

# Peking Branch

*Peking University, China, October 8, 1925.*

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## A comparison of different urease preparations in the determination of urea.

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Since Takeuchi<sup>1</sup> discovered a "selective enzyme," urease, in soy bean (the seeds of *Glycine hispida*), more than fifteen methods have been developed for the preparation of urease solution or powder for the determination of urea in blood and in urine. Experience has shown that each has its own advantage and all have the same disadvantage.<sup>2</sup>

No attempt has been made to try all of these methods. However, it is worth while to determine which one gives the best results and which is, therefore, best adapted to routine work. At random, the methods proposed by Armstrong and Horton and by Folin and Wu were selected for trial and used to compare the extractions from Jack bean meal with 10, 5, and 2 per cent sodium chloride solution, and with distilled water (5 gm. meal in 100 cc. solvent). Since Sumner and his co-workers<sup>3</sup> believe that urease is a protein and since the vegetable proteins can be extracted by sodium chloride solutions of different strengths and by water, it is thought that extraction from Jack bean meal with sodium chloride solution of a certain strength may be of a high activity.

In all the experiments urease extracted with 5 or 2 per cent

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<sup>1</sup> Takeuchi, T., *Chem. Abstr.*, 1910, iv, 213.

<sup>2</sup> Ling, S. M., Urease, a bibliographic review, to be published.

<sup>3</sup> Sumner, G. B., Graham, V. A., and Nobaek, C. Y., *Proc. Soc. Exp. Biol. and Med.*, 1924, xxi, 551; Sumner, J. B., and Graham, V. A., *J. Biol. Chem.*, 1925, lxii, 43.

sodium chloride solution or with distilled water, and the one prepared according to the directions of Armstrong and Horton seems to be more active in decomposing urea than the alcoholic extract prepared according to the method of Folin and Wu. The former recovers 99 per cent of urea while the latter recovers only 92 per cent. The one prepared with 10 per cent sodium chloride solution gives nearly the same result as the Folin and Wu urease solution, which may be explained by the depressing effect of sodium ion.<sup>4</sup>

An alcoholic extract of Chinese soy bean meal (yellow) was prepared according to the method of Folin and Wu and the activity of the enzyme urease was compared with that of a similar preparation of Jack bean meal. The fresh urease solutions from these two sources are efficient in decomposing urea to the same extent. After keeping them in the refrigerator for a week the activity of these two preparations is not diminished, but at the end of two weeks the former is able to decompose only half as much urea as before and about two-thirds as much urea as the Jack bean urease does, while the latter deteriorates slightly in this interval.

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A convenient apparatus for the determination of ferment action.  
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In determinations of ferment action it is first of importance, that both ferment and substrate be brought to the same temperature before mixing. Secondly, the mixing of any series of tubes containing ferment and substrate should be carried out simultaneously. For this purpose, a test tube with a side arm (see figure) was constructed, so that (a) could contain the substrate and (b) the ferment. A series of these tubes is filled with the appropriate solutions, and placed in the holder (c), which ena-

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<sup>4</sup> Onodera, N., *Biochem. J.*, 1915, ix, 575.