ABSTRACT

The phosphate status of Volcanic Ash soils from St. Vincent was investigated by measuring sorption isotherms, Chang and Jackson and 'Available' P (Bondorff and Olsen) fractions.

'Optimum P' (added P required to produce a soil solution concentration of 0.2 μg/ml) obtained from sorption isotherms was the most reliable estimate of P status; this was confirmed by pot-tests with tomato.

The Al-P fraction fixed most added phosphate, followed by the Fe-P fraction.

Bondorff's solution extracted mainly Al-P and Sal-P, Olsen's Al-P and Fe-P. It was not possible to prove from which fractions the plants removed phosphate.

Amorphous Al was shown to be the major cause of P fixation and sorption. Segalin Al (extracted with successive alternate HCl and NaOH), clay Al, amorphous Al, and amorphous + 1:1 mineral Al were all highly correlated with 'Optimum P'.

Reduction of soil P sorption after treatment with reagents to remove Al, Si and/or Fe from the soils was closely related only to the Al extracted. Similar results pertained in an experiment with the <2μ clay fraction.

Although removal of extractable Al did not reduce P sorption *per se*, it was highly linearly correlated with 'Optimum P' for both native and fertilised soils and could prove useful as a measure of P status for these soils.

The clay fractions of the soils were dominated by allophane and poorly crystalline halloysite. The high P fixing soils were more allophanic in nature. Climate and age of the soils appeared to be the major factors influencing mineralogical constituents and therefore phosphate fixation.

Addition of silica, arrowroot starch and glucose amendments reduced P sorption only to a small extent.

Glucose was most successful at increasing soil solution P in an incubation experiment.