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Low mercury, cadmium and lead concentrations in tuna products from the eastern Pacific region

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reavy metals such as mercury, cadmium and lead are bio-accumulated by pelagic fish like tuna and could reach levels $\mathbf 1$ considered as potentially toxic to humans. Bio-accumulation is proportional to age of fish; the older it is the higher the possibility to find increased concentration of these elements, whose sources are basically dissolved and inorganic forms in the water column which in turn are introduced via aeolian dust (sand, ashes from volcanic eruption and anthropogenic activities), coastal erosion and riverine pathways. These elements are determined as normal innocuousness of quality control, before food is sold. Tuna products mainly canned either in water or oil are analyzed as part of the quality control by the National Fisheries Institute of Ecuador. From 2009 to 2016, 2572 samples have been analyzed (by standard methods) for mercury, cadmium and lead. The averages were 0.24±0.14; 0.03±0.03 and 0.05±0.05 mg/kg (wet weight) respectively; which are well below the norms; i.e., mercury (methylmercury): 1 mg/kg; lead: 0.3 mg/kg and cadmium: 0.1 mg/kg according to the European Union maximum limits. Additionally; randomly taken samples from local vendor benches gave concentrations of: mercury: 0.043±0.004 mg/ kg; cadmium: 0.012 ± 0.002 mg/kg; lead: below detection limit (0.01 mg/kg). There have been few cases of near or just over limit concentrations, but statistically can be considered as statistical outliers. Apart from this, experience has shown that when close or above the limit values are found, there have been analytical issues, as crossed contamination during analysis resulting in a potential problem. Analysis on raw fish show similar lower concentrations. Tuna canned products from Ecuador can be considered much safer to be consumed from the point of view of these metal concentrations. Most, if not all the processed tuna in Ecuador is captured in the eastern Pacific and within its EEZ (Exclusive Economic Zone). There was found very low concentrations of these metals in the water column of the equatorial eastern Pacific; these concentrations are in the order of a few ng kg-1. Ecuadorian canned tuna complies with astringent consumption safe limits of the studied metals. However, further studies should assess metal concentrations exclusively from Ecuadorian tuna captured close to coastal areas; continental and insular Ecuador. Ideally, it would be recommendable to analyze the impact the use of brine (20-25% concentration), to freeze tuna fish, when certain badly-managed operation occurs during the first step of freezing on board.

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