INVESTIGATION OF ELEMENTAL COMPOSITION IN COMMERCIAL DIETARY SUPPLEMENTS BY NEUTRON ACTIVATION ANALYSIS

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Dietary supplement consumption has grown to complement deficiency of essential nutrient intake, to improve physical activity performance in athletes, to prevent diseases and to delay the effects of age. The aim of this study was to evaluate the elemental composition in multivitamin and protein supplements for its quality control and to assess the risks to human health. This study evaluated elemental composition of multivitamin and protein dietary supplements, acquired in São Paulo city. Elements As, Br, Ca, Co, Cr, Cs, Fe, K, La, Na, Rb, Sb, Sc, Se and Zn were determined in these dietary supplements, using neutron activation analysis (NAA). Aliquots of the supplements weighted in polyethylene envelopes were irradiated with elemental standards at the IEA-R1 nuclear research reactor from 1 to 8h with thermal neutron flux of 4.0×10^{12} n $cm^{-2}s^{-1}$. After adequate decay times the induced gamma activities of the samples and standards were measured using a HPGe detector coupled to a Digital Spectrum Analyzer DSA 1000. The elements were identified in the gamma spectra by gamma ray energies and half-lives and the concentrations were calculated by comparative method. The certified reference material NIST 1632d Coal Bituminous were analyzed for quality control. The results presented good precision and accuracy with $|Zscore| \leq 2$. Mass of elements found in multivitamins agreed with label values but in proteins, several elements did not comply with the National Health Surveillance Agency (ANVISA) regulations. Element amount per dose of the dietary supplement indicated that Cr and Se exceeded the recommended daily intake percentile values. The daily element intakes by consumption of supplements did not exceed the Tolerable Upper Intake Limits (UL) for the supplements analyzed. Toxic elements (Cd, Hg and Sb) were not detected in the supplements and As was detected at very low mass fractions.

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