

Efficient Tributyltin Extraction Method from Marine Sediment

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Tributyltin (TBT) is one of the most toxic xenobiotic compound in the aquatic environment. It has been widely used as a biocide in antifouling paints to control the growth of marine organisms on submerging surfaces in water. Studies have demonstrated a wide range of negative impacts of TBT on non-target organisms such as shell deformation, developmental retardation and imposex. TBT is quickly removed from the water and adheres to bed sediments due to its high specific gravity. We developed a method to quantify TBT in sediment was developed using Solid Phase Micro Extraction (SPME) technique followed by Gas Chromatography-Mass Spectrometry (GCMS) analysis. Sediment samples were collected from Kirinda, Hikkaduwa, Trincomalee and Mirissa fishing harbors, where boat activities were high. Three samples were collected from each location and were freeze dried and spiked with internal standard of TBT chloride (50 ppb). Distilled water was used as the dissolving solvent and mixture was sonicated for 2 hours prior to being centrifuged. Hybridization process was followed by absorption of TBT hydride into SPME fiber. The samples were analyzed using GCMS in parts per trillion levels. The highest concentration of TBT was recorded in Kirinda harbor (98 ± 3.7 ng/Kg) and following Trincomalee, Hikkaduwa and Mirissa were 63 ± 2.5 ng/Kg, 52 ± 2.8 ng/Kg and 44 ± 2.1 ng/Kg respectively. This is a newly optimized HS/SPME- GCMS method is sensitive and simple; it requires less reagents, reduce waste and is less time consuming. It also gives high precise with excellent recovery value $78 \pm 1.7\%$. Due to the increase in the use of industrial chemicals, it is an important to develop novel techniques to assess their presence in the environment.

Keywords: Tributyltin, sediment, Solid Phase Micro Extraction (SPME), Gas Chromatography Mass Spectrometry (GCMS), Imposex