Germination of Leguminous Seeds and Urease Activity.

THE enhanced urease activity accompanying the germination of urease-containing seeds[1,2] may be due to (1) an increase in the absolute quantity of the enzyme, (2) an elaboration of activators or elimination of inhibitors and/or (3) a greater extractability of the enzyme. A series of experiments designed to test these possibilities was carried out in which the activities of the aqueous extracts of defatted powders were compared with those of the powders themselves.

0·1 g. of the powder or a quantity of the extract corresponding to 0·1 gm. of powder, was incubated for 30 minutes with 10 c.c. of a 1·0 per cent. solution of urea (in phosphate buffer of pH 6·9) at 30°·0 C. and the ammonia liberated was estimated by the æration method. The results obtained are tabulated below.

TABLE I.

(*Urease Activity expressed in mgms. of Ammonia Nitrogen.*)

Seed Material	Extract		Powder–100 mesh	
	U.G.*	G.‡	U.G.*	G.‡
Dolichos biflorus, Linn.	2·4	8·7	8·5	9·0
Glycine hispida (Mœnch)	5·4	8·2	9·7	9·6
Cajanus indicus, Spreng.	5·7	8·2	8·1	8·5
Canavalia ensiformis, Dc.	19·1	27·3	26·1	28·1

*U.G. = Ungerminated.
‡G. = Germinated.

The results show (1) that the activities of the germinated seed extracts are invariably greater than those of the ungerminated seed extracts, and (2) that in the case of powders, the differences between the activities of germinated and ungerminated seed materials are not marked. The activities of the powders represent the total urease content of the seed, as the enzyme is capable of acting on its substrate in the absorbed state.[3] Calculated on the basis of the activities of powders, the percentage of extractable urease is above 95 in the case of germinated seeds, and less than 70, in the case of the ungerminated seeds. Activators and paralysers, if present, will influence the activities of both extracts and powders equally.

These considerations lead to the conclusion that part of the urease exists in the seeds in an adsorbed and unextractable condition—*desmo*-urease, and that during the process of germination, it is converted into an extractable, *lyo*-form. Further work is necessary to characterise the two forms of urease.

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[1] Yutaka Jono, *Acta. Schol. Med. Univ. Imp. Kyoto*, 1931, **13**, 211.
[2] Wei Sun Tao and Shigeru Komatsu, *Mem. College of Sciences, Kyoto Imp. Univ.*, Ser. A, 1931, **14**, 293.
[3] Przylecki, Niedzwiedzka, and Majewski, *Biochem. J.*, 1927, **21**, 1026.

Ascorbic Acid Oxidase from Drumstick, *Moringa pterygosperma*.

IT has been shown[1] that extracts from different plants exhibit great variations in the rate of oxidation of ascorbic acid. As resistance to oxidation was usually shown by extracts which contained reducing substances other than ascorbic acid, it was inferred that such substances exerted a protective action on the acid. An example of a material in which ascorbic acid was extremely stable to oxidation and which contained a large proportion of substances titrating against iodine but not against Tillmans' reagent, was the press juice of the Indian gooseberry, *Phyllanthus emblica*. In order to examine if this juice contained protective substances, it was decided to try the effect of its addition to the press juice of drumstick, *Moringa pterygosperma*, which on account of the identity of iodine and Tillmans' titres, was known to contain ascorbic acid as the only reducing substance. The surprising result was, however, obtained that, in contradistinction to trichloroacetic acid extracts of drumstick, its *press juice* did not reduce 2 : 6-dibromophenol-indophenol : further, that the juice rapidly oxidised the reducing factor in gooseberry or in orange juice, as also solutions of ascorbic acid (B.D.H.). It was also found that if the intact drumsticks were immersed in boiling water for a short time, press juice containing the usual amount of ascorbic acid could be obtained. Thus, in drumstick juice, the presence of an enzyme system capable of