

on one's back if an occasion demands it. Even when stored at room temperature, it is expected, it will keep its full potency for ten years or so.

The new polyvalent anti-snake-venom serum thus meets the long-felt need for a serum, effective against all the common poisonous snakes of India, and which can be made available at rural dispensaries and other out-of-the-way places where it is needed and has not so far reached.

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### THERMAL REACTIONS OF IRON PYRITES

These studies were carried out with several samples of iron pyrites some of which were collected in the field while others were obtained in the laboratory by separation and concentration from its mineral associates. The pyrites of the samples employed, viz., the FeS<sub>2</sub> contents ranged from 90 to 99.9 per cent. Complete analysis of the samples were also done and the nature and extent of the impurities ascertained.

Some important features of the thermal reactions of iron pyrites under various conditions are the following:

(1) Absorption of oxygen with consequent increase in weight (about 10 per cent.) of the sample and conversion of the combined sulphur into water-soluble sulphate. (2) Liberation of elementary sulphur to the extent of about 25 per cent. of the sulphur content of the pyrites. (3) Formation of the normal as well as of a basic ferric sulphate. (4) Evolution of sulphuric anhydride in appreciable amounts.

The studies were all carried out in all-glass apparatus adopting standard methods of analysis.

Full details concerning the mechanism of the various reactions and also of their industrial utilisation will soon be presented.

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### INFLUENCE OF CARBOHYDRATE TO NITROGEN RATIO ON THE FORMATION OF DIASTASE BY *ASPERGILLUS ORYZAE*

Our previous work has shown that the formation of diastase by *Aspergillus oryzae* is influenced by the character and complexity of the nitrogen employed in the culture medium. Further

studies have revealed that the carbohydrate-nitrogen ratio appears to constitute an essential factor in the elaboration of the enzyme. It is generally recognised that starch stimulates the production of the enzyme, but no quantitative data is available in literature. The present study has been undertaken to determine the effect of the addition of varying amounts of starch to a given quantity of nitrogen, on the formation of diastase by *Aspergillus oryzae*.

The method of culturing the fungus, of making the enzyme extract and of determining the

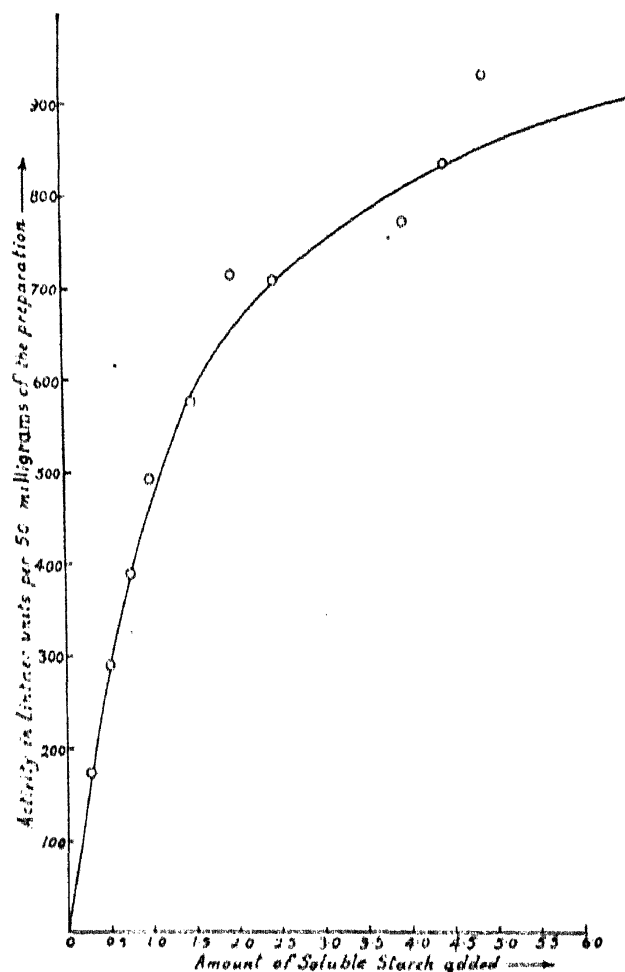


FIG. 1

diastatic activity, are similar to those described in our earlier communications. Finely shredded and acid-digested and purified asbestos was used to provide an inert mat for the growth of the fungus. The basal nutrient solution was composed of:—Peptone (Difco) 60 gms.; potassium dihydrogen phosphate 1 gm.; potassium citrate 1 gm.; magnesium sulphate, 7H<sub>2</sub>O 1 gm.; ferrous sulphate 0.01 gm.; zinc sulphate 0.01 gm.; calcium chloride 0.5 gm.; water 1 litre.

The medium was constituted as follows:—A given weight (5 gm.) of the asbestos was placed in 250 c.c. conical flasks, moistened with 12.5 c.c. of the nutrient solution (corresponding to 290 mgms. of nitrogen) and treated with graded amounts of soluble starch. The mass was intimately mixed, autoclaved at 20 lbs. for 30 minutes on two successive days. The flasks were then inoculated with a suspension of the spores of the fungus, incubated at 30° C. for three days, the resulting moldy

TABLE I

Reaction Mixture No.	1	2	3	4	5	6	7	8	9	10	11
Starch added in gms.	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.5	4.0	4.5	5.0
Activity per 50 mgms. of preparation in Lintner units.	173	291	3.8	492	574	711	704	747	760	824	924
Total number of units elaborated by the mixture (in thousands of Lintner units).	4.17	7.10	9.55	12.30	13.96	18.81	20.28	21.96	22.95	26.37	30.49

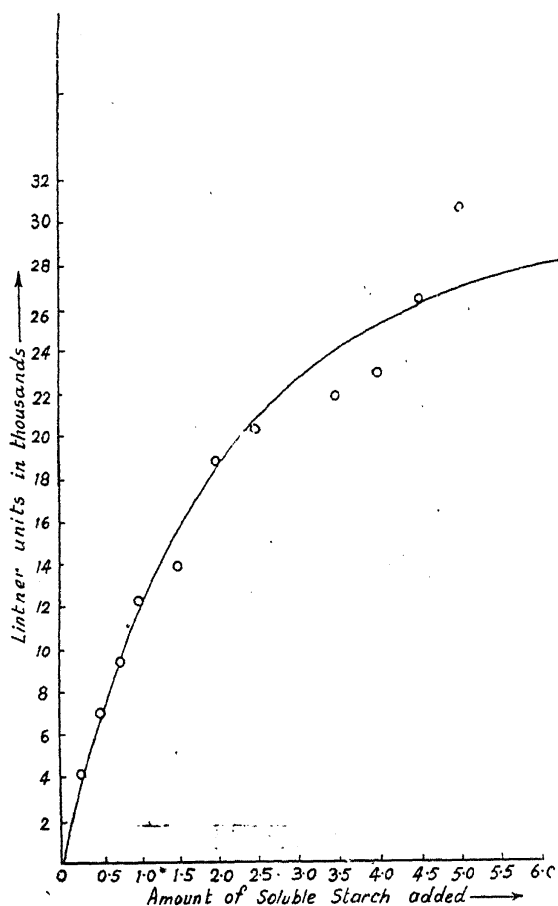


FIG. 2

mass extracted with 25 c.c. of water and the diastatic activity of the extract determined. The results are given in Table I and graphically represented in Figs. 1 and 2. Fig. 1 gives the activity of the preparations from fungi raised on different concentrations of starch; Fig. 2 gives the total quantity of diastase (in Lintner units) elaborated by the different experimental mixtures.

A close study of Table I and the Figures 1 and 2, reveals that with an increase in the proportion of starch, there is a steady increase not only in the purity of the diastase but also in the total quantity of the enzyme formed.

The total quantity of the diastase which is formed in proportion to added starch tends to fall off rapidly after the two per cent. concentration of starch (see Fig. 2). The economic optimum for the ratio of the soluble starch to nitrogen appears to lie somewhere about 7:1.

It has been found that starch is completely utilised in all the mixtures so far investigated and the reducing sugar content of the preparations has been found to be insignificant.

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### ERGOT AND SPHACELIAL STAGES ON SOME WILD GRASSES IN MYSORE

FURTHER studies on the collections of ergot and Sphacelial stages occurring on wild grasses were continued some of which have been found to be of interest. A preliminary account of some of them is presented here. On *Digitaria longiflora* Pers., a common grass in the dry waste lands, ergot and Sphacelial stages have been observed. Individual spikelets in the inflorescence are affected. Drops of nectar are secreted in the infected spikelets embedding numerous spores. The spores are hyaline, ovate-ellipsoid, asymmetric to slightly arcuate, tapering at both ends and measuring  $11.5-16.5 \mu \times 3.4-4 \mu$ . The sclerotia that are formed later on are black, ovate to spherical, with a brownish white core and measure up to 2-1.3 mm. in size. They resemble very closely *Claviceps digitariae* Hansf., recorded on *Digitaria scalaris* by Hansford<sup>1</sup> in Uganda. In spite of the lack of germination stages it is probable that the two belong to one and the same species. Sphacelia stage has not been described by Hansford for *Claviceps digitariae*.

Two other Sphacelial stages of some *Claviceps* have been noticed round about Bangalore on *Cymbopogon caesium* Stapf. and *Heteropogon contortus* Beauv. The presence of the Sphacelia is indicated in the field by the presence of *Cerebella* which forms greenish-black folded crusts. The spores of the Sphacelia on *Cymbopogon caesium* are hyaline, ovate-cylindrical, rounded at both ends, with two conspicuous vacuoles and measuring  $9-12.7 \mu \times 3.5-4.5 \mu$ . The spores of the Sphacelia on *Heteropogon contortus* are also cylindrical, hyaline, rounded at both ends and measure  $11.5-19 \mu \times 3.5-5 \mu$ . Development of sclerotia has not been observed.

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