

**HEAVY METAL CONTAMINATION AND HUMAN HEALTH RISK  
ASSESSMENT IN FISH SAMPLES**

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## ABSTRACT

### HEAVY METAL CONTAMINATION AND HUMAN HEALTH RISK ASSESSMENT IN FISH SAMPLES

The growing industrialization and anthropogenic activities have led to the release of heavy metals into aquatic ecosystems which posing adverse effects to both environmental and public health. This study aimed to investigate the levels of heavy metal contamination in fish samples, to compare the concentration with a standard guideline, and to assess the associated human health risks through the consumption. Nine fish species, *Spratelloides gracilis*, *Decapterus macarellus*, *Nemipterus japonicus*, *Atule mate*, *Selar crumenophthalmus*, *Epinephelinae*, *Euthynnus affinis*, *Rastrelliger kanagurta*, and *Selaroides leptolepis* were collected from main local fisheries, Fisheries Development Authority of Malaysia (LKIM) Kuantan, Pahang. The essential and toxic heavy metals, namely copper (Cu), iron (Fe), zinc (Zn), arsenic (As), cadmium (Cd), and lead (Pb) were undergoes wet acid digestion and analyzed using analytical techniques, Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The hierarchy of the concentration of heavy metal in fish samples is  $Fe > Zn > Cu > Pb > As > Cd$ . The concentration heavy metals in fish samples were compared with permissible limit set by World Health Organization (WHO), Food and Agriculture Organization (FAO), and Malaysia Food Act and Regulation (MFA). The results showed that some of the fish samples had higher concentrations of these heavy metals in the fish tissues, which exceeding permissible limits. A human health risk assessment was carried out using Estimated Daily Intake (EDI) and Target Hazard Quotient (THQ) formulas to evaluate the possible risk associated with the consumption of contaminated fish. Therefore, public awareness initiatives are recommended to educate communities about the potential health risks associated with consuming contaminated fish. Overall, this research highlights the urgency of implementing proactive measures to reduce heavy metal exposure, safeguarding both environmental and human well-being.