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Determination of tributyltin in marine water and sediment in commercial and fishery harbors

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Tributyltin (TBT) is a ubiquitous contaminant in the aquatic environment which used as an active ingredient for biocides, antifouling paints and wood preservatives in industrial sector. According to their high lipophilic strength, TBT accumulate in fat tissues of wild life via the environment food chains. Their high biocides activity leads to impairments and malformations of endocrine system and sex changes in affected aquatic organisms. Leading to collapse of faunal diversity in the aquatic ecosystem. Therefore, monitoring TBT contamination is important to understand the level of contamination in Sri Lanka thus to prepare management protocols to protect aquatic environment. In present study, novel modified method from Solid Phase Micro Extraction (SPME) method was used to extract TBT from the environmental samples and quantification was done using the Gas Chromatography Mass Spectrometry (GC-MS). Water and sediment samples from Colombo, Galle, Hambanthota and Trincomalee commercial harbors and Dikkowita, Beruwala, Ambalangoda, Galle, Mirissa, Dewundara, Kudawella, Hambanthota, Kirinda and Trincomalee fishing harbors were collected (samples were collected from three locations in each site). Results of the study showed that over 60% of the sampling locations were contaminated with TBT and the concentrations were exceeded the threshold concentration given for wildlife and human beings by WHO (5-10 ng/L). TBT concentrations in water collected from commercial and fishery harbors were ranged from 25±4.2 ng/L to 303±7.4 ng/L whereas in sediments those were ranged from 17± 1.4 ng/g to 107±4.1 ng/g respectively. The highest TBT concentration for both water and sediment were recorded in Colombo harbor which is the largest and the busiest port in Sri Lanka. It was found that the TBT concentration in water was greater than the sediment. Thus, ship/boat traffic zones may responsible sources for the TBT input into environment which follow potential exposure to TBT via consumption of TBT contaminated sea foods which pose human health risks as well.

Keywords: Tributyltin (TBT), fishing harbor, sediment, seawater, Solid Phase Micro Extraction (SPME) and biocides

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