



Occurrence of 1,4-Dioxane in effluents of municipal wastewater treatment plants in Bangkok, Thailand

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1,4-Dioxane, an emerging organic contaminant and a probable human carcinogen, is a manufacturing by-product that may be present in various personal- and household-care commodities. Intensive use and improper disposal of 1,4-dioxane-containing products result in the contamination of triclosan in wastewater, which may eventually end up in domestic wastewater treatment plants (WWTPs). In this study, we investigated the occurrence of 1,4-dioxane in effluent samples of seven municipal WWTPs in Bangkok, Thailand. Water samples were extracted using Frozen Micro-Extraction method and analyzed for 1,4-dioxane using Gas Chromatography-Mass Spectrometry. The results showed that all effluent samples from all WWTPs contained 1,4-dioxane in the range of 4.34 - 1285.44 micrograms per liter. The load units of 1,4-dioxane in the treated effluents of WWTPs were estimated at 0.54 to 254.95 kilograms 1,4-dioxane per day. Interestingly, 1,4-dioxane concentrations in the effluents were directly proportional to mean monthly rainfall. These results successfully demonstrated that WWTPs in Bangkok received and discharged 1,4-dioxane-containing wastewater throughout the year and the release of treated wastewater may cause the spread of the toxic compound in Bangkok's surface water.

Keywords: Emerging water contaminant; Water pollution; Environmental analysis; Wastewater treatment plants