

ABSTRAK

OPTIMASI DAN EVALUASI KINERJA *POLYMER INCLUSION MEMBRANE* (PIM) YANG MENGANDUNG SENYAWA PEMBAWA KOPOLI EUGENOL DIALIL FTALAT 10% UNTUK TRANSPOR *MALACHITE GREEN* (MG)

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Malachite Green adalah senyawa pewarna yang umum digunakan untuk mewarnai sutra, wol, kapas, dan kertas, serta berfungsi sebagai pewarna bakteri dalam analisis mikroskopis sel dan jaringan. Penelitian ini mengeksplorasi proses transpor *Malachite Green* menggunakan membran *Polymer Inclusion Membrane* (PIM) berbasis kopolimer eugenol dialil ftalat (Ko-EDAF) 10%. Penelitian difokuskan pada beberapa parameter optimasi, meliputi pH fasa sumber, konsentrasi HNO_3 pada fasa penerima, ketebalan membran, serta waktu transpor. Membran PIM disintesis dengan melarutkan Co-EDAF 10%, polivinil klorida (PVC), dan dibenzil eter (DBE) dalam pelarut *tetrahydrofuran* (THF). Konsentrasi *Malachite Green* setelah transpor dianalisis menggunakan spektrofotometri UV-Vis pada panjang gelombang 614 nm. Hasil menunjukkan efisiensi transpor mencapai 84,60% pada kondisi optimal pH fasa sumber 9, konsentrasi HNO_3 0,75 M, ketebalan membran T_{54} , dan durasi transpor 12 jam. Evaluasi terhadap jenis garam menunjukkan bahwa penambahan NaNO_3 0,1 M pada fasa sumber menghasilkan efisiensi transpor sebesar 86,34%, sedangkan pada variasi konsentrasi garam penambahan NaNO_3 0,001 M pada fasa sumber dan penerima menghasilkan efisiensi masing-masing sebesar 86,68% dan 88,39%. Uji pemakaian berulang membran menunjukkan efisiensi transpor tertinggi pada pemakaian berulang tanpa pencucian sebesar 91,68%. Membran PIM memiliki masa pakai hingga 69 hari, terutama saat ditambahkan garam NaNO_3 dalam fasa sumber.

Kata kunci: Ko-EDAF, *Malachite Green*, PIM, Optimasi, Evaluasi

ABSTRACT

OPTIMIZATION AND PERFORMANCE EVALUATION OF POLYMER INCLUSION MEMBRANE (PIM) CONTAINING 10% EUGENOL-DIALLYL PHTHALATE COPOLYMER AS A CARRIER FOR THE TRANSPORT OF MALACHITE GREEN (MG)

By

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Malachite Green is a dye compound commonly used to color silk, wool, cotton, and paper, and also functions as a bacterial stain in microscopic analysis of cells and tissues. This study explores the transport process of Malachite Green using a Polymer Inclusion Membrane (PIM) based on 10% eugenol-diallyl phthalate copolymer (Co-EDAF). The research focuses on several optimization parameters, including the pH of the source phase, HNO_3 concentration in the receiving phase, membrane thickness, and transport duration. The PIM membrane was synthesized by dissolving 10% Co-EDAF, polyvinyl chloride (PVC), and dibenzyl ether (DBE) in tetrahydrofuran (THF). The concentration of Malachite Green after transport was analyzed using UV-Vis spectrophotometry at a wavelength of 614 nm. The results showed a transport efficiency of 84.60% under optimal conditions: source phase pH of 9, HNO_3 concentration of 0.75 M, membrane thickness of T_{54} , and transport duration of 12 hours. Evaluation of salt type revealed that the addition of 0.1 M NaNO_3 to the source phase resulted in a transport efficiency of 86.34%. For salt concentration variations, the addition of 0.001 M NaNO_3 to both the source and receiving phases yielded transport efficiencies of 86.68% and 88.39%, respectively. Reusability tests of the membrane showed the highest efficiency (91.68%) in repeated use without washing. The PIM membrane demonstrated a lifespan of up to 69 days, particularly when NaNO_3 was added to the source phase.

Keywords: Co-EDAF, Malachite Green, PIM, Optimization, Evaluation