E2-09: Studies on phosphorus fractionation of soils from Sinharaja forest

R P Gunawardena, W M P Wijetunge
(Dept of Chemistry, Univ of Peradeniya)

Phosphorus is an important plant nutrient and P fertility is a limiting factor in tropical soils. The usual practice of characterization of soil P into total P and available P only, seems inadequate in the proper understanding of the P cycle. In this study, a sequential extraction scheme was developed for the fractionation of soil P and the method was applied to soil samples from Sinharaja forest.

Inorganic (P_i) and organic (P_o) components were further fractionated in this scheme. Labile P (resin extractable), moderately labile P_i (NaOH extractable), calcium bound P_i (HCl extractable), moderately labile P_o (NaOH extractable), Total P_o (by ignition) and total P (by NaOH fusion) were estimated. Residual P_i and P_o values were also evaluated.

Labile P and calcium bound P_i (0.7 - 9 ppm) were present in very small quantities. Moderately labile P_i (21 - 47) ppm) was found to be relatively high. Moderately labile P_o (45 - 103 ppm) was higher than the corresponding P_i fraction. 35-70% of the total soil P was stable and unreactive. This residual P in forest sites was much higher than in the pinus plantation at Sinharaja.

The main advantage of this scheme is that it permits a complete account on P fertility status in soils. Each of the extracts used in the procedure can be assigned some role in the P transformations occurring in soil. These assignments may then be used to characterize various P pools and their transformations in the P cycle.