SYNTHESIS AND APPLICATION OF COCAMIDOPROPYL BETAINE (CAPB) MODIFIED ZEOLITE TO REDUCE CHEMICAL OXYGEN DEMAND (COD) LEVEL IN HOUSEHOLD WASTEWATER

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ABSTRACT

Synthesis and application of Cocamidopropyl betaine (CAPB) modified zeolite to reduce COD levels in household wastewater has been carried out. These research purposes are qualitative and quantitative analysis of the interaction of zeolite modified by a surfactant to reduce COD content. This research starts with preparing natural zeolite and activated by a chemical agent. After that, activated zeolite was reacted with CAPB surfactant. The dry samples were analyzed using the Cation Exchangeable Capacity method, Fourier-Transform Infrared (FT-IR), X-Ray Diffraction (XRD), and Scanning Electron Microscope-Energy Dispersive X-Ray (SEM-EDX).

Zeolite modified by using CAPB surfactant has been successfully prepared. This is based on the characterization results using the CEC value of SMZ-CAPB (66.80 meq (100 g) $^{-1}$) decreased from the CEC value of AZ (76.00 meq (100 g) $^{-1}$) and NZ value (78.00 meq (100 g) $^{-1}$). The optimum conditions for reduction of COD value in wastewater on SMZ-CAPB adsorbent weight are 6 g and contact time 90 minutes. Based on pseudo-first-order kinetics, Lagergren obtained the adsorption rate of organic substances is 2.02 x 10^{-2} min^{-1} for Guras WWTP, and the rate of adsorption of Prambanan WWTP is 1.83 x 10^{-2} min^{-1}, and The adsorption capacity of organic substances at equilibrium is 0.391 mmol g^{-1} for Guras WWTP and 0.4175 mmol g^{-1} for Prambanan WWTP. The reduction of COD value in wastewater on SMZ-CAPB follows Pseudo-first order Lagergren Kinetics mechanism adsorption. The application of COD reduction value from artificial wastewater containing using natural zeolite (NZ), Activated Zeolite(AZ) and surfactant-modified zeolite-CAPB (SMZ-CAPB) showed that the reduction efficiency was > 38.78%.
Keywords: Zeolite, CAPB, Adsorption, COD