

Evaluation of AB-DTPA Extractant for the Estimation of Plant Available Macro and Micro Nutrients in Acidic and Neutral Soils

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ABSTRACT

*Use of multi nutrient extractants to assess available nutrients in soils is economically advantageous in routine soil testing. Even though AB-DTPA extractant has been proved to be successful for alkaline soils, its potential as a multi nutrient extractant for acidic soils has not been documented. This study examined the suitability of AB-DTPA extractant to determine plant available P, K, Na, Ca, Mg, Fe, Mn, Cu and Zn in acidic and neutral soils of Sri Lanka. Thirty one soils were collected from different locations, including alfisols, ultisols, entisols, and inceptisols. Available nutrient status of soils was analyzed by conventional methods as well as by AB-DTPA method. Conventional methods tested were; Olsen and Bray-1 methods for available P, neutral ammonium acetate extraction for exchangeable Ca, Na, K and Mg, and DTPA extraction for available Fe, Mn, Cu and Zn. Contents of nutrients in plants and plant uptake of nutrients were determined by conducting a pot experiment, using Guinea grass (*Panicum maximum*) as the indicator plant. Relationships between the amount of nutrients extracted by AB-DTPA method with those of conventional methods, and with plant nutrient concentration and uptake were analyzed using simple linear regression, for each nutrient separately. The amount of P, K, Na, Ca, Mg, Fe, Mn, Cu and Zn extracted with AB-DTPA method showed highly significant correlation ($p < 0.001$) with those extracted by conventional methods. The correlation between AB-DTPA extractable nutrient levels and plant uptake was highly significant for P ($r = 0.85^{***}$), K ($r = 0.83^{***}$), Na ($r = 0.86^{***}$), Mn ($r = 0.75^{***}$), Zn ($r = 0.74^{***}$) and Cu ($r = 0.75^{***}$). Comparatively weak, but a significant correlation was observed between AB-DTPA extractable Fe with plant uptake of Fe ($r = 0.48^*$). However, Ca and Mg extracted by both AB-DTPA and ammonium acetate methods did not show a significant correlation with plant uptake, probably due to the relatively high level of Ca and Mg in the tested soils. It could be concluded that AB-DTPA method can be recommended as a suitable extraction for routine soil analysis for acidic and neutral soils of Sri Lanka.*

Key Words: Available nutrients, multi nutrient extractants, soil analysis