REMOVAL OF REACTIVE DYE WITH FLAT SHEET SUPPORTED LIQUID MEMBRANE

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ABSTRACT

The abundant use of reactive dyes in textile industries has risen as an environmental issues as it is highly toxic and chemically hazard. The reactive dye is often used for dyeing of cotton and cellulose fibre due to its color fastness and bright colors. The reactive dyes have high solubility in water which makes it ineffective to treat by conventional wastewater treatment process. In this study, the extraction and removal of Remazol Black B dye are carried out using supported liquid membrane (SLM) in continuous process. The supported liquid membrane is prepared by impregnate the commercial membrane support with kerosene as diluents, and presence of tridodecylamine (TDA) as carrier and salicylic acid (SA) as co extractant. Besides, the NaOH is used as the stripping agent at the acceptor phase. Six parameters have been studied to examine the optimum condition for extraction and stripping process. The parameters includes flow rate of feed phase, pH of the feed phase, concentration of stripping agent, concentration of the feed concentration, concentration of stripping agent, concentration of salt in feed phase, and stability of membranes. The results show the supported liquid membrane having the optimum condition when the flow rate is 150 ml/min, pH 2 at the feed phase, with the 0.2 M of stripping agent, and 70 ppm of feed phase. The addition of salt would affect on the removal efficiency. At optimum condition, the percentage of extraction and recovery was 99%. Meanwhile, the results show that the SLM was stable for 34.5 hours with optimum conditions.
ABSTRAK

Penggunaan pewarna reaktif dalam industri tekstil telah membangkitkan isu alam sekitar disebabkan pewarna reaktif merupakan bahan toksik dan berbahaya. Pewarna reaktif sering digunakan untuk pewarnaan gentian kapas dan selulosa kerana ketahanan luntur dan warnanya bersifat terang. Pewarna reaktif sangat larut dalam air menyebabkan ia tidak sesuai untuk dirawat dengan proses rawatan air sisa lazim. Dalam kajian ini, pengekstrakan dan pelucutan pewarna reaktif telah dijalankan melalui process membran penyokong cecair (SLM) secara berterusan. SLM disediakan dengan penyuburan cecair terdiri daripada pelarut kerosin, tridodecylamine (TDA) sebagai pembawa dan asid salicyclid (SA) sebagai pembantu pembawa. Manakala, natrium hidroksida digunakan sebagai ejen pelucutan di fasa penerima. Enam parameter telah dikaji untuk menentukan keadaan optimum untuk process pengekstrakan dan pelucutan. Parameter dikaji termasuk kadaralir air di fasa suapan, pH pada fasa suapan, kepekatan agen pelucutan, kepekatan pewarna reaktif di fasa suapan, kepekatan garam di fasa suapan, dan kestabilan membran. Keputusan kajian menunjukkan optimum dicapai pada kadaralir 150 ml/min, pH 2 pada fasa suapan, 0.2 M kepekatan agen pelucutan NaOH dan, 70 ppm kepekatan pewarna reaktif di fasa suapan. Kandungan garam di fasa suapan akan mengakibatkan penurunan kecekapan pelucutan. Pada keadaan optimum, peratusan pengekstrakan and penghasilan semula adalah 99%. Manakala, membran penyokong cecair didapati stabil selepas menjalankan process selama 34.5 jam secara berterusan.
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