

APPLICATION BIOCOMPOSITE FROM CHICKEN EGGSHELL AND CRAB SHELL ON METHYL ORANGE (MO) ADSORPTION

ABSTRACT

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Research has been carried out on the application of biocomposites from chicken egg shells and crab shells to the adsorption of methyl orange. Methyl orange contains azo compounds, if the azo compounds are in the environment for too long they will cause shortages in the waters and inhibit photosynthesis. The biocomposite synthesis method from chicken egg shells and crab shells was carried out by mixing sodium sulfide hydrate (Na_2SO_4) and sodium hydroxide (NaOH) which were then stirred using a stirrer, after which it was dried in an oven at $65\text{ }^\circ\text{C}$ for 30 minutes – 1 hour. Biocomposites were characterized using FTIR, XRD and GSA. Characterization using FTIR obtained O-H functional groups; N-H; C-H; C=O; CO_3^{2-} ; C-O; CH_2 ; CH_3 and CaCO_3 . Characterization using XRD was obtained on chicken egg shells having a rhombohedral crystalline phase, and crab shells having a monoclinic crystalline phase. Characterization using GSA obtained a composite surface area of $0.145\text{ m}^2/\text{g}$, pore volume of $0.036\text{ cm}^3/\text{g}$ and pore size of 13.016 nm . The results of the adsorption process were analyzed using a UV-Vis Double Beam Spectrophotometer. The results showed that the optimum MO pH variation was at pH 4 with an adsorption % of 6.09%. Optimum contact time variation on MO is at 30 minutes with % adsorption of 5.82%. The optimum mass variation of MO is 0.05 gram with % adsorption of 4.02%. Variation of the optimum concentration of MO at 40 ppm with % adsorption of 6.58%. The optimum temperature variation of MO at $25\text{ }^\circ\text{C}$ with an adsorption % of 3.74%.

Keywords: methyl orange (MO), chicken eggshell, crab shell, adsorption, characterization.