

UNIVERSITI TEKNOLOGI MARA

**PERFORMANCE EVALUTION OF
ULTRAFILTRATION FOR RUBBER
GLOVE WASTEWATER FOR
RECLAMATION SYSTEM**

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ABSTRACT

The feasibility of using flat sheet ultrafiltration (UF) Polycera® membrane for the treatment of rubber glove wastewater reclamation system was carried out in this work. Chemical characterization of the effluent also executed to compare the effluent and permeate quality. Membranes molecular weight cut off (MWCO) of 70 kDa and 100 kDa were operated in cross-flow and dead-end mode and its performance were measured with respect to permeate flux and rejection. The parameters tested in this study were chemical oxygen demand (COD), total suspended solids (TSS), and color. It appeared that the 70 kDa UF membranes have higher hydrophilicity but lower permeability as compared to 100 kDa UF membrane. As 70 kDa membranes are smaller in pore size, it was observed that the membrane exhibited greater rejection in every parameter tested in contrast to 100 kDa UF membranes. The overall result showed that cross-flow filtration of 70 kDa UF membranes gave higher rejection where removal percentage of COD, TSS, and the color was observed at 66.9%, 80.24% and 82.7%, respectively. Therefore, the ultrafiltration of rubber glove effluent was successfully carried out.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

An expandable hydrocarbon polymer which is also referring to natural rubber is primarily developed from either a milky colloidal suspension or latex of *Hevea brasiliensis*. Rubber industry is one of the biggest contributors to Malaysia's economy and appears as the top manufacturer along with Thailand, Indonesia, and India (Mokhtar et al., 2015). The refined natural rubber is massively utilized in countless application and products (Mohammadi et al., 2010). The products are significantly distributed to petroleum products, electronic equipment, palm oil, wood products, rubber, and textiles. The natural rubber latex and the standard Malaysia rubber serve as the main category of raw material used in rubber manufacturing process (Mokhtar et al., 2015). In spite of that, enormous amount of adulterated wastewater produced from the rubber production as a consequence of abundant water consumption throughout the processing needs to be managed wisely in accordance to the regulation stipulated in Environmental Quality (Industrial Effluent) Regulation, 2009.

Nowadays, there are various approaches used in treatment of rubber wastewater. However, biological methods particularly aerobic, anaerobic and facultative ponds are commonly applied in this country for rubber glove wastewater treatment (Mohammadi et al., 2010). Unfortunately, these methods demanded wide area to execute despite its low and effectiveness for organic load reduction. As such, a number of new alternatives were introduced such as membrane-based process as it