

## **Eco-Nanofiltration Membranes: Nanofiltration Membrane Technology Utilization-Based Fiber Pineapple Leaves Waste as Solutions for Industrial Rubber Liquid Waste Processing and Fertilizer Crisis in Indonesia**

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**Abstract :** Indonesian rubber plant area reached 2.9 million hectares with productivity reached 1.38 million. High rubber productivity is directly proportional to the amount of waste produced rubber processing industry. Rubber industry would produce a negative impact on the rubber industry in the form of environmental pollution caused by waste that has not been treated optimally. Rubber industrial wastewater containing high-nitrogen compounds (nitrate and ammonia) and phosphate compounds which cause water pollution and odor problems due to the high ammonia content. On the other hand, demand for NPK fertilizers in Indonesia continues to increase from year to year and in need of ammonia and phosphate as raw material. Based on domestic demand, it takes a year to 400,000 tons of ammonia and Indonesia imports 200,000 tons of ammonia per year valued at IDR 4.2 trillion. As well, the lack of phosphoric acid to be imported from Jordan, Morocco, South Africa, the Philippines, and India as many as 225 thousand tons per year. During this time, the process of wastewater treatment is generally done with a rubber on the tank to contain the waste and then precipitated, filtered and the rest released into the environment. However, this method is inefficient and thus require high energy costs because through many stages before producing clean water that can be discharged into the river. On the other hand, Indonesia has the potential of pineapple fruit can be harvested throughout the year in all of Indonesia. In 2010, production reached 1,406,445 tons of pineapple in Indonesia or about 9.36 percent of the total fruit production in Indonesia. Increased productivity is directly proportional to the amount of pineapple waste pineapple leaves are kept continuous and usually just dumped in the ground or disposed of with other waste at the final disposal. Through Eco-Nanofiltration Membrane-Based Fiber Pineapple leaves Waste so that environmental problems can be solved efficiently. Nanofiltration is a process that uses pressure as a driving force that can be either convection or diffusion of each molecule. Nanofiltration membranes that can split water to nano size so as to separate the waste processed residual economic value that N and P were higher as a raw material for the manufacture of NPK fertilizer to overcome the crisis in Indonesia. The raw materials were used to manufacture Eco-Nanofiltration Membrane is cellulose from pineapple fiber which processed into cellulose acetate which is biodegradable and only requires a change of the membrane every 6 months. Expected output target is Green eco-technology so with nanofiltration membranes not only treat waste rubber industry in an effective, efficient and environmentally friendly but also lowers the cost of waste treatment compared to conventional methods.

**Keywords :** biodegradable, cellulose diacetate, fertilizers, pineapple, rubber

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