

A STUDY ON THE USE OF SAND, ZEOLITE, AND ACTIVATED CARBON MEDIA FILTERS TO REDUCE IRON (FE) LEVELS AND TURBIDITY IN DRILLED WELL WATER AT HUNTAP PLUMBON, SINDUMARTANI, NGEMPLAK, SLEMAN

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ABSTRACT

Background: The groundwater at the Plumbon Permanent Housing (Huntap) in Sindumartani Village, Ngemplak Subdistrict, Sleman Regency contains relatively high levels of iron (Fe) and turbidity, and therefore does not meet the standards set forth in Ministry of Health Regulation No. 2 of 2023, which stipulates a maximum Fe level of 2.0 mg/L and turbidity of less than 3 NTU. Therefore, filtration is necessary as a means of reducing the iron content and turbidity of the water. The filtration system uses a series of filters containing Malang sand, zeolite, and activated carbon, with a media bed depth of 20 cm within the filter housing.

Objective: To investigate the use of sand, zeolite, and activated carbon filters in reducing iron (Fe) levels and turbidity in well water at Huntap Plumbon, Sindumartani, Ngemplak, Sleman.

Method: This study is a quasi-experimental study with a pre-test–post-test design that will be analyzed descriptively to determine the performance of the filter media. The study sample consisted of one control group and one treatment group, with the experiment conducted over a period of three days. A flow rate of 500 ml/minute was used to collect water samples from the Huntap Plumbon borehole in Sindumartani, Ngemplak, Sleman.

Results: The results showed that the Fe concentration after filtration on days 1, 2, and 3 was 1.16, 1.22, and 1.18 mg/L, respectively, with an average reduction of 50%. Meanwhile, the turbidity levels after filtration on days 1, 2, and 3 were 9.97, 12.18, and 11.05 NTU, respectively, with an average percentage reduction of 56%.

Conclusion: Filtration using Malang sand, zeolite, and activated carbon can reduce iron (Fe) levels by an average of 50% and turbidity by an average of 56%. Based on these research findings, the iron (Fe) levels and turbidity in the water still do not meet the quality standards set forth in Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2023.

Keywords: filtration, Malang sand, zeolite, activated carbon, iron (Fe), turbidity, water

**STUDI PENGGUNAAN FILTER MEDIA PASIR MALANG, ZEOLIT DAN
ARANG AKTIF UNTUK MENURUNKAN KADAR BESI (Fe),
KEKERUHAN AIR SUMUR BOR DI HUNTAP PLUMBON,
SINDUMARTANI, NGEMPLAK, SLEMAN**

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ABSTRAK

Latar Belakang: Air tanah di Hunian Tetap (Huntap) Plumbon, Desa Sindumartani, Kecamatan Ngemplak, Kabupaten Sleman mengandung kadar besi (Fe) dan kekeruhan yang cukup tinggi, sehingga tidak memenuhi standar Permenkes Nomor 2 Tahun 2023 dengan batas maksimum Fe 2,0 mg/L dan kekeruhan kurang dari 3 NTU. Dengan demikian, diperlukan filtrasi sebagai salah satu cara menurunkan kadar besi dan kekeruhan air tersebut. Filtrasi menggunakan rangkaian filter media pasir malang, zeolit dan arang aktif dengan ketebalan media 20 cm dalam *housing filter*.

Tujuan: Mengetahui penggunaan filter media pasir malang, zeolit dan arang aktif dalam menurunkan kadar besi (Fe) dan kekeruhan air sumur bor di Huntap Plumbon, Sindumartani, Ngemplak, Sleman.

Metode: Jenis penelitian ini quasi eksperiment dengan desain *pre test - post test* yang akan dianalisis secara diskriptif untuk mengetahui kinerja media filter. Sampel penelitian ini adalah 1 kontrol 1 perlakuan yang dilakukan selama 3 hari. Debit aliran yang digunakan yaitu 500ml/menit untuk mengambil sampel air di air sumur bor Huntap Plumbon, Sindumartani, Ngemplak, Sleman.

Hasil: Hasil penelitian menunjukkan kadar Fe setelah filtrasi pada hari ke-1, ke-2, dan ke-3 berturut-turut sebesar 1,16 mg/L, 1,22 mg/L, dan 1,18 mg/L, dengan persentase penurunan rata-rata sebesar 50%. Sementara itu, tingkat kekeruhan setelah filtrasi pada hari ke-1, ke-2, dan ke-3 masing-masing sebesar 9,97 NTU, 12,18 NTU, dan 11,05 NTU, dengan persentase penurunan rata-rata sebesar 56%.

Kesimpulan: Filtrasi menggunakan media pasir malang, zeolit dan arang aktif dapat menurunkan kadar besi (Fe) dengan rata-rata 50% dan kekeruhan dengan rata-rata 56%. Dengan hasil penelitian tersebut, kadar besi (Fe) dan kekeruhan dalam air masih belum memenuhi standar baku mutu menurut Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2023.

Kata kunci: filtrasi, pasir malang, zeolit, arang aktif, besi (Fe), kekeruhan, air