

## **Mercury speciation in fish tissue from a regional market in Mexico, City. A human health risk assessment.**

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Methylmercury (MeHg) is a potent neurotoxin that attacks the central nervous system as its primary target. When ingested, it tends to bioaccumulate and biomagnify throughout the food chain until it affects human health. The general population is exposed to MeHg mainly through the ingestion of fish and shellfish with high mercury (Hg) content, but also through the ingestion of other products contaminated with this metal. Derived from the concern of the involuntary intake of Hg by contaminated food products, each government has established the Maximum Permissible Limits (MLP) for several products, mainly those from the sea. The FAO/WHO committee has suggested an MPL of  $1.0 \text{ ug}\cdot\text{g}^{-1}$  MeHg in fish tissue for predatory species and  $0.5 \text{ ug}\cdot\text{g}^{-1}$  MeHg for fish products in general, which have been adopted in countries of North America, Europe, and Asia (Mexico included). There are various studies worldwide and some in Mexico, estimating the health risk under the methodology proposed by the EPA (HQ) derived from the intake of seafood, using the total concentration of Hg ( $\text{Hg}_{\text{Tot}}$ ), but considering the EPA intake recommended dose for MeHg, this is mainly because the recommended intake dose for Hg has not been established by EPA and because the simultaneous speciation of mercury ( $\text{MeHg}/\text{Hg}_{\text{Tot}}$ ) has always been an analytical challenge. Nevertheless, estimating the risk to health using the total concentration of Hg may lead to an incorrect estimate of the human health risk. Thus, the present study had the following objectives: i) Compare the  $\text{Hg}_{\text{Tot}}$  concentrations analyzed by Q-ICP-MS versus the ratio of  $\text{MeHg}/\text{Hg}_{\text{Tot}}$  analyzed by speciation with Liquid Chromatography coupled to ICP-MS (HPLC-ICP-MS); ii) Determine the ratio  $\text{MeHg}/\text{Hg}_{\text{Tot}}$  in three species of fish with the highest consumption in Mexico purchased in the central market of Mexico City and compare them with what is reported worldwide; iii) Compare the MeHg values in fish tissue with the national and international MLP and; iv) Calculate the health risk (HQ) derived from exposure to fish with mercury based on the concentrations calculated by both methods (ICP-MS and HPLC-ICP-MS) and compare it with the risk calculated by other authors using the total mercury concentration.