

FILTRATION USING A GALLON FILTER UPFLOW SYSTEM TO REDUCE IRON (FE) AND MANGANESE (MN) LEVELS

Zulfa Nuril Hidayah¹, Haryono², Ibnu Rois³

^{1,2,3} Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Yogyakarta
Jl. Tatabumi No. 3 Banyuraden, Gamping, Sleman
email: zulfanurilhidayah15@gmail.com

ABSTRACT

Background: Borehole water containing high levels of Iron (Fe) and Manganese (Mn) can degrade air quality and cause health and aesthetic problems such as a yellow-brown color, a fishy odor, and sedimentation in the reservoir. One simple way to reduce Fe and Mn levels is to use an upflow filter gallon system with zeolite, activated charcoal, and silica sand as media.

Objective: To determine the levels of Iron (Fe) and Manganese (Mn) in borehole wells before and after filtration using an upflow filter gallon system.

Methods: This is an experimental study using a "Pre-Test-Post-Test Design" with descriptive analysis. The study was conducted in April 2026 in Jambon Hamlet, Sendangagung, Minggir, Sleman, Yogyakarta. The research subjects were water from three borehole wells containing Fe and Mn. Filtration used an upflow filter gallon system.

Results: The average iron (Fe) content before filtration was 4.36 mg/L and after filtration decreased to 1.08 mg/L, with an average reduction of 75%. The average manganese (Mn) content before filtration was 0.50 mg/L and after filtration decreased to 0.20 mg/L, with an average reduction of 66%. The highest reduction in Fe occurred in the third well, at 93.80%, while the highest reduction in Mn occurred in the second well, at 100%. The final filtration results showed that the Fe and some Mn levels still did not meet the quality standards stipulated in the Indonesian Minister of Health Regulation No. 2 of 2023.

Conclusion: From this study, it can be concluded that the upflow gallon filter system is capable of reducing iron (Fe) and manganese (Mn) levels in drilled well water.

Keywords: Filtration, Gallon Filter, Upflow, Iron (Fe), Manganese (Mn).

FILTRASI MENGGUNAKAN GALON FILTER SISTEM UPFLOW DALAM MENURUNKAN KADAR BESI (FE) DAN MANGAN (MN)

Zulfa Nuril Hidayah¹, Haryono², Ibnu Rois³

^{1,2,3} Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Yogyakarta
Jl. Tatabumi No. 3 Banyuraden, Gamping, Sleman
email: zulfanurilhidayah15@gmail.com

ABSTRAK

Latar Belakang: Air sumur bor yang mengandung kadar Besi (Fe) dan Mangan (Mn) tinggi dapat menurunkan kualitas air dan menimbulkan gangguan kesehatan maupun estetika seperti warna kuning kecokelatan, bau amis, dan endapan pada bak penampungan. Salah satu upaya sederhana yang dapat dilakukan untuk menurunkan kadar Fe dan Mn adalah menggunakan *galon filter* sistem *upflow* dengan media zeolit, arang aktif, dan pasir silika.

Tujuan: Mengetahui kadar Besi (Fe) dan Mangan (Mn) pada air sumur bor sebelum dan sesudah dilakukan filtrasi menggunakan *galon filter* sistem *upflow*.

Metode: Penelitian ini merupakan penelitian eksperimental dengan menggunakan design penelitian "Pre Test-Post Test Design" yang dianalisis secara deskriptif. Penelitian dilaksanakan pada April 2026 di Dusun Jambon, Sendangagung, Minggir, Sleman, Yogyakarta. Objek penelitian berupa air dari tiga sumur bor yang mengandung Fe dan Mn. Filtrasi menggunakan *galon filter* sistem *upflow*.

Hasil: Rata-rata kadar Besi (Fe) sebelum filtrasi sebesar 4,36 mg/L dan sesudah filtrasi menurun menjadi 1,08 mg/L dengan rata-rata penurunan sebesar 75%. Rata-rata kadar Mangan (Mn) sebelum filtrasi sebesar 0,50 mg/L dan sesudah filtrasi menurun menjadi 0,20 mg/L dengan rata-rata penurunan sebesar 66%. Penurunan tertinggi Fe terjadi pada sumur ke-3 sebesar 93,80%, sedangkan penurunan tertinggi Mn terjadi pada sumur ke-2 sebesar 100%. Hasil akhir filtrasi menunjukkan kadar Fe dan sebagian kadar Mn masih belum memenuhi baku mutu Permenkes RI No. 2 Tahun 2023.

Kesimpulan: Dari penelitian ini dapat disimpulkan bahwa *galon filter* sistem *upflow* mampu menurunkan kadar Besi (Fe) dan Mangan (Mn) pada air sumur bor.

Kata Kunci: Filtrasi, Galon Filter, Upflow, Besi (Fe), Mangan (Mn).