

B-102: Availability of Fe, Mn, Zn and Cu in some Sri Lankan soils

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The low availability of essential Zn and Cu in the exchangeable soil fraction of Sri Lankan soils was highlighted by Deb (1992). Since the exchangeable fraction is but one of the pools from which plants acquire nutrients, in this study, 6 other fractions from which plants can take up nutrients, were investigated. These included: water soluble, exchangeable (outer sphere - neutral salt displaceable), inner sphere (Pb-displaceable), acid soluble (dissolved poorly crystalline hydroxy and carbonate metal phases), Mn oxide bound and organically bound fractions. The total Fe, Mn, Zn and Cu content of the soil samples - wet zone paddy (4), tea (14), dry zone paddy (12) - were also analysed.

Results indicated that soil was dominated by Fe in all fractions. Total Fe ranged from 67,021 $\mu\text{g/g}$ in the wet zone to 32,875 $\mu\text{g/g}$ in the dry zone. Mn and Zn totals ranged from 450 $\mu\text{g/g}$ (wet) to 256 $\mu\text{g/g}$ (dry) while Cu totals ranged from 60 to 30 $\mu\text{g/g}$ from wet dry zones.

At most 6.5-8% (4360-2630 $\mu\text{g/g}$) of total Fe was available in the 6 fractions held almost exclusively in the organic fraction. The exchangeable fraction contained less than 0.1% of total. Similarly 2 - 4% (10 $\mu\text{g/g}$) of total zinc was plant available of which the exchangeable fraction contained approximately half. Though total Mn content equaled Zn, 20% - 40% of it was held in the 6 fractions, of which the exchangeable fraction contained 6% in the wet zone and 18% in the dry zone.

In contrast Cu was apportioned equally among the exchangeable, organic and residual fractions. Thus, approximately 66% (40 to 20 $\mu\text{g/g}$) was plant available. The total and residual Cu contents were extremely low compared to the other elements.