Waste Batik Treatment Using Cross-Flow Zeolite Nanofiltration Membrane to Remove Turbidity, Color, and Ammonium

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ABSTRACT

The development of batik industry since the enactment of National Batik Day on October, 2nd 2009, increasing the amount of production of batik in Indonesia. The emergence of new batik industries causing residual waste which are need for treated. One of the treatment of batik waste is with nanofiltration membrane. Nanofiltration membrane made of natural rock named zeolite that easily found and obtained. Then, cross-flow reactor is used to determine the rejection percentage and the value of flux flow generated by membrane. Cross-flow reactor’s chosen to reduce the risk of fouling and clogging due to accumulation of particles in nanofiltration membrane. As for the analysis of structure and morphology of membrane, we use Scanning Electron Microscopy (SEM).

There are some parameters will be tested and determined in this study i.e turbidity, color, and ammonium. Each parameters use different method to analyze base on the standart method. For turbidity, method used is Hellige Turbidimetry methods, Spectrometry for color, and Nessler for ammonium parameters. All of those three methods will be tested before and after cross-flow reactor examination.

The natural zeolite rock will be sieved until 200 mesh and will be used as the mixture and raw material of nanofiltration membrane. With the variation of mass of 3 grams and 5 grams membrane as
well as the concentration of batik wastewater with raw water about 100%, 75%, and 50% ratio of batik wastewater and raw water, respectively produced different values of each parameters. For turbidity parameters, the highest rejection value is 92,93% for the 3 grams membrane and 100% concentration of batik waste, and respectively 95,69% and 95,17% for each 75% and 50% concentration of batik waste in the same mass of membrane. And there are some difference with other parameters value. In addition, examination of cross-flow reactor used to determine the value of generated flux in every mass and concentration variation of membrane and SEM EDX to determine the structure and elements contained in zeolite nanofiltration membrane.

Keywords : Zeolite Membrane, Nanofiltration, Cross-flow, Batik Wastewater treatment, SEM EDX.