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Metal bioaccumulation in the soil–leaf–fruit system determined by neutron activation analysis

Abstract

The determination of macro- and microelements in soil–leaf–fruit systems is extremely important for the quality of the fruits and for consumer health. The content of major and trace elements in selected varieties of fruits (apple, plum, and grape) as well as in leaves and soils samples, collected in the Republic of Moldova, was determined using neutron activation analysis. Soil elemental content allowed evidencing more similarities between the considered

soils and the World Average Soil, while the content of trace elements corresponds to average values obtained for microelements in the Republic of Moldova. The content of the main part of the element in apple fruits was higher in comparison with plum and grape fruits. The highest concentration in case of all fruits was obtained for K: 14,500 $\mu\text{g/g}$ (grape), 21,600 $\mu\text{g/g}$ (plum) and 23,700 $\mu\text{g/g}$ (apple). Transfer factors from soils to leaves and fruits as well as from leaves to fruits, the daily intake of metals, and the hazard quotient indices were calculated. The transfer factor calculated for different systems showed large differences between metals. The values for the estimated dietary intakes and hazard quotients for toxic elements (Cr, Co, Fe, Mn, Ni, V, and Zn) were lower than the recommended safety limits by Food and Nutrition Board. Therefore, the analyzed fruits were considered to be safe for human consumption.