BIOACCESSIBILITY OF Cr, Cu, Fe, Mg, Mn, Mo, Se AND Zn FROM NUTRITIONAL SUPPLEMENTS BY THE UNIFIED BARGE METHOD

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Bioaccessibility has been defined as the fraction of a compound that is released from its matrix in the gastro-intestinal tract, and thus becomes available for intestinal absorption, i.e. that available to enter the blood stream. The Bioaccessibility Research Group of Europe (BARGE) is a European network bringing together international institutes and research groups to study human bioaccessibility of priority contaminants in soils via the gastro-intestinal tract. BARGE has developed a unified bioaccessibility method (UBM) with the aim of producing a validated and standardised procedure. The UBM is carried out at 37°C (body temperature) because enzyme activity and chemical characteristics such as solubility are affected by temperature.

In this study, the BARGE in vitro method was applied to ten nutritional supplement samples and three certified reference materials to evaluate the bioaccessibility of Cr, Cu, Fe, Mg, Mn, Mo, Se and Zn. The total digest, gastric phase and gastro-intestinal phase concentrations of Cu, Fe, Mg, Mn and Zn were determined by ICP-OES and Cr, Mo and Se by ICP-MS. The order for the mean bioaccessibility of each element in the gastric phase for all supplements was: Se (96.7 %) > Zn (91.6 %) ≈ Mn (91.4 %) > Mo (83.3 %) ≈ Fe (81.8 %) > Mg (77.4 %) > Cr (37.4 %) > Cu (30.9 %) whereas in the gastro-intestinal phase the order was Se (99.6 %) ≈ Mo (98.7 %) > Mg (72.4 %) > Mn (58.3 %) > Cu (46.5 %) > Cr (27.0 %) > Zn (18.6 %) > Fe (9.3 %).

KEYWORDS: BARGE method, bioaccessibility, nutritional supplement, ICP-MS, ICP-OES

REFERENCES: