The levels of mercury, methylmercury and selenium and the selenium health benefit value in grey-eel catfish (Plotosus canius) and giant mudskipper (Periophthalmodon schlosseri) from the Strait of Malacca

ABSTRACT

The present study examined the concentrations of mercury (Hg), methylmercury (MeHg), and selenium (Se) in the multiple tissues of the Plotosus canius and Periophthalmodon schlosseri collected from the Strait of Malacca. The mean value in mg kg−1 of Hg (P. canius: 0.34 ± 0.19; P. schlosseri: 0.32 ± 0.18) and MeHg in muscle (P. canius: 0.14 ± 0.11; P. schlosseri: 0.17 ± 0.11) were below the Codex general standard for contaminants and toxins in food and feed (CODEX STAN 193-1995), the Malaysian Food Regulation 1985 and the Japan Food Sanitation Law. For P. canius, the liver contained the highest concentrations of Hg (0.48 ± 0.07 mg kg−1) and MeHg (0.21 ± 0.00 mg kg−1), whereas for P. schlosseri, the gill contained the highest concentrations of Hg (0.36 ± 0.06 mg kg−1) and MeHg (0.21 ± 0.05 mg kg−1). The highest concentration of 80Se (mg kg−1) was observed in the liver of P. canius (20.34 ± 5.68) and in the gastrointestinal tract (3.18 ± 0.42) of P. schlosseri. The selenium:mercury (Se:Hg) molar ratios were above 1 and the positive selenium health benefit value (HBVSe) suggesting the possible protective effects of Se against Hg toxicity. The estimate weekly intakes (EWIs) in μg kg−1 body weight (bw) week−1 of Hg (P. canius: 0.27; P. schlosseri: 0.15) and MeHg (P. canius: 0.11; P. schlosseri: 0.08) were found to be lower than the provisional tolerable weekly intake established by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). Based on the calculated EWIs, P. canius, and P. schlosseri were found to be unlikely to cause mercury toxicity in human consumption.

Keyword: Demersal fish; Food safety; Mercury; Methylmercury; Selenium