MetaFRisks project

Title: Advanced Metallomics Analysis in Fish for Improved Assessment of Human Risk and Environmental Quality

Funding Source: HFRI (ΕΛΙΔΕΚ)

Budget IO: 169,775 €

Start / End Date: 2020 – 2023

Web site URL: to be announced

Research Directions:

Environment and food safety
Environmental impacts
Human health risks
Nutritional benefits
Greek fisheries and aquaculture
Marine environment

Principal Investigator:

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Collaborating Organizations:

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Advisory board:

- Dr. M. Tsapakis (Institute of Oceanography, HCMR)
- Dr. S. Somarakis (Institute of Marine Biological Resources and Inland Waters, HCMR)
- Ass. Prof. L. Kokokiris (Department of Nutritional Sciences & Dietetics, International Hellenic University)
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- Prof. S. Antonopoulou (Department of Science of Nutrition-Dietetics, Harokopio University)

Description:

Fish are an important part of the human diet as it provides many essential nutrients. However, these health benefits may be compromised by the presence of toxic metals and metalloids, which can have harmful effects on humans if present at elevated concentrations. Until today, only the total concentration of some toxic elements is regulated and there is limited specific legislation on metal species levels. It has become apparent, however, that this is no longer a valid approach as it has been shown that different species of the same metal (As, Hg) may exhibit vastly different chemical and/or toxicological properties. In addition, biological, environmental and seasonal factors may influence the presence and formation of different forms of metal species in fish. Hence, the aims of MetaFRisks are (i) to investigate the metal speciation in Greek fisheries (wild and farmed fish) and

(ii) to find the factors that may affect metal species transformations, in order (iii) to make more reliable assessments of human health risks and benefits from fish consumption.

In this study, we will:

1. optimize and validate advanced metal speciation methods for the detection and quantitation of a wide range of metal species present in the marine environment (fish muscle, seawater and sediment),

2. study the influence of some biological (fish species type, size, protein/lipid content) and environmental (location, habitat) parameters on elemental speciation in the muscle of wild fish,

3. determine the effect of harvesting season, temperature and substrata type on the elemental speciation in the muscle of farmed fish,

4. assess the health risks and benefits for Greek populations from the consumption of fish (wild, farmed) based on actual metal species and levels present.

To the best of our knowledge the proposed study will be the first to determine such an extensive range of metal species in wild and farmed fish from the Greek sea area, and to evaluate their human health risks and benefits.