

# **RESTAURANT WASTEWATER TREATMENT BY USING CROSS-FLOW ZEOLITE NANOFILTRATION MEMBRANE WITH FILTRATION OF TURBIDITY, OIL AND GREASE**

Name : Risyda Zulfiyatush Sholihah  
NRP : 3310100702  
Supervisor : Alia Damayanti, S.T., M.T., Ph.D

## **ABSTRACT**

The development of food business, especially restaurants have harm impacts for environment, which caused by wasting untreated wastewater. Restaurant wastewater affected blockage of sewages pipes and increase the processing load on the wastewater treatment plant. One of the potential alternatives for wastewater treatment is nanofiltration membranes with pore size of  $0,001 \mu\text{m}$  which could filter wastewater with high organic content. The material which used in this case is natural zeolite. Thus, this study aims to obtain the optimum mass of zeolite in the production of nanofiltration membranes, obtaining the value of rejection and flux from zeolite membranes on mass variations and waste water concentrations.

This study was begun by setting up of natural zeolite as a membrane material and then synthesized to obtain pure zeolite. Subsequently, membranes made by synthesized zeolite then analyzed its the morphology used SEM-EDX. Membrane testing used a cross-flow reactor. In this test, the variation of each zeolite mass and wastewater concentration influenced both of flux and rejection value. Variation of concentration that used were pure wastewater which mixed with water in ratio 100%, 75% : 25% and 50% : 50%.

Mass variation zeolite that used were 3 grams and 6 grams. The results showed that the best mass of zeolite for zeolite

nanofiltration membranes was 6 grams. The highest flux value was reached  $7,64 \text{ L/m}^2\cdot\text{hour}^{-1}$  for 100% concentration,  $11,89 \text{ L/m}^2\cdot\text{hour}^{-1}$  for 75% concentration and  $13,59 \text{ L/m}^2\cdot\text{hour}^{-1}$  for 50% concentration. The highest value was reached  $13,59 \text{ L/m}^2\cdot\text{hour}^{-1}$  in 3 grams and  $12,74 \text{ L/m}^2\cdot\text{hour}^{-1}$  in 6 grams. The highest rejection value for turbidity was reached 88,84% for 100% concentration, 70,00% for 75% concentration and 77,50% for 50% concentration. The highest rejection value for turbidity was reach 83,26% for 3 grams and 88,84% for 6 grams. The highest rejection value for oil and grease was reached 91,22% for 100% concentration, 84,44% for 75% concentration, and 77,18% for 50% concentration. The highest rejection value was reached 85,40% for 3 grams and 91,22% for 6 grams.

***Keywords: Restaurant Wastewater, Rejection Value, Flux Value, Turbidity, Oil and Grease***