ABSTRAK

PENGARUH LAJU ALIR DAN TEKANAN UDARA PADA PRETREATMENT BERBASIS AERASI FEROLIT COLOUMN TERHADAP KINERJA ULTRAFILTRASI AIR SUNGAI MUSI AIR MINUM

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Air sungai merupakan salah satu sumber air yang banyak dimanfaatkan oleh masyarakat, namun kualitasnya sering kali belum memenugi standar air minum karena masih mengandung kontaminan seperti besi (Fe), mangan (Mn), kekeruhan dan mikroorganisme yang berpotensi menimbulkan gangguan kesehatan. Oleh karena itu, penelitian ini dilakukan untuk menganalisis pengaruh variasi laju alir bahan baku (6, 8, 10, 12 dan 14 L/menit) serta tekanan udara aerasi (4 dan 5 bar) pada proses pretreatment berbasis aerasi dan ferolit kinerja membran ultrafiltrasi dalam pengolahan air sungai menjadi air minum. Penelitian dilaksanakan pada Febuari hingga Juli 2026 di Bengkel dan Laboratorium Teknik Energi Politeknik Negeri Sriwijaya dengan tahapan proses meliputi aerasi dan filtrasi menggunakan media pasir silika, karbon aktif, ferolit, zeomangan, dan greensand untuk mengurangi kandungan logam dan partikel tersuspensi, kemudian dilanjutkan dengan proses ultrafiltrasi menggunakan membran yang berfungsi menyaring partikel berukuran sangat kecil, termasuk mikroorganisme, sehingga meningkatkan kualitas air secara lebih optimal. Parameter yang dianalisis meliputi pH, *Total Dissolved Solid* (TDS), kekeruhan, besi (Fe), mangan (Mn), serta parameter kualitas air lainnya. Hasil penelitian diharapkan dapat menentukan kondisi operasi optimum sehingga kualitas air memenugi standar air minum sesuai Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2023.

Kata Kunci: *Air Sungai, Pretreatment, Ferolit, Zeomangan, Ultrafiltrasi, Kualitas Air Minum*

ABSTRACT

THE EFFECT OF FLOW RATE AND AERATION AIR PRESSURE IN AN AERATION–FERROLITE-BASED PRETREATMENT COLUMN ON IMPROVING ULTRAFILTRATION PERFORMANCE FOR TREATING RIVER WATER INTO DRINKING WATER

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River water is one of the water sources widely used by the community; however, its quality often does not meet drinking water standards due to the presence of contaminants such as iron (Fe), manganese (Mn), turbidity, and microorganisms that may pose health risks. Therefore, this study was conducted to analyze the effect of variations in raw water flow rate (6, 8, 10, 12, and 14 L/min) and aeration air pressure (4 and 5 bar) in an aeration and ferrolite-based pretreatment process on the performance of ultrafiltration membranes in the treatment of river water into drinking water. The research was carried out from February to July 2026 at the Workshop and Energy Engineering Laboratory of Politeknik Negeri Sriwijaya. The treatment process consisted of aeration and filtration using silica sand, activated carbon, ferrolite, zeomangan, and greensand media to reduce metal content and suspended particles. The process was then continued with ultrafiltration membrane technology, which functions to remove very fine particles, including microorganisms, thereby improving water quality more effectively. The parameters analyzed included pH, Total Dissolved Solids (TDS), turbidity, iron (Fe), manganese (Mn), and other water quality indicators. The results of this study are expected to determine the optimum operating conditions for the pretreatment and ultrafiltration processes, resulting in water quality that complies with the drinking water standards stipulated in the Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2023.

Kata Kunci: *River Water, Pretreatment, Ferolit, Zeomangan, Ultrafiltrasi, Drinking Water Quality*