Copper and zinc speciation in soils from paddy cultivation areas in Kelantan, Malaysia.

Abstract

The purpose of this study was to investigate the present concentration of copper (Cu) and zinc (Zn), and factors controlling the bioavailability of metals in paddy cultivation soils collected from Kelantan. Cu and Zn levels in soil samples were extracted by using the sequential extraction procedures, which are namely easily or freely, leachable and exchangeable (EFLE), acid-reducible, oxidisable-organic and resistant fractions. The highest concentration of Cu was found in the oxidisable-organic fraction (19.77±1.89 µg/g) for March, while the resistant fraction (18.29±0.87 µg/g) was the highest in April. In contrast, Zn concentration was the highest in the resistant fraction for both months. Statistically, Cu and Zn results showed a non-significant difference among these two months in the fraction of paddy soil studied. These results indicate a low bioavailability of Cu and Zn in the paddy cultivation soils. Therefore, the anthropogenic-based Cu and Zn in the paddy cultivation areas of Kelantan are expected to originate from applications of chemical fertilizers and pesticide, not from the lithogenic sources.

Keyword: Cu and Zn; Bioavailability; Soils; Paddy cultivation; Anthropogenic.