

KeywordsMetals, ICP-MS, Mussels,
Maximum Levels, Tolerable
intakes**CORRESPONDING AUTHOR****Federica Ceriani**
federica.ceriani@unimi.it**JOURNAL HOME PAGE**riviste.unimi.it/index.php/hafUNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI SCIENZE VETERINARIE
PER LA SALUTE, LA PRODUZIONE ANIMALE
E LA SICUREZZA ALIMENTARE

Metals in mussels from Italian mollusc culture plants

Federica Ceriani^{1*}, Luca Maria Chiesa¹, Sara Panseri¹, Francesco Arioli¹¹University of Milan, Department of Health, Animal Science and Food Safety, Italy

Abstract

The beneficial effects on human health of seafood are well known. However, seafood is a major source of exposition for consumers of most of the contaminants due to human activities such as breeding, industries, mining and agriculture: the overall level in biota, therefore seafood and particularly molluscs, dramatically increased over this last two centuries (Mozaffarian and Rimm, 2016). This study evaluates the presence of Cadmium, Lead, Mercury, Arsenic, Nickel and Chromium in mussels from the Italian mussel culture plants, and estimates the risk that Italian consumer undergoes eating these molluscs. A total of 30 mussel samples was collected at the wholesale fish market of Milan. The fishing area of origin were 37 FAO marine area (corresponding to Mediterranean Sea), particularly from FAO 37.2.1 Liguria, 37.2.2. North Adriatic, middle Adriatic, Puglia, 37.2.3 Lazio and Sardinia, and were collected from July 2016 to February 2017. (Fig.1). The analyses were done by using an Inductively Coupled Plasma Mass Spectrometer (ICP-MS), according to the Environmental Protection Agency (EPA) 3050B method. The concentrations (mg kg⁻¹ wet weight) were shown as 25th, 50th (median), 75th and 100th (maximum concentration) percentiles. The sample concentrations were below the Maximum Levels (MLs) given by Commission Regulation (EC) No 1881/2006 (European Union, 2006) for Cadmium (0,15; 0,23; 0,08; 2,13 mg kg⁻¹), Lead (0,14; 0,20; 0,32; 0,79mg kg⁻¹) and Mercury (0,02; 0,03; 0,04; 0,16 mg kg⁻¹), except one sample from south Adriatic sea, that showed Mercury concentration of 0.528 mg kg⁻¹. Arsenic, Nickel and Chromium MLs are not stated by EU. Arsenic concentration was 4,00; 4,73; 5,58; 13,36 mg kg⁻¹ and Nickel 0,27; 0,43; 0,69; 3,98 mg kg⁻¹. Chromium was found only in 5 of 30 samples analysed with a concentration 0,00; 0,00; 0,00; 0,64 mg kg⁻¹. Based on the tolerable intakes by EFSA (EFSA, 2014a, 2014b, 2015) and MLs by EU, Italian mussels do not pose a risk consumers.

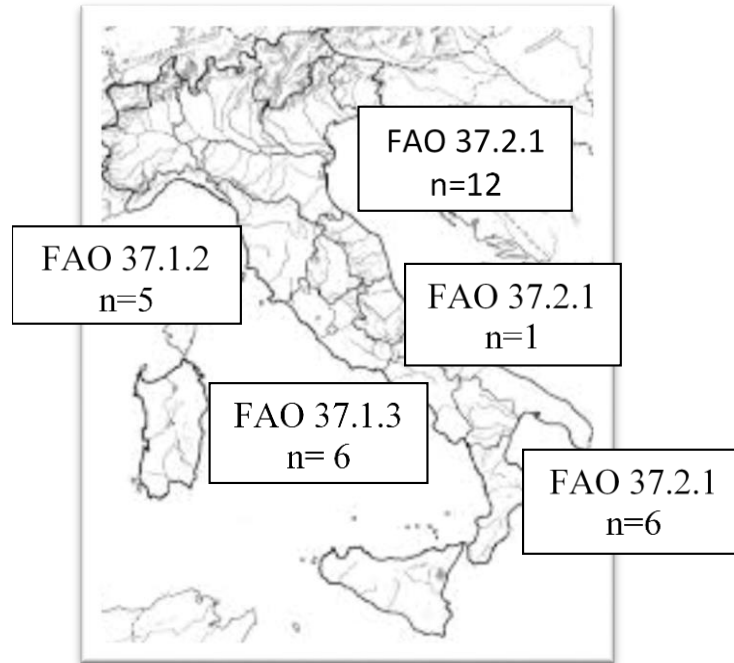


Fig.1: Origin FAO areas of mussel samples
FAO 37.2.1 Liguria, 37.2.2. North Adriatic, middle Adriatic, Puglia, 37.2.3 Lazio and Sardinia; n=number of samples.

References

- EFSA, 2014a. Dietary exposure to inorganic arsenic in the European population. *EFSA J.*, 12, 3597-3658.
- EFSA, 2014b. Scientific Opinion on the risks to public health related to the presence of chromium in food and drinking water¹. *EFSA J.*, 9, 11-25.
- EFSA, 2015. Scientific Opinion on the risks to public health related to the presence of nickel in food and drinking water. *EFSA J.*, 13, 4002-4203.
- European Union (2006) Commission Regulation (EC) NO. 1881/2006 setting maximum levels for certain contaminants in foodstuffs. *O.J.E.U.*, L 364, 5-24.
- Mozaffarian, D., Rimm, E.B., 2006. Fish intake, contaminants, and human health: evaluating the Risks and the Benefits. *JAMA*, 296, 1885-1899.