Metals and Trace Elements Composition of Maize, Wheat, and Teff grown in Volcanic-ash Rich Soils of the Main Ethiopian Rift Valley

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We determined the concentrations of 27 metals and trace elements in teff (an indigenous cereal), wheat, and maize grown in volcanic ash-rich soils of the Main Ethiopian Rift (MER) Valley using inductively coupled plasma mass spectrometry (ICP-MS). Our results show higher mean concentrations (in mg/kg) of Fe (159), Cu (4.8), and Mn (71) in teff compared to wheat (Fe (33), Cu (3.7), and Mn (43)) and maize (Fe (13.0), Cu (1.3), and Mn (4.1)). However, teff samples had higher mean concentrations of As (in μg/kg) (24.7) and Pb (69.9) compared to wheat and maize, both of which had comparable concentrations of 4.4 for As and 8.9 for Pb. Toxic elements concentrations in the cereals were below the Codex standards established for cereal grains. This new information on elemental concentrations contributes to the nutritional database and food safety of these cereals cosumed in Ethiopia and other parts of the world.