PENGARUH ASAM LEMAH SEBAGAI PELARUT CaO DALAM SINTESIS HIDROKSIAPATIT DARI CANGKANG KERANG DARAH (*Anadara granosa*) SEBAGAI PENYERAP ZAT WARNA *MALACHITE GREEN*

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ABSTRACT

THE EFFECT OF WEAK ACIDS AS A SOLVENT OF CaO IN THE SYNTHESIS OF HYDROXYAPATITE FROM BLOOD CRUSH SHELLS (*Anadara granosa*) AS AN ABSORBENT OF MALACHITE GREEN DYE

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The dissolution of CaO from blood cockle shells using weak acid solvents has been successfully carried out to synthesize hydroxyapatite (HAp) through the sol-gel method. The variations of weak acids used include acetic acid, ascorbic acid, citric acid, and oxalic acid. Among the four variations, HAp synthesized using citric acid (HAp-citrate) showed the best performance with the highest yield of 28.44% and adsorption efficiency against Malachite Green (MG) dye reaching 90.56%. Fourier Transform Infrared (FTIR) characterization showed that all samples had PO_4^{3-} and OH^- functional groups which are typical groups of HAp. The results of X-Ray Diffraction (XRD) analysis showed the crystallite size of each HAp was 11.91 nm (HAp-acetate), 12.97 nm (HAp-ascorbate), 13.52 nm (HAp-citrate), and 15.35 nm (HAp-oxalate). The morphology of the Scanning Electron Microscopy-Energy Dispersive Spectroscopy (SEM-EDS) results showed irregular particle shapes and agglomeration, with the average particle sizes of HAp-acetate, HAp-ascorbate, HAp-citrate and HAp-oxalate respectively being 1.58; 2.22; 2.07; and 2.96 μm and the Ca/P ratio of each sample was obtained at 1.16; 1.29; 1.38; and 1.31. Surface Area Analyzer (SAA) analysis showed differences in surface area between samples. Adsorption isotherm studies showed that HAp-citrate followed the Freundlich model and pseudo-second-order kinetics. In addition, reusability tests showed that HAp-citrate could be reused up to five cycles without significant decrease in adsorption efficiency. Overall, HAp synthesized using weak acid solvents has high potential as an adsorbent material in efforts to reduce MG dye waste from the environment.

***Keywords**: Hydroxyapatite, Weak acids, Blood clam shell, Adsorption, Malachite green*