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Mercury concentrations in diverse lean fish species of the western Mediterranean

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The Mediterranean Sea is a water body in which the concentration of mercury is much higher than in the other world seas and oceans. Most inputs of this metal originate from the general atmospheric fallout. However, in this semi-enclosed environment there are specific sources that should be identified to understand the causes of the high toxicity by this metal. A significant proportion of Mediterranean fish devoted to human consumption is above the mercury threshold set by the European Community as suitable for human consumption. The proportion is even much larger if the recommended World Health Organization threshold is considered.

Oily fish is known for containing mercury concentrations above these thresholds. Lean fish has been investigated in much fewer cases. The present study is devoted to this second fish type that constitutes a substantial component of human diet. Thus, the study of mercury and methylmercury in fish from local fishermen marketed in diverse Mediterranean sites has provided information on the exposure of diverse populations to this metal and has afforded a description of the Mediterranean areas that have received highest mercury spills.

1350 commercial seafood samples from the Western Mediterranean Sea were collected (Feb 2014-July 2019) in several sites such as Mallorca, Menorca, Eivissa, Alacant (Spain), Marseille (France), Genoa, Alguer, Civitavecchia (Italy). Samples from Egypt and the Atlantic Ocean (Senegal, Mauritania coasts) were also taken for comparison. Fish species were selected considering the most consumed by the population.

Comparison of the mercury concentrations in the specimens of the same fish species collected at different sites revealed where are the hot spots of introduction of the excess of this metal in comparison to the atmospheric fallout and allowed the identification of the source processes.

The fish species were grouped in three trophic levels, those feeding on plankton (first), on small fish and crustaceans (second) and on fish and cephalopods (third).

A considerable number of the analyzed fish species exceeded the maximum levels proposed by the European legislation, such as dusky grouper (100% of the examined specimens), common dentex (65%), conger (45%), common sole (38%), hake (26%) and angler (15%), among others. Representation of the Hg concentrations vs. weight of each specimen from the third trophic level

showed a significant positive correlation, $r = 0.78$ ($p < 0.01$).

The average THg intake due to fish consumption, $0.61 \mu\text{g/g ww}$, involved Hg estimated weekly intakes of $5.7 \mu\text{g/kg bw}$ for children aged 7-12 years and $4.4 \mu\text{g/kg bw}$ for adults. These values were higher than the provisional tolerable weekly intakes for total Hg intake recommended by FAO/WHO, $4 \mu\text{g/kg bw}$, 140% and 110%, respectively.