

PHOSPHORUS ADSORPTION BY SOME TROPICAL COCONUT SOILS OF SRI LANKA: I. EFFECT OF SOIL PROPERTIES

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Phosphorus adsorption, in the presence of $10^{-2}M$ $CaCl_2$, by 10 acid coconut soils belonging to the Order, Ultisols, Alfisols and Entisols, is described by a two site Langmuir adsorption isotherm. The first site adsorption (equilibrium $P < 1\mu g/ml$) had very high bonding energy coefficient and low adsorption maxima compared to the second site (equilibrium $P > 1\mu g/ml$). The first site adsorption maxima of Ultisols (349 to 825 $\mu g/ml$), were higher than those of the other soils (136 to 345 $\mu g/ml$). These adsorption maxima were significantly correlated with surface area, % clay, % silt, free iron oxides and active Al ($1M$ NH_4OAc , pH 4.8) but not with organic carbon, cation exchange capacity, exchangeable Ca, and extractable Fe ($1M$ NH_4OAc , pH 4.8). Among these factors, free iron oxides was the most important factor ($r = 0.906^*$) controlling the adsorption.

The kinetics of P adsorption by these soils showed an initial rapid phase followed by a slow process. In the region of the first site, about 75% of the adsorption was complete within a few minutes while the rest of the adsorption took 3 to 6 days.

Langmuir adsorption maxima was satisfactorily used to predict the P availabilities in these soils treated with concentrated superphosphate.