

Source differentiation and weathering characteristics of refined oil products using biomarkers and aromatic sulfur heterocycles contents

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Oil spills or chronic sources is perceived as a serious environmental problem. After the oil spill incident, oils are undergone weathering processes such as dissolution, evaporation, and biodegradation. This study focuses on the distribution of hydrocarbon and the diagnostic ratio of biomarkers, polycyclic aromatic hydrocarbons and polycyclic aromatic sulfur heterocycles (PASH) compounds such as dibenzothiophene during natural long-term weathering (six months), gasoline products during short-term weathering (three days). All samples were characterized by GC-MS and GC-PFPD. Results from the pure-phase oil products experiments indicated that the weathering characteristics of saturated hydrocarbon compounds of diesel oil during hydrodesulfurization is similar. The results from experiments of oil-contaminated wetland after 6-month weathering revealed that significant depletion of n-alkanes (carbon ranged to C13) occurred, thus influencing the content of bicyclic sesquiterpenes (BS1) compounds. Volatilization rate of gasoline is reduced may also result from the incorporation of oil into the wetland in which weathering of oil is slow, and mean the effect on the environment is prolonged. The terpene compounds diagnostic ratio such as $\alpha\beta$ H/ $\alpha\beta$ H and Tri/ Tri was stably present in the soil can be used as indicators to differentiate refined oil products since both of them are strong anti-weathering.

Keywords: Biomarker, Oil spill, Weathering, Aromatic sulfur heterocycles