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Arsenic speciation in edible marine algae: Presence of water and lipid-soluble arsenic compounds

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Nowadays, there is considerable interest in arsenic speciation in food products due to the different toxicity exhibited by the different arsenic compounds. This is accentuated in the case of marine algae, because they contribute substantial amounts of arsenic to the human diet and their consumption is increasing due to their properties as food additives, nutritional values and suggested medical applications. Organic arsenic compounds are abundant in marine ecosystems. Although most of the arsenic compounds identified so far have been water-soluble species, the early work on arsenic marine chemistry focused on lipid-soluble compounds. In 1988, an arsenolipid was first rigorously characterized and identified as an arsenosugar-containing phospholipid in algae. Subsequently, several arsenic-containing fatty acids and hydrocarbons have been discovered in different fish products, which origin was presumed to be algae. In this work, we report the water and lipid-soluble arsenic compounds found in 9 commercially available edible marine algae from Japan and Spain. The extraction of water-soluble arsenic species was performed by microwave-assisted extraction, using deionized water as extracting agent, and they were determined by HPLC-(UV)-HG-AFS. Lipid-soluble arsenicals were extracted by mechanical shaking with a (2:1; v/v) chloroform/methanol mixture, purified by SPE on home-made silica columns and determined by online HPLC-ICPMS/ESMS analysis. 6 water-soluble arsenic species, comprising DMA, As(V) and 4 arsenosugars (glycerol, phosphate, sulfonate and sulfate sugars), as well as 14 lipid-soluble arsenic species (3 arsenic-containing hydrocarbons and 11 arsenosugar-containing phospholipids), were found in the water and chloroform extracts, respectively, of the edible marine algae analyzed.

Biography

Sara Garcia Salgado has completed her PhD in 2013 from Technical University of Madrid, Spain. She is an Assistant Professor in this University and Deputy Director for External Relations at School of Civil Engineering. She has published 10 papers in reputed journals and published two books.

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