

ABSTRAK

POTENSI NANOMATERIAL S/CaO/nGO (0,625/1 dan 1/1) SEBAGAI AGEN ANTIBAKTERI (*Bacillus subtilis* DAN *Escherichia coli*) DAN ANTIJAMUR (*Candida albicans*) DI BAWAH IRADIASI SINAR TAMPAK

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Pada penelitian ini telah dilakukan sintesis dan uji aktivitas nanomaterial S/CaO/nGO sebagai agen antibakteri dan antijamur di bawah iradiasi sinar tampak. Nano *Graphene Oxide* (nGO) disintesis dari bonggol jagung menggunakan metode Hummers termodifikasi, sementara CaO diperoleh dari cangkang telur melalui metode sol-gel dan didoping dengan sulfur. Impregnasi S/CaO pada nGO dilakukan dengan perbandingan massa 0,625/1 dan 1/1.

Hasil karakterisasi XRD menunjukkan ukuran kristal S/CaO/nGO 0,625/1 dan 1/1 masing-masing sebesar 50,37 nm dan 50,22 nm. Spektrum FTIR menunjukkan keberadaan gugus fungsional nGO serta vibrasi S=O dan Ca-S yang mengindikasikan keberhasilan doping sulfur. Nilai energi *band gap* S/CaO/nGO 0,625/1 dan 1/1 berdasarkan analisis DRS sebesar 0,96 eV dan 1,07 eV.

Uji aktivitas antibakteri dan antijamur dilakukan menggunakan metode difusi sumuran. Zona hambat optimum terhadap *Bacillus subtilis* dan *Escherichia coli* dicapai pada waktu penyinaran 45 menit, dengan diameter masing-masing sebesar 11 mm dan 10 mm untuk *B. subtilis*, serta 10 mm dan 8,5 mm untuk *E. coli*. Sementara itu, terhadap *Candida albicans*, zona hambat optimum diperoleh pada penyinaran 60 menit, dengan diameter masing-masing sebesar 9 mm dan 7,5 mm. Hasil ini menunjukkan bahwa S/CaO/nGO memiliki potensi sebagai agen antimikroba berbasis fotokatalitik yang efektif di bawah sinar tampak.

Kata kunci: S/CaO/nGO, sinar tampak, antibakteri, antijamur.

ABSTRACT

THE POTENTIAL OF S/CaO/nGO NANOMATERIALS (0.625/1 AND 1/1) AS ANTIBACTERIAL (*Bacillus subtilis* AND *Escherichia coli*) AND ANTIFUNGAL (*Candida albicans*) AGENTS UNDER VISIBLE LIGHT IRRADIATION

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In this study, the synthesis and testing of the activity of S/CaO/nGO nanomaterials as antibacterial and antifungal agents under visible light irradiation were conducted. Nano *Graphene Oxide* (nGO) was synthesized from corn cobs using a modified Hummers method, while CaO was obtained from eggshells via the sol-gel method and doped with sulfur. Impregnation of S/CaO into nGO was performed at mass ratios of 0.625/1 and 1/1. XRD characterization results showed crystal sizes of 50.37 nm and 50.22 nm. FTIR spectra indicated the presence of nGO functional groups as well as S=O and Ca-S vibrations, confirming successful sulfur doping. Bandgap energy values based on DRS analysis were 0.96 eV and 1.07 eV, respectively. Antibacterial and antifungal activity tests were conducted using the well diffusion method. Optimal inhibition zones against *Bacillus subtilis* and *Escherichia coli* were achieved at an irradiation time of 45 minutes, with diameters of 11 mm and 10 mm for *B. subtilis*, and 10 mm and 8.5 mm for *E. coli*, respectively. Meanwhile, against *Candida albicans*, the optimal inhibition zones were obtained at an irradiation time of 60 minutes, with diameters of 9 mm and 7.5 mm, respectively. These results indicate that S/CaO/nGO has potential as an effective photocatalytic-based antimicrobial agent under visible light.

Key words: S/CaO/nGO, visible light, antibacterial, antifungal.