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GASOLINE AND DIESEL AEROBIC BIODEGRADATION INVESTIGATED BY SPECTRAL AND CHEMOMETRICS TECHNIQUES

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Abstract

Cameroon's coast that is located in the Guinea Gulf oil region was exposed to hydrocarbon pollution due to oil exploitations and other petroleum activities. The intrinsic biodegradation of hydrocarbons is essential for the depollution methods of the marine environment. Nevertheless, these do not represent a common practice in Cameroon. This study aimed to assess the capacity of bacteria of Cameroon's waters coast to degrade gasoline and diesel. The kinetic degradation of gasoline and diesel was studied after 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 35 days by Fourier Transform Infrared Spectroscopy with Attenuated Total Reflectance (ATR-FTIR). The analyzed spectrum was between 4000 cm⁻¹ and 400 cm⁻¹ and had revealed important information about the modification of oils components. Chemometric analysis with Partial Least Square (PLS) regression model was used for quantification. The biodegradation took place after 2 days of incubation. The most slow-moving and the weakest rates were observed for hydrocarbon components of gasoline compared to those of diesel. Saturated aliphatic hydrocarbons and saturated cyclic hydrocarbons were the most degraded components of both the pollutants. The concentration of gasoline alkane C-H bending decreased by 66.02% after only one day. The reduction of diesel aromatic monocyclic hydrocarbons had not exceeded 70.45%.

Key words: bacteria, biodegradation, Cameroon's cost water, hydrocarbons, petroleum region

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