Analysis and Investigation of Heavy Metals in Marine Fishes by GFAAS/FLAAS/Hg-AFS in Taiwan

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Abstract

In order to analyze heavy metals in fish samples, a simple and rapid wet digestion method was developed for complete destruction of the marine fish tissue samples, as opposed to the conventional dry-ashing procedures. An atomic absorption spectrometer equipped with Zeeman background correction was used for the determination of heavy metals of Cd, Cr, Cu, Ni, Pb, and Sn. Zn was analyzed by a flame atomic absorption spectrometer. Hg was determined by a mercury atomic fluorescence spectrometer after the microwave digestion pretreatment. The method was evaluated using certified reference materials. The developed method was applied to analyze 100 marine fish samples, including hairtail, porgy, Pacific saury, pomfret, parrotfish, swordfish, tuna, shark, salmon, cod, and other specimens. The results showed that average content of Cd, Cr, Cu, Ni, Pb, Sn, Zn, and Hg was 0.007 mg/g (N.D.~0.067 mg/g), 0.011 mg/g (N.D.~0.082 mg/g), 0.270 mg/g (N.D.~1.954 mg/g), 0.022 mg/g (N.D.~0.112 mg/g), 0.016 mg/g (N.D.~0.087 mg/g), 0.019 mg/g (N.D.~0.330 mg/g), 2.909 mg/g (1.097~6.366 mg/g), and 0.188 mg/g (0.001~1.515 mg/g), respectively.

Key words: heavy metals, graphite furnace atomic absorption spectrophotometer (GFAAS), flame atomic absorption spectrophotometer (FLAAS), mercury atomic fluorescence spectrometer (Hg-AFS), fish