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POLLUTANTS REMOVAL USING ZEOLITE AND SALTWATER CLAMSHELL (*Paratapes textilis*) IN FABRICATED MODEL

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Abstract

The excessive amount of biowaste in landfills has resulted in significant environmental contamination problems. To achieve environmental sustainability and protection of our ecosystem, this study aims to evaluate the adsorption performance of saltwater clamshell (SWCS) and zeolite in reducing the water pollutants expressed as Total Nitrogen (TN), Total Phosphorus (TP), Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD) and total suspended solids (TSS) from river water. The collected natural river water sample was first circulated through the adsorbents in a fabricated model for five consecutive days and each of the water parameters was then tested every day according to APHA standards. The result showed that SWCS had a higher adsorption capacity than zeolite. The adsorption capacity of the SWCS for TSS, TP, TN, COD, and BOD was 6.967 mg/g, 0.310 mg/g, 1.357 mg/g, 3.5 mg/g, and 1.667 mg/g respectively. Whilst zeolite had capacities of 2.51 mg/g, 0.032 mg/g, 0.6377 mg/g, 0.7 mg/g, and 0.4 mg/g respectively. Based on the isotherm analysis, BOD(Zeolite), TSS(Zeolite), COD(Zeolite), TN(Zeolite), BOD(SWCS), TP(SWCS), and TSS(SWCS) showed higher regression ($R^2 > 0.95$) in Langmuir isotherm, while TP(Zeolite), TN(SWCS), and COD(SWCS) had higher regression ($R^2 > 0.88$) in Freundlich isotherm. Additionally, BOD (Zeolite), TP (Zeolite), TSS (Zeolite), and TN(SWCS) demonstrated a higher correlation with the Pseudo-First-Order model. On the other hand, COD(Zeolite), TN(Zeolite), BOD(SWCS), COD(SWCS), TP(SWCS), and TSS(SWCS) fitted well into the Pseudo-second-order model. Overall, this study proved that SWCS and zeolite are viable alternatives for removing organic and nutrient pollutants.

Key words: fabricated model, nutrients, organic matter, saltwater clamshell, zeolite

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