

INTISARI

FABRIKASI DAN KARAKTERISASI *BEADS* KITOSAN DENGAN PENAMBAHAN AMPAS KOPI DALAM ADSORPSI METILEN BIRU

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Pembuatan *beads* kitosan dengan penambahan *Waste Coffee Ground* (WCG) telah berhasil difabrikasi dan telah diuji kemampuan adsorpsinya pada metilen biru (MB). *Beads* dibuat dengan rasio berat 1:0 (kitosan), 1:1 (kitosan/WCG 3%), 1:2 (kitosan/WCG 6%), dan 1:3 (kitosan/WCG 9%) lalu diikat silang menggunakan glutaral dehidat untuk menjaga stabilitasnya ketika berada di medium cair. Pengujian kemampuan adsorpsi MB menggunakan metode *batch*. Masing-masing variasi dianalisis menggunakan *Scanning Electron Microscopy* (SEM), *Fourier Transform Infra-Red* (FTIR), *Ultraviolet Visible Spectroscopy* (UV-Vis) dan *X-Ray Fluorescence* (XRF). Hasil morfologi pada sampel masing-masing menunjukkan terbentuknya pori dan rongga yang semakin banyak seiring dengan meningkatnya WCG yang ditambahkan. Komposisi dari WCG dianalisis menggunakan XRF yang menunjukkan terdapatnya atom karbon sebagai perkursor dari karbon aktif. Selain itu, spektrum FTIR menunjukkan ketersediaan gugus fungsi yang berperan dalam proses adsorpsi. Dari hasil pengukuran adsorpsi MB menggunakan UV-Vis didapatkan persentase degradasi sebesar 17,03%; 90,72%; 92,48% dan 92,99% untuk masing-masing variasi *beads* kitosan/WCG dengan rasio berat 1:0, 1:1, 1:2, dan 1:3. Pada pengujian *reusable*, *beads* kitosan dengan penambahan WCG memiliki kemampuan yang baik hingga 7 kali pengulangan. Adsorpsi isoterm *beads* kitosan/WCG 9% telah di *fitting* dengan model Langmuir dan Freundlich.

Kata kunci: *Waste Coffee Ground*, *Beads* Kitosan/WCG, Adsorpsi, Metilen Biru.

ABSTRACT

FABRICATION AND CHARACTERIZATION OF CHITOSAN BEADS WITH ADDITION OF WASTE COFFEE IN ADSORPTION OF METHYLENE BLUE

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Chitosan beads with the addition of Waste Coffee Ground (WCG) has been successfully fabricated and its adsorption ability has been studied on methylene blue (MB). Beads were made with a weight ratio of 1:0 (chitosan), 1:1 (chitosan/WCG 3%), 1:2 (chitosan/WCG 6%), and 1:3 (chitosan/WCG 9%). Glutaraldehyde crosslinking was added to increase beads stability in water. The adsorption ability of MB was tested using the batch method. Each variation was analyzed by Scanning Electron Microscopy (SEM), Fourier Transform Infra-Red (FTIR), Ultraviolet Visible Spectroscopy (UV-Vis) dan X-Ray Fluorescence (XRF). Morphological results in each sample showed the formation of more pores and more cavities with the addition of WCG. The composition of WCG was analyzed using XRF which indicated the presence of carbon atoms C as precursors of activated carbon. In addition, the FTIR spectrum indicates the availability of functional groups that play a role in the adsorption process. From the measurement results of MB adsorption using UV-Vis, the percentage of degradation was 17.03%; 90.72%; 92.48% and 92.99% for each variation of chitosan/WCG beads with a weight ratio of 1:0, 1:1, 1:2, and 1:3. In the reusable test, chitosan beads with the addition of WCG had good ability up to 7 repetitions. The adsorption isotherm of 9% chitosan/WCG beads was fitted with the Langmuir and Freundlich model.

Keywords: Waste Coffee Ground, Chitosan Beads/WCG, Adsorption, Methylene Blue