pretarsal pulvillus is the prevalent mode of attachment of the translator to the insect leg.

Anatomy of the pollinated flowers reveals that the pollinium is held with its ridge clasped between the adjacent anther flaps (Fig. 1 E). The pollen tubes push through the common germ pore present in the ridge of the pollinium and traverse toward the receptive lining of the stigmatic chamber. Role of the characteristic morphology of the pollinium in orienting the pollen tubes toward the receptive surface of stigma has been discussed elsewhere[5].

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EFFECT OF ROCK PHOSPHATE AND GLUCOSE CONCENTRATION ON PHOSPHATE SOLUBILISATION BY *ASPERGILLUS AWAMORI*

THERE are large deposits of low grade rock phosphate in the country which are estimated to be about one hundred million tonnes. Substantial deposits of these rock phosphates are low in phosphate content and thus are not suitable for superphosphate manufacture or utilisation as such as phosphatic fertilizers in non-acidic soils which cover a very large farm area of this country. For proper utilisation of these vast resources of low grade rock phosphates, it is necessary to use them alongwith efficient phosphate solubilising bacteria or fungi. The microbial solubilisation of insoluble phosphates has been studied[1–3]. However, the report on the factors affecting phosphate solubilisation is meagre. Carbon source for their active proliferation and for production of organic acids by these organisms is an important factor in phosphate dissolution. The optimum amount of rock phosphate to be applied in the milieu for maximum phosphate dissolution efficiency is an important parameter. With these points in view, the effect of different concentrations of rock phosphate and energy source on phosphate solubilisation by *Aspergillus awamori* in culture medium was investigated.

Three concentrations of Mussoorie rock phosphate were added per 100 ml of Pikovaskaya's medium. The flasks with medium were sterilised at 15 lb pressure for 15 minutes. After sterilisation they were inoculated with 0·5 ml of mycelium and spore suspension of *Aspergillus awamori*, keeping uninoculated control. Each treatment was duplicated. The average room temperature was 25° C ± 2. Two flasks from each treatment were removed at periodic intervals for the determination of available phosphorus and the pH.

The effect of varying dosage of glucose was investigated on rock phosphate solubilisation by *A. awamori*. Rock phosphate was added at 50 mg P_2O_5/100 ml medium. The experiment was done during October with an average room temperature of 30° C ± 2. Available phosphorus was determined by the method of King[4] improved by Sharman (Jackson[5]) using Hilgers absorptiometer. The pH of the filtrate was determined by Elico pH meter.

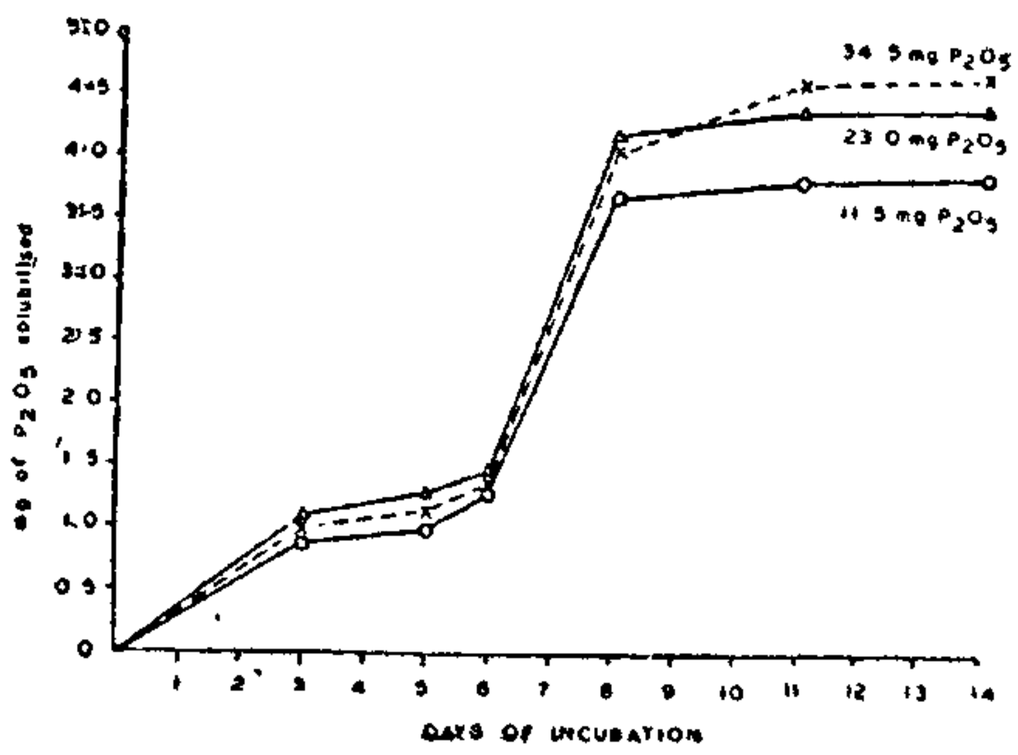

FIG. 1. Microbial solubilisation of different concentration of rock phosphate.

The results of P_2O_5 solubilised from different concentrations of rock phosphate during two weeks of incubation are presented in Fig. 1. The quantity of phosphate solubilised, increased with progressive incubation. During 6 days, the amount of phosphate solubilised was 1·3 and 1·5 mg P_2O_5 out of 11·5 and 23·0 mg of P_2O_5 added in the medium. Maximum solubilisation was obtained between 6th and 8th day

TABLE I

Effect of concentration of energy source on P. solubilisation by Aspergillus awamori

Quantity of Energy Source	Weeks of Incubation					
	1st week		2nd week		3rd week	
	P. solu.[a]	pH	P. solu.[a]	pH	P. solu.[a]	pH
1% Glucose	6·35	5·1	8·42	6·1	7·14	6·5
2% Glucose	8·33	3·5	12·40	3·2	12·02	3·5
3% Glucose	13·74	3·3	16·67	3·3	15·56	3·3

P. solu.[a] — P. solubilised in mg.

as a result 3·7 and 4·2 mg P_2O_5 was solubilised out of the applied rock phosphate (11·5 mg and 23·0 mg of P_2O_5). At intervals of 11th and 14th days, only a slight increase in water soluble phosphorus was recorded. The percentage of phosphate solubilised during 2 weeks of incubation was 33 and 18·7 out of 11·5 and 23·0 mg of P_2O_5 added as rock phosphate respectively in the medium. The results showed that lower the quantity of phophate applied, greater was the conversion percentage. It seems that during solubilisation of rock phosphates other ions such as Al^{3+}, Fe^{3+}, Ca^{2+} are released which may be either inhibitory to the growth and activity of the fungus or due to a change of the pH of the medium.

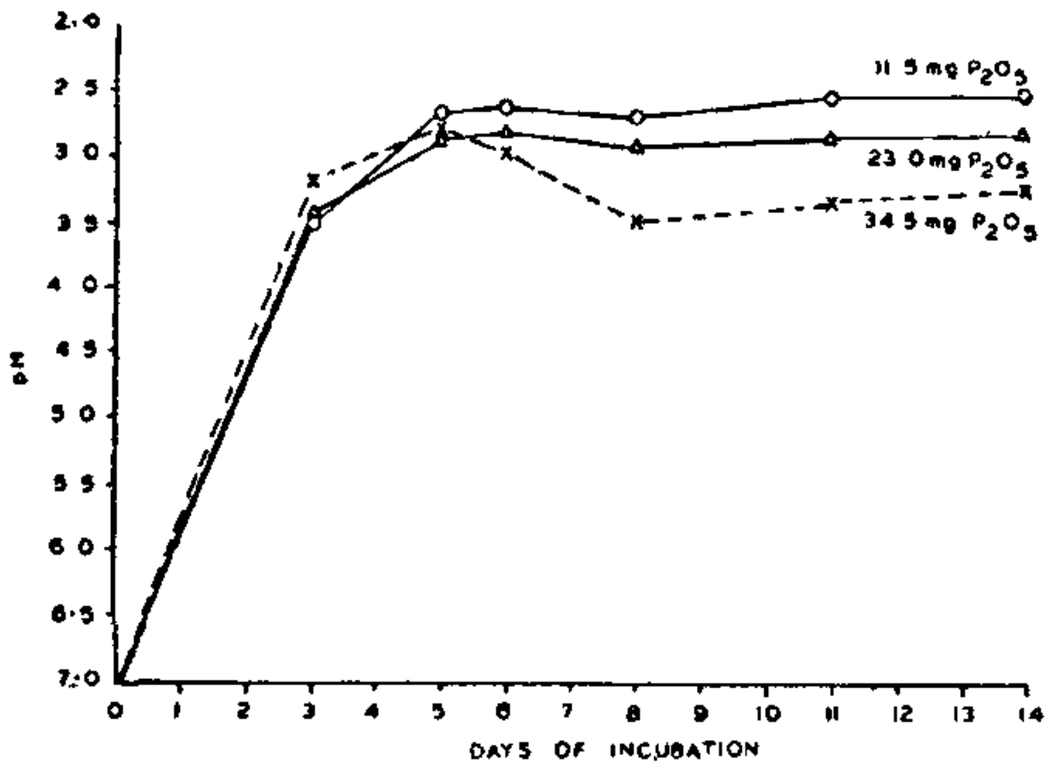

FIG. 2. pH changes during P solubilisation.

The solubilisation of rock phosphate was caused due to the production of acidity in the medium (Fig. 2). On the 3rd day, the pH of the medium was decreased to about 3·5 and on 5th day the pH was around 3 and later on the differences were not marked. It was observed that the treatment receiving lowest quantities of phosphate remained more acidic than treatments receiving higher amounts of rock phosphate.

The effect of concentrations of energy source (glucose) on rock phosphate solubilisation by the organism is presented in Table I. The rate of solubilisation of the rock phosphate by *A. awamori* was increased due to the addition of greater quantities of energy source. Maximum solubilisation was brought about by 3% glucose. Maximum solubilisation occurred during second week and 16·7, 12·4 and 8·4 mg P_2O_5 were solubilised in the presence of 3, 2 and 1% glucose. It was also observed that greater acidity was produced by glucose applied at the rate of 3 and 2% as compared to 1% which is an important factor in phosphate dissolution. It is apparent from these results that for the maximum activity of the phosphate solubiliser, a good amount of energy source is required.

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