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ADSORPTION OF SULPHATE BY SOILS

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## ABSTRACT

Studies of sulphate adsorption, phosphate sorption and surface charge on soils of varying anion sorption ability which had been incubated, each with several rates of calcium hydroxide, have indicated that:

- (i) The amounts of both sulphate and phosphate sorbed from 0.1M NaCl can be correlated with surface positive charge, but whilst there is a 1:1 relationship between the amounts of sulphate adsorbed and surface positive charge phosphate is sorbed in amounts well in excess of the amounts of positive charge present.
- (ii) Although there is a requirement for some positive charge on the surface before sulphate adsorption can occur in both 0.1M NaCl and 0.025M CaCl<sub>2</sub>, there is a strong selectivity for sulphate over non-specifically adsorbed ions such as chloride.
- (iii) Sulphate is adsorbed from 0.025M CaCl<sub>2</sub> in excess of the amounts of surface positive charge initially present ( $y = 1.51x + 1.45$ ), an observation which is consistent with a closer approach of sulphate to the surface in the presence of calcium such that the actual surface charge is modified.

These findings point to a predominantly electrostatic link between sulphate and the surface, with the changes in sulphate adsorption with pH being dependent on changes in surface positive charge. Sulphate adsorption was strongly reduced (10 - 60%) by increasing pH, and in a study of competitive sorption was also significantly (10 - 30%) reduced by addition of phosphate. An investigation with one soil showed that the measured charges in sulphate adsorbed on phosphate addition were highly correlated with measured changes in surface positive charge, and there was some evidence for phosphate having a larger effect on surface positive charge at low pH.

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