

Parent and alkylated PAHs profiles in 11 petroleum fuels and lubricants: Application for oil spill accidents in the environment

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Eleven types of petroleum fuels and lubricants including regular gasoline, premium gasoline, jet fuel, kerosene, light oil, bunker A, bunker A–white, bunker A–low sulfur, bunker C, quench oil and lubricant samples were analyzed for parent and alkylated polycyclic aromatic hydrocarbons (PAHs). Naphthalene was the predominant compound in gasolines, jet fuel and kerosene, constituting > 95% of the parent PAHs, whereas dibenzothiophene and other high molecular weight PAHs were predominant in bunker A and bunker C. PAH compositions in petroleum fuels differ because of differences in their refining temperatures and the boiling points of individual PAHs. Principal component analysis classified into four groups of petroleum fuels. Further, oil samples were clearly separated into five groups based on their ratios of select alkyl homologs ($C_0/(C_0+C_1)$ and $C_4/(C_2+C_4)$ naphthalenes): ‘gasolines’ ‘light oil’ ‘bunker oils’ ‘kerosene’ and ‘quench oil’. A wide variety and detailed profiles of PAHs in petroleum fuels and lubricants in this study can be used for baseline data in oil fingerprinting analyses to identify the potential source of oil spill accidents in the environment.