

Science for Environment Policy

Low toxic heavy metal risk for the average Spanish consumer of seafood

A new study assessing the levels, and potential health risk, of toxic heavy metals in market-bought fish and shellfish in Spain has found that they are generally below European Commission regulatory limits, and that these products are therefore safe to eat for the average consumer in Spain. However, for high level consumers of specific fish species, toxic element levels could pose a risk to health.

Human activities, in the form of industry, agriculture and mining, have added to naturally-occurring sources of [heavy metals](#), such as copper, manganese and mercury, in the environment, including in water and sediments in marine ecosystems. Marine organisms, such as fish and shellfish, can accumulate these heavy metals in their bodies to potentially toxic levels.

Fish are considered to be an important part of a well-balanced diet, providing a range of beneficial nutrients including proteins, vitamins, and omega-3 fatty acids. However, diet is considered the main route of human exposure to heavy metals which can be toxic in larger amounts. For this reason, maximum safe levels of heavy metals in fish and shellfish were established through the European Commission regulation which sets optimum levels for certain contaminants in foodstuffs¹.

To assess toxic heavy metal exposure through consuming fish and shellfish species, the researchers collected a total of 485 samples, representing the 43 most commonly consumed species, from Granada, Spain. Fresh and frozen fish were sourced from the central market, while canned species were sourced from local major supermarkets. Levels of heavy metals were estimated for each of the samples using 'atomic absorption spectroscopy', a common technique for identifying different elements based on the unique light absorbency of each element.

In general, all heavy metals were below established EC regulation limits, with the exception of lead in frozen sole, which had median levels of 0.544 mg/kg, well above the legal limit of 0.3 mg/kg. Predatory fish, such as tuna and swordfish, had higher levels of mercury at 0.47 and 0.054 mg/kg respectively, but below maximum regulatory levels of 1 mg/kg. While also well below regulatory limits, cadmium (limit of 1mg/kg) was observed to be higher in shellfish, such as canned clams (0.244 mg/kg) and mussels (0.208 mg/kg). No regulatory levels of arsenic have yet been set; however, this was typically highest in crustaceans, such as fresh shrimp (0.739 mg/kg).

Information on average levels of seafood consumption was taken from the Spanish National Survey on Dietary Intake², which identifies the average daily intake in grams per person for a range of food products. The study concludes that fish and shellfish products were safe for the average consumer in Spain, while also bearing in mind that seafood consumption is typically higher here than in most other European countries.

However, the study could not rule out potential risks for consumers who eat more than average quantities of specific species, such as sole or swordfish. Its results are similar to those found in other national and international studies of heavy metals in fish and shellfish and, in general, are encouraging as they indicate that seafood products, eaten as part of a balanced diet, are safe for the average consumer. They also reinforce the public health message of healthy balance in diet, by highlighting the risk of consuming certain fish species excessively or by more at-risk individuals, such as children and pregnant women.



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1. EC No.1881/2006, amended by EC No. 629/2008 and EC No. 420/2011. See: http://europa.eu/legislation_summaries/food_safety/contaminations_environmental_factors/l21290_en.htm

2. Agencia Española de Seguridad Alimentaria y Nutrición (2011). *Encuesta Nacional de Ingesta Dietética Española (ENIDE)*. Available online at: www.aesan.msssi.gob.es/AESAN/docs/docs/evaluacion_riesgos/datos_consumo/ENIDE.pdf [in Spanish]