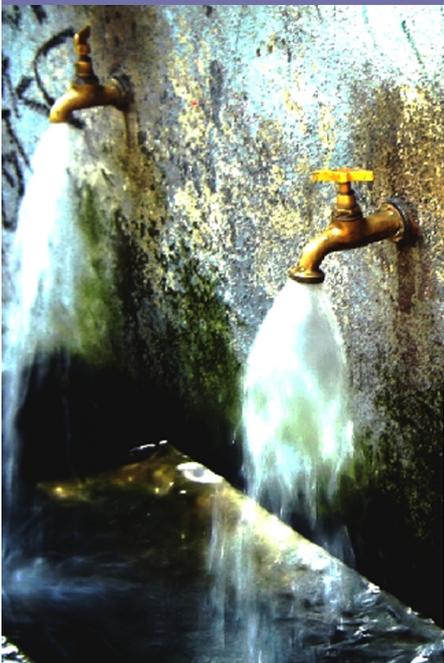




Arsenic speciation

The toxicity and biological effects of an element depend to a large extent on the state in which it is present. For As, arsenite is more toxic and more water soluble than arsenate. As a detoxification mechanism, various organisms methylate As, ultimately producing benign As species such as arsenobetaine. ALS Scandinavia has performed As speciation on a variety of sample types including children's foods, fish and shellfish, as well as environmental waters and polluted soils.



Inorganic As species

Arsenite is more toxic than arsenate. It also has a higher water solubility, which makes it more mobile than arsenate. These inorganic species have been classified as being carcinogenic.

Organic As species

Methylation of inorganic As by microorganisms can occur in waters, soils and sediment. In plants and animals, further metabolism leads to the production of various species including arsenobetaine, the predominant form of As in most marine animals.

Stability

The organic As species are relatively stable, whereas arsenite is subject to oxidation ($As[III] \rightarrow As[V]$), and arsenate to reduction ($As[V] \rightarrow As[III]$). It is therefore crucial to protect the sample from alteration of the native species during storage and sample preparation.

Analysis

As species are typically extracted from edible commodities using methanol-water mixtures, and from environmental solids using phosphoric acid. Water samples or extracts are analyzed using HPLC-ICP-SFMS.

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| | Biota | Soil/sediment | Fresh water |
|--------------------------------|---------------|---------------|--------------|
| Sample requirements | 0.5 g minimum | 1 g minimum | 1 ml minimum |
| Limit of quantification | | | |
| As(III) | 0.01 mg/kg | 0.01 mg/kg | 0.1 µg/l |
| As(V) | 0.04 mg/kg | 0.04 mg/kg | 0.4 µg/l |
| DMA | 0.01 mg/kg | 0.01 mg/kg | 0.1 µg/l |
| MMA | 0.02 mg/kg | 0.02 mg/kg | 0.2 µg/l |
| Delivery time | 5-10 days | 5-10 days | 5-10 days |

