

ABSTRAK

PENGARUH LAJU ALIR DAN TEKANAN UDARA PADA *PRETREATMENT* BERBASIS ZEOMANGAN *COLUMN* TERHADAP PENINGKATAN KINERJA ULTRAFILTRASI AIR SUNGAI MENJADI AIR MINUM

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Air sungai sebagai sumber air baku masih mengandung kontaminan seperti Fe, Mn, kekeruhan, TDS, dan mikroorganisme sehingga diperlukan proses pengolahan sebelum menjadi air minum. Penelitian ini menganalisis pengaruh variasi laju alir sebesar 6, 8, 10, 12, dan 14 L/menit dan tekanan udara aerasi sebesar 4 dan 5 bar pada *pretreatment* berbasis zeomangan *column* terhadap kinerja ultrafiltrasi. Hasil penelitian menunjukkan kondisi optimum pada laju alir 12 L/menit dan tekanan 4 bar menghasilkan nilai TDS 47 mg/L; pH 7,1; dan efektivitas *pretreatment* 70,63%. Kualitas produk air minum yang dihasilkan memiliki nilai kekeruhan sebesar 0,3 NTU; kadar Fe sebesar 5,8 µg/L; dan kadar Mn yang di analisa sebesar 15,8 µg/L, serta E. coli dan *Total Coliform* 0 CFU/100 mL dan telah memenuhi standar Permenkes No.2 Tahun 2023.

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

ABSTRACT

THE EFFECT OF FLOW RATE AND AIR PRESSURE IN ZEOMANGANESE COLOUMN-BASED PRETREATMENT ON IMPROVING THE PERFORMANCE OF ULTRAFILTRATION OF RIVER WATER INTO DRINKING WATER

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River water, as a raw water source, still contains contaminants such as iron (Fe), manganese (Mn), turbidity, total dissolved solids (TDS), and microorganisms, requiring treatment before it can be used as drinking water. This study analyzed the effect of varying the raw water flow rates of 6, 8, 10, 12, and 14 L/min and aeration air pressures of 4 and 5 bar in a zeomangan column-based pretreatment system on the performance of an ultrafiltration process. The results showed that the optimum operating condition was achieved at a flow rate of 12 L/min and an aeration pressure of 4 bar, producing a TDS value of 47 mg/L, a pH of 7.1, and a pretreatment effectiveness of 70.63%. The treated drinking water met the quality requirements of the Indonesian Ministry of Health Regulation (Permenkes) No. 2 of 2023, with a turbidity of 0.3 NTU, an iron (Fe) concentration of 5.8 µg/L, a manganese (Mn) concentration of 15.8 µg/L, and Escherichia coli and Total Coliform counts of 0 CFU/100 mL.

Kata Kunci : *River Water , Pretreatment, Zeomangan, Ultrafiltration, Drinking Water Quality*