ON-LINE DETERMINATION OF ARSENIC SPECIES BY HPLC-ICP-MS - OCCURRENCE OF ARSENICALS IN RICE, APPLE AND SEAFOOD FROM ANKARA, TURKEY MARKETS

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In this study, a method for the determination of arsenic species in rice by high performance liquid chromatograph on-line coupled with an inductively coupled plasma spectrometer (HPLC-ICP-MS) was developed. There have been many studies related to total arsenic determination in rice and the results showed that arsenic levels in rice are high. However, all arsenic species do not have toxic effect on human health. According to the studies conducted As(III) and As(V) are the most toxic ones among all arsenicals. As a result, speciation gains importance. In January 2012, Codex Alimentarius Commission (CAC) accepted the limits for both organic and inorganic arsenic as 0.3 mg/kg in rice.

Extraction for arsenite (As(III)), arsenate (As(V)), dimethylarsinic acid (DMMA) and arslenobetaine (AsB) was carried out both in microwave oven and with methanol solutions. After multi-step extractions, the supernatants were collected in the same tube and filtered through 0.45 µm syringe filter and injected to HPLC by using a 20µL loop. Arsenic species were determined by both PRP X-100 column and BDS C18. TBAB or TMAHSO4 was used as the ion pairing agent in the mobile phase when it was needed. The accuracy of the proposed method has been checked by analyzing spiked samples and 90-115% recoveries were obtained. Linear working range was between 10-100 µg/L and R²>0.99. Intra-day and inter-day precision studies were also performed with RSDs below %15 for both.

The aim of this study was to investigate the incidence and levels of arsenicals in rice, apple and seafood samples in Ankara, Turkey. The levels of arsenicals were determined using LC for separation and ICPMS detection. A total of 70 products were analyzed for arsenicals during the second 6 months of 2013.

Figure 1. Typical chromatogram obtained in our Lab as Arsenobetain, As(III), DMMA, As(V), respectively.

KEY WORDS: Arsenic Speciation, LC-ICP-MS, seafood, rice

REFERENCES: