

Thesis Title	Treatment of Textile Dyeing Effluents by Nanofiltration Membranes
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#### Abstract

Nanofiltration membranes were employed for the treatment of textile dyeing effluents (acid and reactive dye). The membrane used were MPF 34 and MPF 36 having the MWCO of 200 and 1000, respectively. The experiments were carried out at the pressure of 10 bar and at 45 and 60 °C.

For the synthetic rinsing water, MPF 34 provided lower permeate fluxes than MPF 36, but higher acid and salt rejections. MPF 34 gave salt rejection in the range of 20.26-52.55 percent and the acid rejection in the range of 11.43-14.86 percent. Salt and acid rejections of MPF 36 were in the range of 2.11-17.52 percent and 6.06-6.25 percent, respectively. The addition of acetic acid in acid dye solution increased dye and acid rejections, but the addition of NaCl into reactive dye solution decreased dye and salt rejections. Both membranes achieved the high rejections of dyes. When acetic acid was added into acid dye solution, dye and acid rejections were increased. But addition of NaCl into reactive dye solution decreased dye and salt rejection and further decreased when the solution was of higher concentration. At higher temperature there was an increase in flux at the expense of rejection.

MPF 36 was selected to treat rinsing wastewater at 60 °C. Permeate fluxes of acid dye rinsing water were in the range of 40-50 l/m<sup>2</sup>.hr and 110-150 l/m<sup>2</sup>.hr for the reactive dye rinsing

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water. The membrane achieved high rejections of dye, COD and SS (over than 80 percent) but low TDS rejection (less than 50 percent).

An economic assessment for the product water of  $12 \text{ m}^3/\text{hr}$  revealed that the total cost for nanofiltration system for reactive dye was  $29.55\text{-}33.39 \text{ ₱}/\text{m}^3$  and gave the approximated pay back time of 2.4-2.6 years. For acid dye, the total cost was  $46.32\text{-}52.03 \text{ ₱}/\text{m}^3$ , while the approximated pay back time was 3.8-4.3 years. In both cases the membrane life was assumed to be 3 years.