Health risk assessment of metal toxicity from the consumption of fish from different water layers: Application of mixture risk assessment method

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Aquaculture is one of the important sources for fish consumption in Taiwan. However, due to urbanization and industrialization, metal contamination problems for fish ponds is a public concerned. This study, therefore, conducted field surveys of fish farming located in the costal area where aquacultures are densely located. Metal content in two cultured fishes, tilapia and milkfish, are examined, and cumulative metal concentrations between these two species with different water layer habitats are compared. By taking coexisting multiple metals toxicity into consideration, assessment of the human health risks on the interaction of metals is evaluated. In terms of human health risks, we used the 95^{th} percentiles of HQ_{add} and HQ_{int} to assess risk on humans. The 95^{th} percentiles of HQ_{add} and HQ_{int} (where binary interaction between metals are excluded and included, respectively) both exceed 1, indicating that consumption of both tilapia and milkfish have potential health risk. However, when interactions between metals were taken into consideration, the modified HQ_{int} was lowered for most metals in this study. This is because most metals have antagonistic effects thus decreasing their original toxicity levels. Therefore in risk assessments of human consumption of cultured fish, binary interactions between metals should be taken into account, and furthermore ensure the accuracy of the risk assessment.