Human health risks of heavy metals via consumption of Musa paradisiaca and the ecological risk assessment of heavy metals in the habitat topsoils

ABSTRACT

Banana Musa paradisiaca collected from three sites in Peninsular Malaysia were determined for human health risk assessment of Cu, Fe, Ni, Pb and Zn. The metal distribution in the different parts of bananas and their habitat topsoils were in the following orders; Cu: Flesh > peel ≥ root > soil ≥ leaf > stem. Fe: Soil > root > stem > leaf > flesh > peel; Ni: Leave ≥ stem ≥ peel > flesh > root ≥ soil; Zn: Root > soil ≥ leaf ≥ flesh > stem ≥ peel; Pb: Root > soil > stem > leave > flesh ≥ peel. The metal concentrations (mg/kg dry weight) in the banana flesh were 13.87-16.43 for Cu, 29.80-54.47 for Fe, 1.57 13.10 for Ni, 1.70-6.40 for Pb, and 7.03-22.27 for Zn. The target hazard quotient values of all metals were found below 1.0, indicating that average and high level consumers would not have non-carcinogenic risk due to the intake of heavy metals via banana consumption. The potential ecological risk index of the habitat topsoils for all three sites were also categorized as ‘low ecological risk.’