

ESTIMATION OF OPTIMUM AVAILABLE PHOSPHORUS EXTRACTION METHOD FOR MAJOR DIFFERENT SOIL TYPES IN THE DRY ZONE OF SRI LANKA

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Several extraction methods are used to assess plant-available phosphorus (P) in soils all over the world. This study was conducted to identify the most suitable phosphorus extraction method for major soil types in Sri Lanka's dry zone: reddish-brown earth (RBE), low humic gley (LHG), grumusols (GRU), calcic red latosols (CRL), and calcic yellow latosols (CYL). The study was carried out at the Faculty of Agriculture, Rajarata University of Sri Lanka, *Puliyankulama*. Nine extraction methods namely - Olsen, Bray 1, Borax, Modified Kelowna, Mehlich 3, Mehlich 1, Deionized Water (H₂O), Ammonium Chloride (NH₄Cl), and Calcium Chloride (CaCl₂)-were tested on each soil type. Soil samples were analyzed for pH, available phosphorus, and total phosphorus, with initial physical and chemical characteristics. The quantities of soil-available phosphorus extracted by each method for each soil type were analyzed using R studio and means were separated using Dunn's test. In RBE, GRU and LHG soils, the Borax method was found to extract significantly more available phosphorus than the other methods ($p < 0.05$), while the water-soluble method was identified to be the least effective. Other methods had no significant differences ($p > 0.05$) over available P extraction. In CRL soil, both Borax and Mehlich 1 methods yielded significantly higher phosphorus levels ($p < 0.05$), while no significant differences were observed for other methods. In CYL soils, the NH₄Cl method extracted the most available phosphorus ($p < 0.05$), while water-soluble and Mehlich 3 methods were the least effective, with no significant differences noted among the remaining methods ($p > 0.05$). Also, the magnitude of P extraction was found to be pH-independent in each and every soil type studied. It is concluded that the P extraction ability of major dry zonal soils depends on the soil chemical and physical characteristics as well as the chemical extractants used.

Keywords: Dry zonal soils, P extraction techniques, Phosphorus availability, Soil Phosphorus analysis