



Chemical Partitioning and Distribution of Copper, Zinc and Nickel in Soils of Lesser Himalayas

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Abstract: Distribution and availability of copper (Cu), zinc (Zn) and nickel (Ni) in agricultural soils of nine districts of Lesser Himalayas were studied during the year 2011-12. Sequential extraction was used to fractionate the metals (Zn, Cu and Ni) from soils into six operationally defined groups: water soluble, exchangeable, carbonate, Fe-Mn oxide, organic, and residual. The residual fraction was the most abundant pool for all the three metals examined (65.93, 80.08 and 48.7% respectively for Cu, Zn and Ni). Results of these analysis showed that 4.35, 1.0 and 1.44% of total Cu, Zn and Ni, respectively is associated to water soluble fraction, 5.14, 2.01, 7.62% with exchangeable fraction, 3.58, 2.07, 8.86% with carbonate bound, 8.28, 8.42, 20.25% with oxide and 12.72, 6.42, 13.13% with organic matter. Only a small amount of Cu and Zn (34.07 and 19.92%) was present in the potentially available fraction: nonresidual fraction indicating lithogenic origin and low bioavailability of the metals considered. A significant amount (51.3%) of Ni was present in potentially available fraction. Assuming that mobility and bioavailability of these metals are related to their solubility and geochemical forms, and that they decrease in the order of extraction sequence, the apparent mobility and potential bioavailability for these three metals in the soils were: Ni > Cu > Zn.

Key Words: Chemical Partitioning, Heavy metals, Lesser Himalayas, Potential mobility
