Abstract No: BO-18

Heavy metal levels *in Chanos chanos* (Milk fish) from Negombo estuary, Sri Lanka and human health risk assessment associated with their consumption

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Contamination of fish with toxic heavy metals can counteract the nutritional and health benefits of fish food on human health. Objectives of this study were to determine selected heavy metals levels viz. Aluminum (Al), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Nickel (Ni) and Zinc (Zn) in edible fish, *Chanos chanos* (Milk fish) from Negombo estuary and assess potential human health risks associated with their consumption. Muscle and liver of freshly captured *C. chanos* (n=20) from the estuary in 2018 were used for metal analysis. Metal levels were determined by Atomic absorption spectroscopy (graphite furnace method) following microwave digestion using standard analytical chemistry techniques. Two certified reference materials for trace metals were used to check the recovery of the metals based on the analytical method used in this study and recovery percentages were within a satisfactory range. Potential human health risks associated with the dietary exposure to these heavy metals through fish consumption were assessed using multiple approaches by comparing the thresholds viz. Maximum Permissible limit (MPL), Tolerable Daily Intake (TDI) and Target Hazard Quotient (THQ) stipulated by international food standards regulatory authorities. Of the seven heavy metals measured, mean metal concentrations in *C. chanos* followed the decreasing order, Zn≈Al>Pb≈Cr>Cd>Ni≈Cu in muscle and Zn≈ Cu > Al≈ Cd>Cr≈ Ni> Pb in liver respectively. Concentrations of Cr and Pb in the edible muscle were significantly greater ($P < 0.05$) than those in the liver of the fish. Human health risk assessment indicated that the detected concentrations of the heavy metals in the edible muscle of the fish were below the MPLs stipulated by international food regulatory authorities except for Cd in 35% of the fish (range 0.06 - 0.08 mg/kg wet weight). Based on mean metal concentrations in the fish muscle, estimated daily intake values for moderate level fish consumers were below the corresponding TDI levels suggested by the food regulatory authorities. THQs for respective metals in the fish muscle were greater than the threshold value of one for Cd (1.5) and Pb (1.7) indicating potential human health risks associated with these metals in edible muscle for non-carcinogenic effects. However estimated maximum allowable fish consumption rates are high enough to safeguard the risks associated with Cd and Pb for moderate level consumers. The results revealed that it is unlikely that the measured seven heavy metals in *C. chanos* would pose non-carcinogenic health risks to the moderate level fish consumers.

Keywords: Heavy metals, Human health risks, *Chanos chanos*, Bioaccumulation