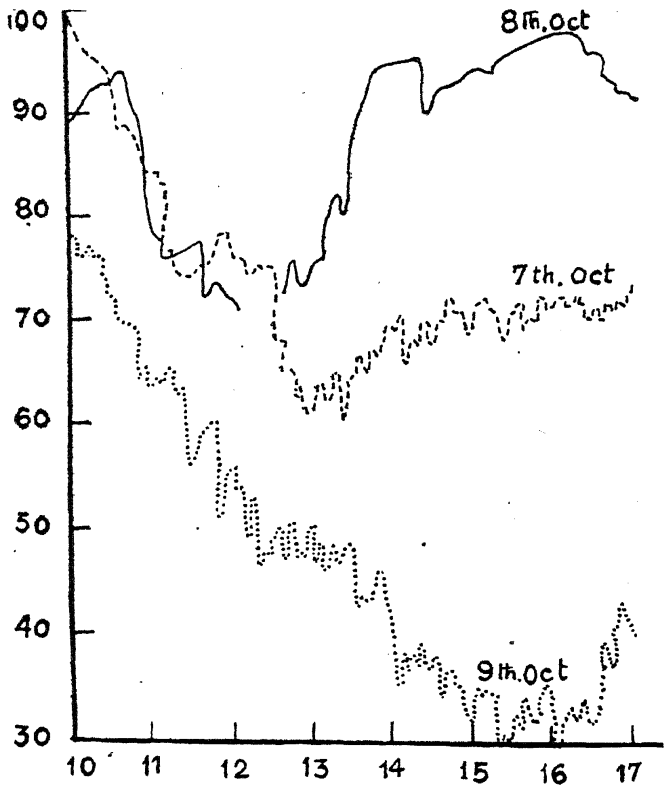

FIG. 3 *Time in Hrs.* I.S.T.

ever, low and did not exceed 15-20 m.p.h. on the 8th. The upper air temperatures, as determined by aeroplane ascents made at dawn, showed a fall by 2-4° F. at all levels on the 8th from the values on the previous day. There was no rain on the 7th and 9th, while on the 8th 34 cents of rain occurred at the Observatory during the period 13-40–15-30 hrs. The synoptic charts disclosed a general fall of minimum temperature up to about 300 miles to the northwest of Madras on the 7th, almost up to Madras on the 8th and practically over the whole of eastern half of the Peninsula on the 9th. There were no major disturbances in weather of any kind over land or out to sea.

It may be inferred, in view of the above facts, that the appearance of the tornado cloud was associated with the incursion of cold northerly air at Madras on the morning of the 8th, in the first flush of the northeast monsoon. The temperature contrast was probably small at the time and the tornado cloud may not have had enough supply of energy to reach down to the surface level. Even though the temperature fell later on to a fairly low value, the contrast seems to have been actually less marked, as there was not much of turbulence to be seen in the cloud.

One noteworthy feature of the tornado cloud was the pointing of its tapering end towards the south. This is what one should expect because of the spin of the earth.[1]

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St. Thomas Mount,
Madras, D. VENKATESWARA RAO.
November 20, 1945.

* The hours given in this article refer to the War Time.

1. Sir Gilbert Walker, "*Some Problems of Indian Meteorology*," *Halley Lecture*, May 1929.

A NEW METHOD OF GROWING *ASP. ORYZAE*

IN the course of our studies of the factors which influence the formation of enzymes, it became imperative to evolve a reproducible technique of culturing *Aspergillus oryzæ*. In addition to the nutrients and the growth factors, the fungus requires a moist 'bed' or 'soil' with a texture or 'tilth' for facilitating free and adequate access of air which is essential for the growth of the organism. In our earlier studies weighed amounts of acid digested asbestos fibre moisted with definite quantities of the nutrients were employed.[1] The large number of weighings thus involved, became laborious and it was not possible to secure uniformity of 'tilth' due to differences in the packing and spreading of the fibre in the reaction flask.

It was of interest to experiment with filter paper as a substitute for asbestos; it was expected to possess several obvious advantages; its readier absorption and retention of the nutrients; the case and rapidity with which given quantities of paper could be dispensed for experiments, and the facility and certainty of securing reasonable uniformity of 'tilth' and surface in the experiments. Test tubes (155 mm. × 15 mm.) slantingly placed as in the work on antibiotics in our laboratory,[2] served to replace the conical flasks employed in our previous studies; this innovation served to simplify and reduce the cost of the experiments.

EXPERIMENTAL

64 Square centimeters (80 mm. × 80 mm.) of Whatman's filter paper No. 1 were cut, folded and introduced into the test tubes. After plugging with cotton, the tubes were sterilised at 20 lbs. for an hour. The nutrient solution, together with supplements if any, is then introduced to moisten the filter paper which absorbs about 1·5 c.c. of the liquid; water is added to make up the volume to 3 c.c. in all the tubes and for allowing for evaporation during incubation. The fungus spore suspension is prepared and added to each tube. After incubation for four days at 28° C., the fungus mat along with filter paper is disintegrated, toluenated water (5 c.c.) added, autolysed at 37° C. for 24 hours, filtered, washed and the enzyme extract made up to 100 c.c.

The composition of the media is given below in Table I.

TABLE I

Composition of the nutrient media

Constituents	I	II	III	IV	V
*Bran extract (c.c.)	1·0	..	1·0	1·0	1·0
Starch (c.c.)	1·0	1·0	..	1·0	1·0
† Peptone (c.c.)	0·5	0·5	0·5	..	0·5
Salts (c.c.)	0·5	0·5	0·5	0·5	..
Water (c.c.)	..	1·0	1·0	0·5	0·5
Total volume	3·0	3·0	3·0	3·0	3·0

*Papain digest of wheat-bran 2 mg. /c.c.

†Difco Bacto-peptone 1·567 mg. N/c.c.

The diastatic activity of the extracts is determined as described previously.[3] The results are given below:—

TABLE II

Total Activity of the Enzyme Extracts in Linter Units

I (Full)	II (–bran)	III (–starch)	IV (–peptone)	V (–salts)
197·1	63·90	77·98	136·5	111·7
205·5	79·98	86·22	138·8	106·3

The results indicate that the method gives reasonably consistent and reproducible results.

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Bangalore,
March 9, 1946.

1. Bindal, A. N., and Sreenivasaya, M., *J.S.I.R.*, 1945, **3**, 386. 2. Rammohan, R. Ramachandra Rao, T. N. and Sreenivasaya, M., *Ibid.*, 1945, **4**, 375. 3. Bindal, A. N., and Sreenvasaya, M., *Ibid.*, 1944, **2**, 245.

COAGULATION STUDIES OF CRYPTOSTEGIA LATEX

THE properties of the latex changed according to the seasonal changes and hence wide variations were observed in the percentages of dry rubber, non-rubber constituents and pH values. The latex was found to be stable between a pH range of 3·5 to 7·5. Beyond this range it exhibited curdling effect. Investigations of the coagulating properties of various chemicals were carried out in the Experimental Station at Okhla since 1943. Acids and alkalies could not produce coagulation. Common salt in sufficient concentrations as to saturate the serum of the latex effected coagulation. It was found that small quantities of common salt, formalin, or tannic acid, if mixed with the latex and heated to 85° C. for ten minutes could coagulate the latex. It has been reported that hot water between 30 and 90° C., if added in volumes about 7 times the volume of the latex, could produce efficient coagulation and the quality of the rubber produced by this method to be good. Though the method looks simple, in factory practice the procedure is inconvenient, as for example, if there is a crop of about 500 gallons of latex, 3,500 gallons of hot water at 80° C. is to be kept ready for coagulation.

It has now been found that soap is an excellent coagulant and can be used as soap solution of 0·5 per cent. strength, the pH being adjusted to 7·5 by the addition of any alkali. The volume of the coagulant required depends on the D.R.C. of the latex and in most cases it does not exceed 35 per cent. of the volume of the latex. It was found that 2½ lbs. of soap could coagulate about 100 lbs. of rubber. The samples of rubber prepared by the above process after compounding and vulcanizing were tested and found to be 85 to 90 per cent. as good as the best hevea rubber.

As certain colloidal dispersions are able to produce coagulation, investigations were continued to find out the effect of mixing Cryptostegia latex with hevea latex. A 100 c.c. of fresh Cryptostegia latex of D. R. C. 7 per cent. was kept in a beaker and ammonia preserved 30 per cent. hevea latex of alkalinity 0·6 per cent. was added in drops from a burette. After the addition of 7 c.c., it was found that there was complete coagulation of the rubber of Cryptostegia and hevea latices. The serum was brownish in colour and was absolutely free from rubber. The pH was observed to be 7·5. It was found that the serum obtained from hevea latex after acid coagulation did not coagulate Cryptostegia latex even after adjustment of pH to 7·5, probably because the acid had already precipitated the proteins of the serum of hevea latex. Therefore, to confirm whether it was the colloidal proteins or the rubber molecule that was responsible for the mutual coagulation, the serum of hevea latex obtained after driving off the ammonia and subsequent coagulation by bacterial activity, was added to 100 c.c. of Cryptostegia latex of the same D.R.C. It was found that 5 c.c. of serum was sufficient to produce effective coagulation of the Cryptostegia latex, if the pH was adjusted to 7·5 by the addition of a drop or two of ammonia solution. The serum extracted from frozen latex also behaved in the same way. The above experiments were then repeated with Cryptostegia latex cream, and it was observed that the quantities of ammonia preserved hevea latex and also of the serum obtained by bacterial activity required for coagulating the cream were smaller than those required for the normal Cryptostegia latex, for in the process of creaming a large percentage of colloidal proteins had been eliminated. This definitely proves that the coagulation of latices is brought about by the mutual coagulating property of their protective colloids, mostly proteins, and it supports Vernet's view that coagulation is caused by protein precipitation. By this method, the volume of the coagulant required is also reduced from 35 per cent. soap solution to 7 per cent. of hevea latex. Since there is complete precipitation, the percenage of non-rubber constituents are also reduced. The coagulum formed is found to be harder than when Cryptostegia alone is coagulated and hence it is easier to pass through the rollers to be converted into sheets. The discovery of the mutual coagulating property of the latices is of great technical importance in so far as a harder coagulum is obtained and also the introduction of chemicals are avoided.

I express my thanks to Mr. J. F. Anderson, Controller of Rubber, for the facilities given to me to continue the researches and also for th permission to publish these results.

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Government of India,
Muttra,
October 9, 1945.