

Title: Applied Hypothetical Scenarios to Estimate the Human Risk of U-238 in *Leiognathus* sp. and *Portunus sanguinolentus* from Madras Nuclear Power Plant Zone, India

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Abstract: The present investigation was set as a database study that estimated the bioaccumulation and potential human health risks of Uranium 238 (U-238) when consuming *Leiognathus* sp. and *Portunus sanguinolentus* from the Madras Atomic Power Station (MAPS) zone, India. In the study, two hypothetical scenarios were applied. The study applied two hypothetical scenarios about the consumption of those fish and crab, to calculate the values of some important pollution and human risk assessment indices, such as eEnrichment factor, bBioaccumulation factor, eEstimated daily intake, dDaily intake of radioactivity, cCommitted effective dose, lLifetime cancer risk, hHazard, and rRisk quotient. The results showed that the study area has a moderate enrichment of U-238 ($2 < EF < 5$) during all seasons; furthermore, *Leiognathus* sp. and *P. sanguinolentus* are hyper-accumulators ($BAF > 10.0$) from seawater. The finding of this study demonstrates that, in light of the hypothetical 1st and 2nd scenarios, the index values were below the limit set, hence there is no radiation/chemical risk from the consumption of *Leiognathus* sp. and *P. sanguinolentus* as a dominant diet from the study area.

Keywords: Radioactivity , Nuclear power plant , U-238 , Bioaccumulation , LCR , Human risk assessment

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