

Microwave-assisted extraction and HPLC-HG-ICP-AES as analytical tools for arsenic speciation in alga samples

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Arsenic is a toxic element widely distributed in the environment, due to both natural sources and anthropogenic applications, and its speciation has received significant attention over the last years due to its species-dependent toxicity. It is known that marine algae can accumulate toxic elements up to $\mu\text{g/g}$ level, one of these elements being arsenic, whose potentially toxic inorganic species can be found in high percentages (Bhattacharya *et al.*, 2007). Therefore, it is necessary not only to determine the total arsenic concentration, but also to evaluate the arsenic species present. In this regard, total arsenic determination in alga samples was carried out by ICP-AES, after the samples were mineralized in a microwave oven. In addition, an analytical procedure was developed for arsenic speciation in algae (*Sargassum fulvellum* and *Hizikia fusiformis*). In order to optimise the extraction procedure, several extraction methods and extractant agents were tested, leading to an optimised microwave-assisted extraction method of arsenic species, which employs deionised water as extractant. The species separation was performed by anion exchange HPLC, using a 17 mM phosphate buffer at pH 5.5 as mobile phase. Finally, HPLC-HG-ICP-AES was employed for species determination, using 0.5% (w/v) NaBH_4 and 4.0 M HCl (García Salgado *et al.*, 2006).

In order to achieve reliable results in speciation analysis, it is necessary to ensure arsenic species integrity during the extraction and chromatography steps, which was carried out by spiking studies of alga samples during the extraction procedure. Moreover, it is interesting to assess total arsenic and arsenic species stability in solid samples and their aqueous extracts. This assessment was carried out under different storage conditions, studying the influence of storage container material and storage temperature (Salgado *et al.*, in press).

References

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