Development and validation of an SPE HG-AAS method for determination of inorganic arsenic in samples of marine origin

The present paper describes a novel method for the quantitative determination of inorganic arsenic (iAs) in food and feed of marine origin. The samples were subjected to microwave-assisted extraction using diluted hydrochloric acid and hydrogen peroxide, which solubilised the analytes and oxidised arsenite (As(III)) to arsenate (As(V)). Subsequently, a pH buffering of the sample extract at pH 6 enabled selective elution of As(V) from a strong anion exchange solid-phase extraction (SPE) cartridge. Hydride generation atomic absorption spectrometry (HG-AAS) was applied to quantify the concentration of iAs (sum of As(III) and As(V)) as the total arsenic (As) in the SPE eluate. The results of the in-house validation showed that mean recoveries of 101-104% were achieved for samples spiked with iAs at 0.5, 1.0 and 1.5 mg·kg\(^{-1}\), respectively. The limit of detection was 0.08 mg·kg\(^{-1}\), and the repeatability (RSD(r)) and intra-laboratory reproducibility (RSD(IR)) were less than 8% and 13%, respectively, for samples containing 0.2 to 1.5 mg·kg\(^{-1}\) iAs. The trueness of the SPE HG-AAS method was verified by confirming results obtained by parallel analysis using high-performance liquid chromatography coupled to inductively coupled plasma mass spectrometry. It was demonstrated that the two sets of results were not significantly different (P <0.05). The SPE HG-AAS method was applied to 20 marine food and feed samples, and concentrations of up to 0.14 mg·kg\(^{-1}\) of iAs were detected.

General information
Publication status: Published
Organisations: National Food Institute, Division of Food Chemistry
Contributors: Rasmussen, R. R., Hedegaard, R. S. V., Larsen, E. H., Sloth, J. J.
Pages: 2825-2834
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Analytical and Bioanalytical Chemistry
Volume: 403
Issue number: 10
ISSN (Print): 1618-2642
Ratings:
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.51 SJR 1.354 SNIP 1.281
Web of Science (2012): Impact factor 3.659
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Original language: English
DOI:
10.1007/s00216-012-6006-7
Source: dtu
Source ID: n:oai:DTIC-ART:pubmed/366066877::17385
Research output: Contribution to journal › Journal article – Annual report year: 2012 › Research › peer-review