

## 378/110. BIOACCESSIBILITY OF METALS IN SEAFOOD: RISK TO HUMAN HEALTH

<sup>(1)</sup>Dos Santos Fogaca, F., <sup>(2)</sup>Alves, R., <sup>(3)</sup>Barbosa, V., <sup>(3)</sup>Maulvault, A., <sup>(3)</sup>Anacleto, P., <sup>(3)</sup>Camacho, C., <sup>(3)</sup>Bandarra, N., <sup>(3)</sup>Marques, A.

<sup>(1)</sup>Brazilian Agricultural Research Corporation. Rio de Janeiro. Brazil., <sup>(2)</sup>Division of Aquaculture and Upgrading (DivAV). Portuguese Institute for the Sea and Atmosphere. Lisbon. Portugal / Red Sea Research Center. King Abdullah University of Science and Technology. Thuwal. Kingdom of Saudi Arabia., <sup>(3)</sup>Division of Aquaculture and Upgrading (DivAV). Portuguese Institute for the Sea and Atmosphere. Lisbon. Portugal.

### Introduction

Despite its well known nutritional attributes, seafood consumption can potentially represent human health hazards, as these species can often accumulate toxic elements namely as mercury, cadmium, lead and arsenic. In toxicological studies, the overall concentration of metals determined does not always reflect the amount that becomes available for absorption at the human intestinal epithelium during the digestive process, also defined as bioaccessibility. The inclusion of bioaccessibility in risk/benefit assessment provides more realistic estimates of metals ingestion through seafood consumption.

### Objective

The present study aimed to assess the bioaccessibility of mercury, cadmium, lead and arsenic in five seafood species of high commercial value in European countries, using an in vitro digestion model, as well as to evaluate the risks associated with fish consumption, using the Target Hazard Quotient (THQ).

### Methodology

As, Cd, and Pb levels were measured by ICP-MS, and mercury was determined via cold vapor atomic absorption spectrometry. The simulated gastrointestinal digestion was used three distinct phases (saliva; gastric juice; duodenal juice and bile digestion).

### Main findings

Results indicate a large variability at initial samples concentrations for arsenic: 0.59 mg kg<sup>-1</sup> for seaweed; 0.69 mg kg<sup>-1</sup> for trout; 1.60 mg kg<sup>-1</sup> for clams; 1.3 mg kg<sup>-1</sup> for shrimp and 3.64 mg kg<sup>-1</sup> for sardine. Conversely, mercury (0.01–0.18 mg kg<sup>-1</sup>), cadmium (0.01–0.45 mg kg<sup>-1</sup>) and lead (0.01–0.40 mg kg<sup>-1</sup>) showed a lower interspecies variability. The highest bioaccessibility values were determined for arsenic in sardine and trout (73%); for lead in algae and clams (65%) and for mercury in trout (66%). Cadmium bioaccessibility was very low (<35%) in all samples. However, due to the low initial concentration of these elements, none of the evaluated specimens had As, Cd, Hg and Pb THQ values higher than 1.

### Conclusion

These THQ values were further decreased when metal's bioaccessibility data was integrated.

### Key words

Consumption, in vitro digestion, Target Hazard Quotient.