

ABSTRAK

STABILITAS DAN KEMAMPUAN MEMBRAN YANG MENGANDUNG POLI-BADGE 3:1 UNTUK TRANSPOR FENOL MENGGUNAKAN METODE *POLYMER INCLUSION MEMBRANE* (PIM)

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Pemisahan dan pemurnian fenol dari air limbah dapat dilakukan dengan menggunakan teknologi membran cair berbasis Poli-BADGE 3:1 sebagai senyawa pembawa. Membran cair yang mengandung senyawa pembawa tersebut dapat digunakan, karena fenol dan senyawa pembawa memiliki sisi aktif yang sama. Penelitian mengenai stabilitas dan kemampuan membran yang mengandung Poli-BADGE 3:1 untuk transpor fenol telah dilakukan menggunakan metode *Polymer Inclusion Membrane* (PIM). Penelitian ini bertujuan untuk mengetahui stabilitas membran PIM dengan pengaruh variasi *plasticizer*, jenis dan konsentrasi garam, serta kemampuan membran PIM melalui pemakaian berulang dan umur membran. Membran PIM dipreparasi dengan melarutkan Poli-BADGE 3:1, polivinil klorida (PVC), dan dibenzil eter (DBE). Penentuan konsentrasi fenol sesudah proses transpor dianalisis dengan metode spektrofotometri UV-Vis dengan penambahan 4-aminoantipirin dan absorbansinya diukur pada panjang gelombang 456 nm. Hasil penelitian menunjukkan bahwa stabilitas membran dicapai pada penambahan *plasticizer* 0,3132 g dengan konsentrasi fenol tertranspor sebesar 60,84%. Penambahan jenis garam NaCl pada sumber menunjukkan hasil optimum dibandingkan jenis garam lainnya, yakni mampu mentranspor fenol pada fasa penerima sebesar 56,16%. Transpor fenol dengan melakukan penambahan NaCl 0,01 M di fasa sumber dan penerima menghasilkan fenol yang tertranspor sebanyak 54,60% dan 45,79%. Pada uji kemampuan membran PIM melalui pemakaian berulang dilakukan 5 kali pengulangan transpor. Pemakaian berulang tanpa pencucian mampu mentranspor fenol sebesar 56,96%, 49,74%, 34,68%, 29,39%, dan 24,75%, serta pada pemakaian berulang dengan pencucian mampu mentranspor fenol sebesar 56,44%, 41,33%, 33,22%, 27,90%, dan 20,72%. Tanpa penambahan garam, kemampuan transpor membran hanya 45 hari tetapi dengan penambahan KNO₃ 0,1 M kemampuannya meningkat menjadi 61 hari.

Kata kunci: fenol, PIM, Poli-BADGE, stabilitas, kemampuan

ABSTRACT

STABILITY AND CAPABILITY MEMBRANE CONTAINING POLY-BADGE 3:1 FOR PHENOL TRANSPORT USING POLYMER INCLUSION MEMBRANE (PIM) METHOD

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Separation and purification of phenol from wastewater can be done using liquid membrane technology based on Poly-BADGE 3:1 as a carrier compound. Liquid membranes containing these carrier compounds can be used, because phenol and carrier compounds have the same active side. Research on the stability and ability of membranes containing Poly-BADGE 3:1 for phenol transport has been carried out using the Polymer Inclusion Membrane (PIM) method. This study aims to determine the stability of PIM membranes with the influence of plasticizer concentration, type and concentration of salt, as well as the ability of PIM membranes through repeated use and membrane life. PIM membrane was prepared by dissolving 3:1 poly-BADGE, polyvinyl chloride (PVC), and dibenzyl ether (DBE). Determination of phenol concentration after the transport process was carried out by UV-Vis spectrophotometric method with the addition of 4-aminoantipyrine and the absorbance was measured at a wavelength of 456 nm. The results showed that membrane stability was achieved at the addition of 0.3132 g plasticizer with a transported phenol concentration of 60.84%. The addition of NaCl salt type at the source showed optimum results compared to other types of salt, which was able to transport phenol in the receiving phase by 56.16%. Phenol transport by adding 0.01 M NaCl in the source and receiver phases resulted in phenol transported as much as 54.60% and 45.79%. In the test of the ability of the PIM membrane through repeated use, 5 repetitions of transport were carried out. Repeated use without washing was able to transport phenol by 56.96%, 49.74%, 34.68%, 29.39%, and 24.75%, and in repeated use with washing was able to transport phenol by 56.44%, 41.33%, 33.22%, 27.90%, and 20.72%. Without the addition of salt, the membrane transport ability was only days but with the addition of 0.1 M KNO₃ the ability increased to 61 days.

Keywords: phenol, PIM, Poly-BADGE, stability, capability