

Title

Evaluation of toxic heavy metal (Cd, As, Hg, Pb) contamination in shellfish imported from countries with varying levels of industrialization.

Abstract

The bioaccumulation of toxic heavy metals in seafood has drawn increasing concern due to rapid industrial development. As shellfish are one of the favorably imported seafoods in Hong Kong (HK), this study compared the levels of arsenic (As), cadmium (Cd), mercury (Hg), and lead (Pb) in oysters (*Crassostrea* sp.) imported from China and New Zealand, representing countries with different levels of industrialization. Samples were digested using closed-vessel microwave digestion and analyzed by inductively coupled plasma mass spectrometry (ICP-MS). Mean concentrations revealed that Cd and Pb levels were significantly higher ($p \leq 0.05$) in Chinese oysters, whereas As level was significantly higher in New Zealand oysters ($p \leq 0.05$). Hg was undetectable in both sources. All measured concentrations were below HK's maximum permitted concentrations (MPCs), except for Cd in Chinese oysters.

Health risk assessments indicated that the target hazard quotients (THQs) for individual metals, as well as the total THQs (TTHQs), exceeded 1 in both sample groups, with Chinese oysters exhibiting significantly higher TTHQs. For carcinogenic risk (CR), the values for As and Cd from both sources surpassed the unacceptable threshold of 10^{-4} , except for Pb. Based on the results, New Zealand oysters were considered safe for consumption according to HK and international standards. The findings suggest a positive correlation between a country's level of industrialization and the contamination of seafood with heavy metals. To minimize health risks, it is recommended to consume oysters imported from less industrialized regions occasionally.

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