

TOTAL ARSENIC AND ARSENIC SPECIES IN SELECTED MARINE FOOD FISH BY HPLC-ICP-MS AND ASSESSMENT OF TOXICITY

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The toxicity of Arsenic (As) is mainly dependent on the As species and oxidation status. Thus, the total As concentration does not provide accurate information about the toxicity in the matrix. The objective of the present study was to assess the actual toxicity of As species in selected marine food fish to ensure safety for human consumption. Ten species (n=3 per each) of fish were collected from the Trincomalee fish market, and total As in fish muscles was determined using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) after microwave digestion. Arsenic species were selectively separated and determined using High-Performance Liquid Chromatography (HPLC) hyphenated to ICP-MS following water bath extraction with 30 mmol dm⁻³ nitric acids. An anion exchange column was used for the separation of the five As species, including arsenobetaine (AsB), arsenite (AsIII), arsenate (AsV), monomethylarsonic acid (MMA), and dimethylarsinic acid (DMA) with 1 mL/min isocratic elution (run time-12 min) of 10 mM Ammonium phosphate (pH - 8.6) as the mobile phase. The employed operating conditions for ICP-MS-HPLC successfully separated and consecutively eluted AsB, AsIII, and AsV in all samples. The level of total Arsenic in the present study varied from a minimum of 0.547±0.038 mg/kg in *Carangoides fulvoguttatus* to a maximum of 13.403±1.075 mg/kg in *Nemapteryx caelata*. In all the species studied, the predominant As the compound was AsB which accounted for 83.2 to 99.4% of the total As ranging from 0.473-13.323 mg/kg. AsIII and AsV were found at low levels, whereas MMA and DMA contents were not detected in any sample. The concentration of inorganic As (sum of AsIII + AsV) ranged from 0.007 (*Carangoides fulvoguttatus*) to 0.040 (*Nemapteryx caelata*) mg/kg. Inorganic As concentrations in all the studied fish species were below the maximum admissible limit 2 mg (inorganic As)/kg, indicating that the species tested are safe for human consumption in terms of inorganic As.

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