LEAD, ARSENIC AND CADMIUM IN BULGARIAN CANNED FOOD

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Lead, arsenic and cadmium are important toxic trace elements and their determination represents an invaluable analytical task in occupational, environmental, nutritional, forensic and clinical fields [1]. The hydride generation (HGAAS) [2] for determination of As and electrothermal AAS (ETAAS) for Pb and Cd are widely accessible and relatively well established at µg L\(^{-1}\) levels.

In the present study the analyses of lead, arsenic and cadmium in Bulgarian canned food were performed by means of electrothermal atomic absorption spectrometry with transversely heated graphite furnace atomizer (Pb, Cd) and with the batch-type hydride generation (As). A microwave digestion for sample preparation was applied. The concentration of the chemical modifier, methods of calibration and the apparatus parameters were optimized for each of the analytes. The analytical methods were validated by participation in international interlaboratory studies “Metallic contaminants in milk powder”, FAPAS Series 7 Round 43 and IMEP-19 “Trace Elements in Rice”. The z-scores calculated for the Pb, Cd and As results in FAPAS round robin are -0.3, 0.3 and -0.6, respectively. For IMEP-19 the concentrations obtained and their uncertainties deviate from the certified values with 4% for Pb and 7% for Cd.

The determined toxic element contents in the investigated canned vegetables (n = 50) are between < LOD and 0.40 mg kg\(^{-1}\) (Pb); from < LOD to 0.030 mg kg\(^{-1}\) (Cd) and from 0.0010 to 0.079 mg kg\(^{-1}\) (As). The concentrations obtained for the canned fruits (n = 30) are from < LOD to 0.19 mg kg\(^{-1}\) (Pb); from < LOD to 0.014 mg kg\(^{-1}\) (Cd) and for As between < LOD to 0.075 mg kg\(^{-1}\).


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