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Fish Scales as a Bioindicator of Potential Marine Pollutants and Carcinogens in Asian Sea Bass and Red Tilapia within the Coastal Waters of Pahang, Malaysia (Article)

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Abstract

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Rahman, S. A .; Abdullah, N. A .; Chowdhury, A .J.K., and Yunus, K., 2018. Fish scales as a bioindicator of potential marine pollutants and carcinogens in Asian sea bass and red tilapia within the coastal waters of Pahang, Malaysia. In : Ashraf, M. A . and Chowdhury, A .J.K. (eds.), Coastal Ecosystem Responses to Human and Climatic Changes throughout Asia. Fish scales are inedible and hence thrown away as industrial waste, which is one of the major sources of pollution in the natural environment. The concept of a sustainable ecosystem, along with the growth of developing countries in the tropics, has made it essential to devise schemes to turn waste products into viable biotechnology materials. This study looked into potential biomaterial safety by investigating the levels of heavy metals and accumulation of potential carcinogens from the marine environment in scales of two brackish water fishes: red tilapia (Oreochromis niloticus) and Asian sea bass (Lates

calcarifer). The closed acid digestion method was used to measure the levels of lead, zinc, copper, and cadmium using the inductively coupled plasma mass spectrometer. Mean concentrations obtained indicated that L. calcarifer scales contained higher levels of the heavy metals, and it was observed that essential metals accumulated at higher concentrations compared to nonessential heavy metals in both fishes. Significant relationships ($p < 0.001$) were found between fish type and heavy metal accumulation for all metals assessed except for lead. Nevertheless, the metal concentrations were still lower than the national and international standard maximum permissible limits for human consumption. Thus, it can be concluded that fish scale waste could be treated as wealth in biotechnological industries for the reduction of toxic materials from waste effluents. © Coastal Education and Research Foundation, Inc. 2018.

Author keywords

Biowaste | heavy metals | Lates calcarifer | Oreochromis niloticus

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Species Index: Lates calcarifer | Oreochromis niloticus | Pisces | Serranidae | Tilapia

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