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Risk-benefit analysis of heavy metals and fatty acids in selected food fish of Sri Lanka

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Beneficial effects on human health by consumption of omega-3 fatty acids may be challenged by the presence of heavy metals (HMs) in fish. This study focused on comparing fatty acid composition (FAC) and HMs in fish lipids (FL) of twenty-seven fish species (N=2) from Trincomalee and quantitative estimation of the risk -benefit. FLs were extracted using Bligh and Dyer method, whereas FAC and HM (As, Cd, Pb & Hg) contents were determined by gas chromatography-mass spectrometry and inductively coupled plasma-mass spectrophotometry respectively. The FL content varied over a wide range (0.291% to 8.191% wet weight) in *Istiophorus platypterus* (N1) and *Nemapteryx caelata* (N1). Eicosapentaenoic acid (EPA)+ docosahexaenoic acid (DHA) was highest in *Amblygaster sirm* (355.606 mg/g of oil, 39.031 mg/g wet weight). The lowest level of EPA + DHA was accounted for *Rastrelliger kanagurta* (20 mg/g of oil) and *Carangoides fulvoguttatus* (3.956 mg/g of wet weight). The highest level of As, Cd, Pb and Hg were found in *Balistoides viridescens* (N1), *Epinephelus malabaricus* (N1), *Istiophorus platypterus* (N1) and *Epinephelus malabaricus* (N2) (28.060 ± 1.397, 0.124 ± 0.016, 2.355 ± 0.096 and 0.101 ± 0.007 mg/kg of FL respectively) whereas, *Nemapteryx caelata* (N1) accounted for the lowest As and Cd level (2.169 ± 0.062 and 0.001 ± 0.000 mg/kg of FL respectively). *Nemapteryx caelata* (N2) and *Chanos chanos* (N1) reported the lowest Pb and Hg level (0.118 ± 0.027 and 0.001 ± 0.000 mg/kg of FL respectively). Hazard quotient (HQEFA) for As was higher than 1 in *Katsuwonus pelamis* and *Nemapteryx caelata*, While *Sphyraena sp.* showed HQEFA > 1 for Cd. All species showed HQEFA < 1 for Pb and 5 species exceeded HQEFA value 1 for Hg. In conclusion, HQEFA > 1 means the risk indicating that some studied species are associated with the risk for consumers.

Keywords: Omega-3 polyunsaturated fatty acids (PUFA); EPA; DHA; Heavy metals; Risk-benefit ratio

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