaCl solution is added and mixed. The opalescence is compared with that of standard opalescent tubes.

STANDARD OPALESCENT TUBES*

	100% Edestin	75% Edestin	50% Edestin	25% Edestin	12.5% Edestin
Stock edestin solution (ml.)	1.00	0.75	0.50	0.25	1.125
Saturated NaCl (ml.)	2.0	2.0	2.0	2.0	2.0
N/10 HCl	..	..	..	..	..
	Add sufficient to make volume up to 4.0 ml.				

* These can, more conveniently, be made artificially.

The amount of pepsin in the test solution can be easily calculated. It can be expressed either indirectly in terms of the amount of edestin digested or else directly in mg.%; e.g., suppose the test gastric juice digested only 50% of the given amount of edestin as the same volume of stock pepsin solution, then the gastric juice would contain half the concentration of pepsin as the latter, viz., 25 mg.%.

If the test solution digests completely in less time than the stock pepsin solution, the unknown pepsin concentration can be calculated by repeating the test after first diluting the gastric juice.

REFERENCES

- Anson, M. L., and Mirsky, A. E. (1932). *J. gen. Physiol.*, **16**, 59.
 Bucher, G. R., and Beazell, J. M. (1941). *Amer. J. Physiol.*, **133**, P 230.
 — Grossman, M. I., and Ivy, A. C. (1945). *Gastroenterology*, **8**, 501.