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DEGRADATION OF DPLMX RIVER WATER VIA $FeCl_3$ AS CATALYST

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Structured Abstract

Background: This research addresses the critical issue of water pollution in the DPLMX river caused by the waste generated during oleochemicals manufacturing in Telok Panglima Garang. The contamination adversely affects the local population's health due to the river's integration with the residential sewer system. The study aims to degrade the polluted water by employing ferric chloride ($FeCl_3$) as a catalyst for degradation, comparing its efficiency with various concentrations.

Methods: The research methodologies encompass sampling, analysis, experimentation, and characterization. Collection of DPLMX river water samples involves direct retrieval using established techniques like APHA standard method. Firstly, samples are collected from three different sampling point by directly dipping the sampling container into the river. The samples are then stored in a cooled box with ice and transported to the laboratory for analysis. For experimental procedure, the experiments are conducted in a stirred tank reactor. Experimental procedures utilize a stirred tank reactor, employing ferric catalyst and hydrogen peroxide (H_2O_2) to initiate the oxidation process. The water sample is mixed with the 10ml of 0.7M ferric catalyst and 2ml of 30% hydrogen peroxide (H_2O_2). The mixture is stirred for 10 minutes to complete the oxidation process. Characterization involves sample preparation, absorbance measurement, and data analysis to interpret results. For characterization by UV-Vis spectrometer, a sample is prepared by diluting it in a suitable solvent which is distilled water. A blank measurement is taken to account for background effects, and then the absorbance of the sample is measured at the appropriate wavelength range. Data analysis is recorded to interpret the results.

Results: The first water sample exhibited successful degradation (11.28% removal). However, the second and third water samples showed negative removal percentages (-92.11% and -7.85%, respectively), indicating unsuccessful degradation. The addition of ferric chloride during the treatment process facilitates coagulation, contaminant precipitation, organic pollutant degradation, and the removal of color and odors, promising an overall enhancement of DPLMX River Water quality.

Conclusion: This research holds significant importance in mitigating the pollution arising from oleochemicals manufacturing. The treatment methods proposed in this study aim to offer a feasible solution to prevent the adverse effects on human health in the affected region.

Keywords: Water pollution, Oleochemicals manufacturing, Ferric chloride degradation, DPLMX River, Environmental remediation

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