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Estimation of Optimum Available Phosphorous Extraction Methods for Reddish Brown Earth Soil

S.N.B.G.L.D. Kumara, D.M.S. Duminda*, J.P.H.U. Jayaneththi

Department of Agricultural Engineering and Soil Science, Rajarata University, Sri Lanka
**dmsduminda@yahoo.com*

Abstract

Several extraction methods are used to determine plant available Phosphorus (P) that affect for growth and yield of plants. This study was conducted to evaluate the different available P extraction methods for reddish brown earth (RBE) soil in dry zone of Sri Lanka. The experiment was conducted as a randomised complete block design (RCBD) with four replicates at Kahatagasdigiliya in Anuradhapura district during Maha (2013/2014) season. Seven extraction methods, i.e., Olsen's, Bray 1, Borax, Mehlich III, Modified Kelowna, ammonium chloride and distilled water were tested. Soil samples were collected at the tasseling stage of maize plants (*Zea mays* L.) treated with four fertiliser rates: 0 (T1), 20 (T2), 30 (T3) and 40 (T4) kg of P ha^{-1}. Soil samples were analysed for pH, available P and total P apart the initial chemical characterisation. The effect of extraction methods for soil available P and the P recovery, interactions among the P levels with different extraction methods were evaluated. Available P extraction and P recovery using Modified Kelowna method was significantly greater than other methods ($p<0.05$). Olsen's, Bray 1, Borax, Mehlich III, Ammonium Chloride extraction methods were not significantly different ($p>0.05$) in available P determination. The extraction methods and fertiliser levels were significantly different ($p<0.05$) with soil available P. The P extraction in T4 was comparatively higher than other methods except distilled water extraction. Modified Kelowna method was most appropriate in available P extraction under experimental conditions in RBE soil.

Keywords: Phosphorus, P extraction methods, P recovery, RBE