Bioaccumulation and Biotransformations of Organic Material-Borne Selenium in Mosquitofish

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Correct determination of dimethylselenoxide by an HPLC-HG-AAS will be helpful to study the mechanisms of Se toxicity in fish and waterfowl.

Formation of superoxides and oxides such as dimethylselenoxide (DMSeO) from oxidative reactions of methanselenol (CH_3SeH) and dimethylselenide [$(CH_3)_2Se$] is one of the important mechanisms causing Se toxicity in fish and waterfowl. Because of a lack of analytical methods for directly measuring the superoxides and oxides, the mechanisms responsible for causing deformity of fish and waterfowl have not been studied in detail. In this study, a high performance liquid chromatography and hydride generation atomic absorption spectrometry (HPLC-HG-AAS) system has been used to directly measure DMSeO in solution. An HPLC was used to separate DMSeO with other HG-active Se compounds such as selenomethionine (Semet) and selenite [Se(IV)], and an optimum concentration of $NaHB_4$ and HCl was used in the HG system to maximally increase the DMSeO signal and decrease interferences from other HG-active Se species, and AAS was used to determine it. A detection limit of DMSeO was <5 µg/L. Recovery of spiked DMSeO in drainage water was close to 100%. This new method will be helpful to study the mechanisms of Se toxicity in fish and waterfowl.

Publications

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