

Arsenolipids in cod liver tissue

U.Arroyo¹, M.-P.Elizalde¹, J.Mattusch², S.Mothes², M.Möder², R.Wennrich² and F.-M.Matysik³

¹ Centro de Química, Universidad Autónoma de Puebla. Apdo. Postal J-55, 72571 Puebla, Pue., Mexico

² Helmholtz Centre for Environmental Research - UFZ, Department of Analytical Chemistry, Permoserstraße 15, 04318 Leipzig, Germany

³ Institute of Analytical Chemistry, Chemo- and Biosensors, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany

Arsenic is a metalloid well known for its toxicity varying depending on the inorganic or organic species. Beside water-soluble arsenic species lipid-soluble arsenicals (arsenolipids) are present in a wide range of biological samples mainly in marine organisms (1). Arsenolipids have recently attracted considerable interest. However, human health effects are still unexplored. In order to elucidate the role of arsenolipids in organisms new analytical approaches for reliable determination of this class of arsenic compounds in various matrices are needed.

The highest concentrations of arsenolipids were found in seafood which served as source material in this study. The investigations were focused on the three mainly occurring arsenolipids found in canned cod liver. The solid samples were extracted and purified using a silica gel column and ethyl acetate/methanol as eluent. Analytical studies were conducted by means of GC-ICPMS, GC-AED, GC-MS and TOF-MS. The results obtained by GC-ICPMS and GC-AED showed the existence of arsenic compounds in the fractions collected. Three major peaks were found within a retention time window between 10 and 25 min. Additional to these major peaks, several other arsenic containing compounds could be detected by GC-ICPMS and GC-AED as highly volatile arsenic compounds (HVAs). The occurrence of HVAs and less volatile compounds (LVAs), can be correlated with the polarity of the eluent used for fractionation. For identification of the three LVAs their molecular masses [M-16] were detected in the SIM mode of GC-MS. TOF-MS which allows highly accurate mass determination was used to gain complementary information. The results showed the presence of these arsenic containing hydrocarbons with the following molecular formulas: C₁₇H₃₇AsO (calculated for [M + H]⁺ 333.2133; found 333.2136; $\Delta m = 0.90$ ppm; C₁₉H₄₁AsO (calculated for [M + H]⁺ 361.2446; found 361.2446; $\Delta m = 0.00$ ppm; C₂₃H₃₇AsO (calculated for [M + H]⁺ 405.2133; found 405.2145; $\Delta m = 2.96$ ppm. Suggestions for corresponding structures will be discussed and compared with recent results reported by Francesconi and coworkers for samples prepared from fish capelin (2).

References:

- (1) E. Schmeisser, W. Goessler, N. Kienzl, K. A. Francesconi, *Analyst*, **2005**, 130, 948
- (2) M. S. Taleshi, K. B. Jensen, G. Raber, J. S. Edmonds, H. Gunnlaugsdottir, K. A. Francesconi, *Chem. Commun.*, **2008**, 4706.