

## ABSTRAK

### EVALUASI STABILITAS DAN KEMAMPUAN MEMBRAN YANG MENGANDUNG KOPOLI EUGENOL DIALIL FTALAT 8% UNTUK TRANSPOR FENOL MENGGUNAKAN METODE *SUPPORTED LIQUID MEMBRANE* (SLM)

Oleh

NURHUDAWATI NINGSIH

Perkembangan sektor industri yang pesat memberikan dampak buruk berupa hasil samping senyawa organik yaitu fenol yang berbahaya karena bersifat korosif dan beracun. Penelitian mengenai transpor fenol menggunakan kopoli(eugenol-DAF) sebagai senyawa pembawa berbasis membran *polytetrafluoroetilene* (PTFE) dengan metode *Supported Liquid Membrane* (SLM) dilakukan untuk mengatasi masalah tersebut. Pada penelitian ini dilakukan optimasi dengan parameter variasi pH fasa sumber, konsentrasi NaOH fasa penerima, waktu perendaman membran SLM, konsentrasi senyawa pembawa dan waktu transpor fenol. Selain itu dilakukan evaluasi dengan parameter kecepatan pengadukan, jenis dan konsentrasi garam, pemakaian berulang, dan *lifetime*. Karakterisasi membran sebelum dan sesudah transpor dilakukan dengan menggunakan SEM dan FTIR untuk mengetahui keberhasilan transpor fenol. Konsentrasi fenol setelah transpor ditentukan menggunakan spektrofotometer UV-Vis dengan reagen 4-aminoantipirin pada  $\lambda_{maks} = 455 \text{ nm}$ . Hasil uji transpor fenol menunjukkan bahwa SLM mengandung Ko-EDAF 8% mampu mentranspor fenol sebesar 87,77% pada pH 5,5 di fasa sumber, konsentrasi NaOH 0,25 M di fasa penerima, waktu perendaman membran selama 90 menit, konsentrasi senyawa pembawa 0,005 M selama 24 jam. Keberhasilan transpor ditunjukkan adanya kehilangan senyawa pembawa pada membran SLM pada hasil FTIR yaitu terjadi penurunan intensitas gugus -OH yaitu pada bilangan gelombang  $3534,57 \text{ cm}^{-1}$  dan hasil analisis SEM menunjukkan adanya celah yang besar pada permukaan membran dan juga susunan pori yang tidak rapat. Kemampuan dan stabilitas membran dicapai pada kecepatan pengadukan 800 rpm dengan penambahan garam  $\text{NaNO}_3$  0,001, teruji mampu mentranspor fenol sebanyak empat kali transpor dalam kondisi optimum dan umur membran (*lifetime*) menjadi lebih lama yaitu 15 hari dengan penambahan  $\text{NaNO}_3$  1 M.

**Kata kunci :** Evaluasi, Fenol, Ko-EDAF, SLM

## ABSTRACT

### EVALUATION STABILITY AND CAPABILITY OF MEMBRANES CONTAINING COPOLY EUGENOL DIALLYL PHTHALATE 8% FOR PHENOL TRANSPORT USING SUPPORTED LIQUID MEMBRANE (SLM) METHOD

By

**NURHUDAWATI NINGSIH**

The rapid development of the industrial sector has had a negative impact in the form of by-products of organic compounds, namely phenol which are dangerous because corrosive and toxic. Research on phenol transport using copoly(eugenol-DAF) as a carrier based on polytetrafluoroethylene (PTFE) membranes with the Supported Liquid Membrane (SLM) method was carried out to overcome this problem. In this research, optimization was carried out with parameters of variation of source phase pH, receiving phase NaOH concentration, SLM membrane immersion time, carrier concentration and phenol transport time. In addition, an evaluation was carried out with the parameters of stirring speed, type and concentration of salt, repeated use, and lifetime. Membrane characterization before and after transport was carried out using SEM and FTIR to determine the success of phenol transport. The concentration of phenol after transport was determined using a UV-Vis spectrophotometer with 4-aminoantipyrine reagent at  $\lambda_{\max} = 455$  nm. The results of the phenol transport test showed that SLM containing 8% Co-EDAF was able to transport 87.77% of phenol at pH 5.5 in the source phase, NaOH concentration of 0.25 M in the receiving phase, membrane immersion time of 90 minutes, concentration of carriers 0.005 M for 24 hours. The success of the transport was indicated by the loss of carriers on the SLM membrane on the FTIR results, namely a decrease in the intensity of the -OH group, namely at wave number 3534.57  $\text{cm}^{-1}$  and the results of SEM analysis showed that there were large gaps on the surface of the membrane and also that the pore arrangement was not tight. The ability and stability of the membrane was achieved at a stirring speed of 800 rpm with the addition of 0.001  $\text{NaNO}_3$  salt, it was tested to be able to transport phenol four times under optimum conditions and the membrane age (lifetime) was longer, namely 15 days with the addition of 1 M  $\text{NaNO}_3$ .

**Keywords:** Co-EDAF, Evaluation, Phenol, SLM