

ABSTRAK

Pengaruh Laju Alir dan Tekanan Udara pada *Pretreatment* Berbasis Ferolit-Zeomangan Terhadap Peningkatan Kinerja Ultrafiltrasi Air Sumur Menjadi Air Minum

Dela Anggraini, 2026.

Air sumur merupakan salah satu sumber air yang banyak dimanfaatkan masyarakat, namun kualitasnya sering kali belum memenuhi standar air minum karena mengandung besi (Fe), mangan (Mn), kekeruhan, dan mikroorganisme. Penelitian ini bertujuan menganalisis pengaruh variasi laju alir air baku (3, 4, 5, 6, 7, 8, 10, 12, dan 14 L/menit) serta tekanan udara aerasi (4 dan 5 bar) pada *pretreatment* berbasis ferolit-zeomangan terhadap peningkatan kinerja ultrafiltrasi. Proses pengolahan meliputi aerasi, filtrasi media ferolit-zeomangan, karbon aktif, dan ultrafiltrasi. Parameter yang dianalisis meliputi pH, TDS, kekeruhan, Fe, Mn, Total *Coliform*, dan *Escherichia coli*. Hasil terbaik diperoleh pada tekanan udara 4 bar dan laju alir 12 L/menit dengan kualitas air yang memenuhi standar air minum berdasarkan Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2023.

Kata Kunci : Air Sumur, *Pretreatment*, Ferolit-Zeomangan, Ultrafiltrasi, Kualitas Air Minum.

ABSTRACT

The Effect of Flow Rate and Air Pressure in Ferrolite–Zeomangan-Based Pretreatment on the Enhancement of Groundwater Ultrafiltration Performance for Drinking Water Production

Dela Anggraini, 2026.

Groundwater is one of the most widely used water sources by communities; however, its quality often does not meet drinking water standards due to the presence of iron (Fe), manganese (Mn), turbidity, and microorganisms. This study aimed to analyze the effect of variations in raw water flow rate (3, 4, 5, 6, 7, 8, 10, 12, and 14 L/min) and aeration air pressure (4 and 5 bar) in a ferrolite–zeomangan-based pretreatment system on the improvement of ultrafiltration performance. The treatment process consisted of aeration, filtration using ferrolite–zeomangan media, activated carbon filtration, and ultrafiltration. The analyzed parameters included pH, Total Dissolved Solids (TDS), turbidity, iron (Fe), manganese (Mn), Total Coliform, and *Escherichia coli*. The optimum operating condition was achieved at an air pressure of 4 bar and a flow rate of 12 L/min, producing treated water that complied with the drinking water quality standards specified in the Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2023.

Keywords : Groundwater, Pretreatment, Ferrolite-Zeomangan, Ultrafiltration, Drinking Water Quality.