

ABSTRAK

MODIFIKASI BIOMASSA ALGA *Sargassum* sp. DENGAN SURFAKTAN *CETYLTRIMETHYLAMMONIUM CHLORIDE* (CTAC) SEBAGAI ADSORBEN KRISTAL VIOLET DAN ANION NITRAT DALAM LARUTAN

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Pada penelitian ini telah dilakukan modifikasi biomassa alga *Sargassum* sp. menggunakan surfaktan *Cetyltrimethylammonium Chloride* (CTAC). Adsorben yang digunakan untuk mengadsorpsi kristal violet dan anion nitrat dalam larutan adalah adsorben alga, alga-Na, dan alga-CTAC. Karakterisasi adsorben dilakukan menggunakan FTIR untuk mengidentifikasi gugus fungsi dan SEM-EDX untuk mengetahui morfologi permukaan dan komposisi unsur. Adsorpsi monokomponen adsorben alga, alga-Na, dan alga-CTAC terhadap kristal violet berturut-turut optimum pada pH 4, 6, dan 5 sedangkan terhadap anion nitrat 3, 5, dan 10. Waktu kontak optimum adsorben alga, alga-Na, dan alga-CTAC terhadap kristal violet berturut-turut 120, 30, dan 60 menit sedangkan semua adsorben terhadap anion nitrat 15 menit dengan konsentrasi optimum masing-masing 300 ppm. Kinetika adsorpsi kristal violet dan anion nitrat cenderung mengikuti kinetika pseudo orde dua dan isotherm adsorpsinya cenderung mengikuti model isotherm Freundlich kecuali kristal violet terhadap alga-CTAC yang cenderung mengikuti isotherm Langmuir. Hasil uji adsorpsi pasangan larutan bikomponen semua adsorben cenderung lebih baik dalam mengadsorpsi kristal violet. Mekanisme adsorpsi yang dilakukan pada alga-CTAC terhadap kristal violet menunjukkan interaksi pertukaran ion dan interaksi fisika, sedangkan mekanisme adsorpsi alga terhadap anion nitrat menunjukkan interaksi fisika. Adsorpsi dengan menggunakan adsorben alga-CTAC terhadap kristal violet dan alga terhadap anion nitrat efektif digunakan hingga empat kali pengulangan dengan persen adsorpsi >60%.

Kata kunci : adsorpsi, kristal violet, anion nitrat, CTAC, *Sargassum* sp.

ABSTRACT

MODIFICATION OF *Sargassum* sp. ALGAE BIOMASS WITH *CETYLTRIMETHYLAMMONIUM CHLORIDE* (CTAC) SURFACTANT AS CRYSTAL VIOLET AND NITRATE ANION ADSORBENT IN SOLUTION

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In this research, modification of *Sargassum* sp. algae biomass using *Cetyltrimethylammonium Chloride* (CTAC) surfactant has been carried out. The adsorbents used to adsorb crystal violet and nitrate anions in solution are algae, algae-Na, and algae-CTAC. Characterization of the adsorbent was carried out using FTIR to identify functional groups and SEM-EDX to determine surface morphology and elemental composition. The adsorption of monocomponent adsorbent algae, algae-Na, and algae-CTAC to crystal violet was optimum at pH 4, 6, and 5 respectively while to nitrate anion 3, 5, and 10. Optimum contact time for algae, algae-Na, and algae-CTAC adsorbents to crystal violet were 120, 30, and 60 minutes respectively, while all adsorbents to nitrate anion were 15 minutes with optimum concentrations of 300 ppm. The adsorption kinetics of crystal violet and nitrate anion tend to follow pseudo second order kinetics and their adsorption isotherms tend to follow the Freundlich isotherm model except for crystal violet to algae-CTAC which tends to follow the Langmuir isotherm. The results of the adsorption test of the bicomponent solution pair of all adsorbents tended to be better at adsorbing crystal violet. The adsorption mechanism performed on the algae-CTAC on crystal violet shows ion exchange interactions and physical interactions, while the algae adsorption mechanism on nitrate anion shows a physical interaction. Adsorption using the algae-CTAC adsorbent for crystal violet and algae on nitrate anion were effectively used up to four repetitions with an adsorption percentage of >60%.

Keywords : adsorption, crystal violet, nitrate anion, CTAC, *Sargassum* sp.