

**ISOTHERM AND KINETIC STUDIES ON OIL
SPILL REMOVAL FROM SEAWATER BY
PKFAD-CHITOSAN COATED MAGNETIC
NANOSORBENTS**

NUR NADIATUL LIYANA BINTI HASSAN

**BACHELOR OF CHEMICAL ENGINEERING
(ENVIRONMENT) WITH HONOURS**

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COATED MAGNETIC NANOSORBENTS**

By

NUR NADIATUL LIYANA BINTI HASSAN

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ABSTRACT

Petrochemical releases and marine oil spills, whether accidental or intentional, can harm an environment and economy of a nation. Aquatic biodiversity faces a threat from oil-contaminated water bodies. The oil pollution may now be removed using innovative methods made possible by nanotechnology. This study was conducted based on objectives to synthesize PKFAD/chitosan-coated magnetic nanosorbents, to determine the adsorption isotherm and kinetics of oil from seawater by PKFAD/chitosan-coated magnetic nanosorbents and to characterize the PKFAD/chitosan-coated magnetic nanosorbents before and after adsorption. A PKFAD-chitosan coated magnetic nanosorbent was synthesized in this study using the co-precipitation method. To characterise the synthesized adsorbent, functional groups, surface area, pore volume, and pore size of the adsorbent were analysed using FT-IR and BET. The magnetic adsorbent was implemented for the adsorptive removal of petroleum-based diesel oil from oil-seawater mixture. Batch adsorption studies were used to study the efficacy of the synthesised nanosorbents and investigate how oil concentration and time affected the adsorption process. From the experimental data, it was found that the adsorption process followed the pseudo second order kinetics ($R^2 = 0.9960$) and Freundlich isotherm ($R^2 = 0.9757$) indicating towards a multilayer chemisorption process. The study serves as the basis for the development of a potential and environmentally friendly material for the treatment of oil from water bodies in environmental clean-up.