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Accumulation of Heavy Metals in Farmed Lates calcarifer of a Tropical Coastal Lagoon

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ORIENTAL JOURNAL OF CHEMISTRY
 Volume: 35 Issue: 3 Pages: 1187-1194
 DOI: 10.13005/ojc/350339
 Published: 2019
 Document Type: Article

Abstract

Heavy metals content in seafood, especially fish species has been of increasing concern to the human health. Nowadays, with increasing dependency towards farmed fish for sources of dietary protein and essential minerals, this heavy metals contamination in fishes are still questionable. This study aimed to investigate the accumulation of heavy metals in farmed fish, Lates calcarifer different organs from Setiu tropical coastal lagoon, Terengganu, Malaysia throughout its out-growing phase in the farm from the fingerling release up to their marketable size. Selected heavy metals namely Cu (Max:291.5 +/- 99.31), Zn (Max: 84.89 +/- 12.76), As (Max: 26.01 +/- 5.170), Cd (Max: 1.634 +/- 0.014), Hg (Max: 0.165 +/- 0.029) and Pb (Max: 0.634 +/- 0.550) in the fish was analyzed using ICP-MS after Teflon bomb closed digestion. The metal accumulation in each organ were generally found in the order of liver > gill > muscle. The concentrations of Cd and Zn in the liver were found to increase with fish size in each organ based on the association found in the principal component analysis (PCA). Meanwhile the overall findings observed negative correlation with L. calcarifer growth in fish size for all other heavy metals and organs. The amount of As in the fish muscle throughout its growth can be potentially harmful to humans with the highest averaged concentration at 3.29 +/- 0.65 mg/kg dw above the standard set by the Malaysian Food Regulation (1985) of more than 1 mg/kg. Meanwhile, all the other heavy metals were relatively safe and the concentrations well below the standard set by both national and international guidelines.

Keywords

Author Keywords: Heavy metals; Farmed Later calcarifer; Tropical coastal lagoon; Human health risk

KeyWords Plus: TRACE-ELEMENTS; FISH; WATER; SIZE; TERENGGANU; SPECIATION; MERCURY; ORGANS; LEAD; BIOACCUMULATION

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Funding

Funding Agency	Grant Number
Ministry of Education Malaysia, under the Niche Area Research Grant Scheme (NRGS)	53131

[View funding text](#)

Publisher

ORIENTAL SCIENTIFIC PUBL CO, PO BOX 35, GPO, BHOPAL, 462 001, INDIA

Categories / Classification

Research Areas: Biochemistry & Molecular Biology; Chemistry

Web of Science Categories: Biochemistry & Molecular Biology; Chemistry, Multidisciplinary

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