Analysis of the effectiveness of the Oily Water Separator at removing Polycyclic Aromatic Hydrocarbons from bilge water on the Training Ship State of Maine

Every vessel in the shipping industry creates and discharges bilgewater as part of its regular shipboard operations. Bilgewater can contain particulates, oils, fuels, as well as other pollutants such as polycyclic aromatic hydrocarbons (PAHs). While federal regulations have been put in place to prevent the discharge of oils and fuels in bilge water, no regulations have been placed on PAH content in bilge water discharge even though they are known toxic, mutagenic, and carcinogenic pollutants. This study utilized solid phase extraction to isolate PAHs from bilge water samples taken from the Training Ship State of Maine (TSSOM) during its cruises over the summer of 2021. Three PAHs (phenanthrene, pyrene, and benzo[a]pyrene) were quantified using gas chromatography - mass spectrometry (GC-MS) and compared to PAH concentration regulations in drinking water. All PAH concentrations measured were below the World Health Organization standard of 0.05 ng mL^{-1} as well as the Environmental Protection Agency drinking water standard of 0.2 ng mL^{-1}. These results suggest that bilgewater discharged overboard from the TSSOM during its 2021 cruises contained “safe” concentrations of PAHs.

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