SYNTHESIS OF CATECHOL/POLYANILINE/ALGINATE BASED COMPOSITE BEADS FOR REMOVAL OF METHYLENE BLUE DYE

ANIS NAZIRA BINTI ALIZAN

BACHELOR OF CHEMICAL ENGINEERING (ENVIRONMENT) WITH HONOURS

UNIVERSITI TEKNOLOGI MARA

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By

ANIS NAZIRA BINTI ALIZAN

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ABSTRACT

Water pollution due to dyes becomes one of the major environmental issues that effects the organisms and ecosystem. Adsorption as one of the most feasible and successful water treatment methods as it is easy operation, high efficiency, and low cost. The objectives of this study are to synthesis and characterize the Catechol/Polyaniline/Alginate Based Composite Beads at different weight percent of catechol and to evaluate the performances of Catechol/Polyaniline/Alginate Based Composite Beads for the removal of methylene blue (MB) dye. In this study, composite beads of alginate beads, catechol/alginate beads, polyaniline/alginate beads, and catechol/polyaniline/alginate beads with different ratio of catechol were synthesized by cross-linking and used as adsorbents for the removal of methylene blue dye. It is expected that the functional groups found in alginate, catechol and polyaniline are carboxylate, hydroxyl, and amine, respectively. Based on the adsorption capacity and removal efficiency, 4%CAT/PANI/ALG beads has the highest removal efficiency and used as selected adsorbent for isotherm and kinetic study. Based on Langmuir and Freundlich isotherm, 4%CAT/PANI/ALG beads fitted very well with Langmuir isotherm due to the correlation coefficients (R^2) of Langmuir isotherm is higher than Freundlich isotherm. It is indicated that the adsorption of MB dye classified by the adsorption was likely to be monolayer coverage adsorption, which was mostly mediated by site-to-site adsorption mechanisms in a single system. The pseudo-second-order model has higher correlation coefficients than the pseudo-first-order model, implying that the MB dye followed the interaction of adsorbent surface sites was governed by the adsorption rate, and chemical adsorption to occur throughout the adsorption process.