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Postgraduate Education and Research Program in Chemistry
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Abstracts

ENVIRONMENTAL MODELING OF PAHS IN THE MEKONG RIVER

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Abstract

Monitoring of the Thai Laos Mekong was undertaken for 2 seasons (hot/dry & wet) during 2003. Samples of both water and sediment were analysed from 10 different sampling stations to determine the concentration of 13 Polycyclic aromatic Hydrocarbons (PAHs).

Water samples were analysed by SPE-HPLC using standard additions. The efficiency of the method was evaluated using a PAH reference standard. Sediment samples were extracted with cyclohexane - acetone (3:2), followed by sonification and then analysed by HPLC. The efficiency of the method was evaluated using certified reference sediment material (LGC6188).

The values obtained for water were multiplied by the Bioconcentration Factors (BCF) for each compound, the potential bioaccumulative concentration was then compared to the Chronic Value (ChrV) and Lethal Concentration 50 (LC₅₀) value for fish.

A fugacity model based on the chemical/ physical properties of each compound was assessed. This is indicative of the partitioning of the PAHs into each media and allows for comparative assessment of potential exposure for Pelagic and bottom dwelling fish.

The results show that when Bioconcentration factors are taken into account that the fish chronic values are almost always exceeded and that the LC₅₀ values are often breached. Of more concern is that where measurable the value for Benzo (a) pyrene, a major carcinogen, always exceeded both the ChrV and LC₅₀ values. This has implications in terms of Biomagnification for consumers of fish exposed to these Persistent Organic Pollutants (POPs).

The fugacity model shows that partitioning of PAHs is mainly into the sediment. Bottom dwelling and feeding fish are therefore likely to be exposed to higher concentrations of POPs. Bioaccumulation and biomagnification may be significantly increased for these species and ultimately consumers.

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