

## ABSTRACT

Indonesia is expected to face a serious clean water crisis by 2050 due to untreated domestic wastewater pollution. Currently, only 6.87% of households have access to clean water that meets health standards. In Malang City, improper exploitation of groundwater further exacerbates this situation, making it important to manage water sources sustainably, in accordance with Law No. 17 of 2019 on Clean Water Utilization. One effective solution to address water pollution is to implement a filtration system that uses environmentally friendly natural materials. Filtration with moringa seeds and crumb rubber waste is proven effective in improving the water quality of industrial effluents, offering an environmentally friendly and cost-effective solution. This study aims to design and evaluate the effectiveness of a crumb rubber and moringa seed-based domestic wastewater filtration system. The FRESH system is a domestic wastewater treatment method that combines initial sedimentation, aerobic, and anaerobic processes, and filtration with crumb rubber and moringa seeds. This process involves upflow and downflow, as well as backwash to keep the filtration media clean. The results showed that the FRESH system was effective in improving domestic wastewater quality by reducing BOD by 32.34%, COD by 32.86%, TSS by 89.46%, and turbidity by 78.48%. In addition, the system also increased DO by 27.5% and pH stability by 3.75%. The system is environmentally friendly and meets most of the domestic wastewater quality standards according to the Minister of Environment and Forestry Regulation No. P.68/MENLHK/SETJEN/KUM.1/8/2016.

*Keywords:* Domestic wastewater, Filtration Technology, Moringa Seed, Rubber Crumb.