

**A STUDY ON THE USE OF MANGANESE GREENSAND AND
ACTIVATED CARBON FILTER MEDIA TO REDUCE IRON (Fe) AND
MANGANESE (Mn) LEVELS IN DUG WELL WATER IN GADINGHARJO
HAMLET, DONOTIRTO, KRETEK, BANTUL**

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ABSTRACT

Background: Dug well water is a common source of clean water used by the community for daily needs. Iron (Fe) and manganese (Mn) levels exceeding quality standards can degrade water quality and cause health and aesthetic issues, such as yellow discoloration, a fishy odor, and sediment accumulation in storage tanks. Observations revealed that dug well water in Gadingharjo Hamlet (RT 22), Donotirto Village, Kretek District, Bantul Regency, contained Fe (0.69 mg/L) and Mn (0.55 mg/L) levels exceeding quality standards; therefore, water treatment via filtration using manganese greensand and activated carbon was required.

Objective: To determine the reduction in Fe and Mn levels in dug well water before and after filtration using manganese greensand and activated carbon filter media.

Methods: This study employed a quasi-experimental design (pre-test/post-test). The samples consisted of dug well water with Fe and Mn levels exceeding quality standards. Filtration was performed using a 1:1 combination of manganese greensand and activated carbon at a flow rate of 1 L/minute. Fe and Mn levels were measured using a test kit (Hanna Checker) with three replicates.

Results: The study showed that the average Fe level was 0.35 mg/L before filtration and 0.22 mg/L after filtration, representing an average reduction of 0.12 mg/L (28.86%). The average Mn level was 0.23 mg/L before filtration and 0.10 mg/L after filtration, representing an average reduction of 0.13 mg/L (66.7%).

Conclusion: Filtration using manganese greensand and activated carbon media effectively reduced iron (Fe) levels by 0.12 mg/L (28.86%) and manganese (Mn) levels by 0.13 mg/L (66.7%) in dug well water. The reduction in Mn levels met the quality standards set by the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023, whereas the Fe level after filtration remained slightly above the established standard.

Keywords: Dug well water, Iron (Fe), Manganese (Mn), Filtration, Manganese Greensand, Activated Carbon.

**STUDI PENGGUNAAN MEDIA FILTER MANGANESE GREENSAND
DAN KARBON AKTIF UNTUK MENURUNKAN KADAR BESI (Fe) DAN
MANGAN (Mn) PADA AIR SUMUR GALI DI DUSUN GADINGHARJO,
DONOTIRTO, KRETEK, BANTUL**

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ABSTRAK

Latar Belakang: Air sumur gali merupakan salah satu sumber air bersih yang banyak digunakan masyarakat untuk memenuhi kebutuhan sehari-hari. Kandungan besi (Fe) dan mangan (Mn) yang melebihi baku mutu dapat menurunkan kualitas air serta menimbulkan gangguan kesehatan maupun estetika seperti warna kuning, bau amis, dan endapan pada bak penampung. Berdasarkan hasil pengamatan, air sumur gali di Dusun gadingharjo RT 22, Kalurahan Donotirto, Kapanewon Kretek, Kabupaten Bantul memiliki kadar Fe 0,69 mg/L dan Mn 0,55 mg/L yang melebihi baku mutu sehingga diperlukan upaya pengolahan air melalui proses filtrasi menggunakan *manganese greensand* dan karbon aktif.

Tujuan: Mengetahui penurunan kadar Fe dan Mn sebelum dan sesudah dilakukan filtrasi menggunakan media filter *manganese greensand* dan karbon aktif pada air sumur gali.

Metode: Penelitian ini merupakan penelitian *quasi experimental* dengan desain *tat-Post Test design*. Sampel penelitian berupa air sumur gali yang mengandung kadar Fe dan Mn melebihi baku mutu. Filtrasi dilakukan menggunakan kombinasi *manganese greensand* dan karbon aktif dengan perbandingan 1:1 dengan debit aliran 1L/menit. Pemeriksaan kadar Fe dan Mn dilakukan menggunakan metode *Test Kit (Hanna Checker)* dengan tiga kali pengulangan.

Hasil: Hasil penelitian menunjukkan bahwa rata-rata kadar Fe sebelum filtrasi sebesar 0,35 mg/L dan setelah filtrasi menjadi 0,22 mg/L dengan rata-rata penurunan sebesar 0,12 mg/L (28,86%). Rata-rata kadar Mn sebelum filtrasi sebesar 0,23 mg/L dan setelah filtrasi menjadi 0,10 mg/L dengan rata-rata penurunan sebesar 0,13 mg/L (66,7%).

Kesimpulan: Penurunan media filter *manganese greensand* dan karbon aktif mampu menurunkan kadar besi (Fe) sebesar 0,12 mg/L (28,86%) dan kadar mangan (Mn) sebesar 0,13 mg/L (66,7%) pada air sumur gali. Penurunan kadar Mn telah memenuhi baku mutu Permenkes RI Nomor 2 Tahun 2023, sedangkan kadar Fe setelah filtrasi masih sedikit di atas baku mutu yang ditetapkan.

Kata Kunci: Air sumur gali, Besi (Fe), Mangan (Mn), Filtrasi, *Manganese greensand*, Karbon aktif.