Sintesis dan Karakterisasi Graphene Quantum Dot sebagai Zat Antibakteri = Synthesis and Characterization of Graphene Quantum Dot as Antibacterial Substance

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Abstrak

Penelitian ini bertujuan untuk mensintesis Graphene Quantum Dots (GQD) dari grafit komersial dengan metode Hummers, reduksi dan eksfoliasi dengan campuran asam nitrat dan asam sulfat, serta purifikasi dengan dialisis. Dalam penelitian ini, digunakan variabel berupa massa sampel grafena oksida (GO) yang direduksi dan dieksfoliasi, yaitu 0,2 g-0,5 g, dan waktu dialisis, yaitu 4 – 6 hari. Pengujian dalam penelitian ini dilakukan dengan menggunakan FTIR (Fourier Transform Infra Red), UV-Vis (Ultraviolet-visible spectrofotometry), uji anti bakteri, PSA (Particle Size Analyzer), dan TEM (Transmission Electron Microscope). Dalam penelitian ini terkonfirmasi bahwa dihasilkan GQD dengan bentuk orbital trigonal planar yang memiliki ukuran partikel berkisar antara 0,38 nm-20 nm dengan persentase rata-rata 66% dari keseluruhan partikel yang dihasilkan. Kemampuan antibakteri hanya dimiliki oleh GQD yang disintesis dari 0,2 g GO dengan besar inhibisi berkisar antara 38-46 mm terhadap bakteri E.coli dan 46-52 mm terhadap bakteri S.aureus.

.....This study aims to synthesize Graphene Quantum Dots (GQD) from commercial graphite by the Hummers method, reduction and exfoliation with a mixture of nitric acid and sulfuric acid, and purification by dialysis. In this study, variables such as the mass of reduced and exfoliated graphene oxide (GO) samples, namely 0.2 g-0.5 g, and dialysis time, namely 4-6 days were used. Testing in this study was carried out using FTIR (Fourier Transform Infra Red), UV-Vis (Ultraviolet-visible spectrophotometry), anti-bacterial test, PSA (Particle Size Analyzer), and TEM (Transmission Electron Microscope). In this study, it was confirmed that GQD was produced with a trigonal planar orbital shape which has a particle size ranging from 0.38 nm-20 nm with an average percentage of 66% of the total particles produced. Antibacterial ability was only possessed by GQD synthesized from 0.2 g GO with inhibition ranging from 38-46 mm against E.coli bacteria and 46-52 mm against S.aureus bacteria.