

Arsenolipids in biota from low and high phosphate oceanic waters

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Although the widespread occurrence of arsenic-containing lipids (arsenolipids) in marine organisms is now well established, the possible role of these unusual compounds in organisms and in the cycling of arsenic in marine systems is unexplored. We report the first results of arsenolipids in plankton collected from subsurface marine waters of low and high phosphate content collected along a transect spanning the Gulf Stream. Samples were collected during the the Blatz II cruise on the RV Knorr in April/May 2012 by filtering (0.7 μm glass fibre) large volumes of water continuously pumped from 5 m below the surface at various sites along the transect. The retained biomass was subsampled and analysed for total carbon content, and then the arsenolipids were extracted from the filters and measured by reversed-phase HPLC/mass spectrometry. By splitting the HPLC effluent post-column, and directing the two effluent streams to an elemental (plasma ionisation, ICPMS) and a molecular (electrospray) mass spectrometer, we obtained simultaneously both quantitative (based on arsenic content) and structural information on the arsenolipids. Previously reported arsenic hydrocarbons and arsenosugar phospholipids were present in samples from both low and high phosphate waters, but the major arsenolipids were from a previously undescribed class of arsenolipids. The results are briefly discussed in terms of the hierarchy of arsenic species formation by algae and their phosphate requirements.