Assessment of arsenic compounds content in seafood samples

AGNIESZKA NAWROCKA[1], MACIEJ DURKALEC[2], MIROSŁAWA KMIECIK[3], ALEKSANDRA PACIOREK[4], ANDRZEJ POSYNIAK[5]

[1]agnieszka.nawrocka@piwet.pulawy.pl
[2]maciej.durkalec@piwet.pulawy.pl
[3]miroslawa.kmiecik@piwet.pulawy.p
[4]aleksandra.paciorek@piwet.pulawy.p
[5]aposyn@piwet.pulawy.p

Arsenic (As) is non-essential and one of the most toxic elements distributed throughout the environment in various chemical forms. Toxic properties and bioavailability depend on concentration and species of As present in nature. Inorganic arsenic (As (III), As (V)) and its organic metabolites (MMA, DMA) are the most toxic arsenic species. Aquatic organisms, due to their sedentary or sessile lifestyle, are particularly exposed to toxic arsenic compounds through waterborne and dietary routes.

The aim of this study was to assess the concentrations of six arsenic species: arsenite As(III), arsenate As(V), monomethylarsonic acid (MMA), dimethylarsinic acid (DMA), arsenobetaine (AsB), and arsenocholine (AsC). The speciation analysis was performed by high-performance liquid chromatography combined with inductively-coupled plasma mass spectrometry (HPLC-ICP-MS) with one anion exchange column. Microwave-assisted extraction method was chosen for preparation of bivalve mollusks samples collected on Polish warehouses and markets: dog cockle (*Glycymeris glycymeris*), Manila clam (*Ruditapes philippinarum*), Atlantic jackknife clam (*Ensis directus*), blue mussel (*Mytilus edulis*), Pacific oyster (*Crassostrea gigas*), great scallop (*Pecten maximus*), common cockle (*Cardium edule*) and hard clam (*Mercenaria mercenaria*). The concentration of total As in obtained extracts was analyzed by ICP-MS to confirm the efficiency of extraction.

Obtained results showed that arsenobetaine (non-toxic chemical form of As) was the major arsenic species that was found in bivalve mollusks. The low relative percentage of inorganic As detected in a minority of samples indicates, that this kind of seafood may not pose a risk to the health of the potential consumers.