TEST PERFORMANCE OF ZEOLITE NANOFLTRATION MEMBRANES FOR NITRATE AND AMMONIUM FILTRATION IN TOFU WASTEWATER

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ABSTRACT

Water treatment technologies that are currently of concern to the scientists, is a membrane technology. The advantages of membrane technology found in the operation of wastewater treatment that does not require too much energy because it does not involve a phase change energy use and not too hot, so that the components inside can be maintained.

This research used zeolite as a nanofiltrate membrane with its pore diameter of 0.001 µm. This research expects high value of rejection coefficient and stable value of flux on longer filtration process, with optimal preparation of nanofiltration membrane. The method which used in order to reduce and optimize concentration of nitrate and ammonium in tofu wastewater was making zeolite particle size 40 mesh and 20 mesh. Duration of centrifuge process as long as 10 minutes and 20 minutes with addition of NH₄Cl as a porogen and also addition of supporting layer PEG for membrane strength. The aims of this research were identifying synthesis process and also specific characteristics of nanofiltration membrane with raw material of natural zeolite. Furthermore, this research was also finding the effectiveness of zeolite performance as nanofiltration membrane in order to reduce nitrate and ammonium concentrations.

This research result shows that the performance of nanofiltration zeolite membrane is very good and effective in filtrating nitrate and ammonium. The permeability of nanofiltration zeolite membrane has its highest value on 200 mesh particle size with 10 minutes centrifuge duration and 6.67 L/m².hour. The zeolite membrane permselectivity in filtrating nitrate has its highest value on 200 mesh particle size with 10 minutes centrifuge duration and 89.26% effectiveness on 25% wastewater volume. While the zeolite membrane permselectivity in filtrating ammonium has its highest value on 40 mesh particle size with 10 minutes centrifuge duration and 98.18% effectiveness on 75% wastewater volume.

keywords : tofu wastewater, membrane, nanofiltration, water treatment, zeolite
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