

VARIATIONS THE THICKNESS OF ZEOLITE AND ACTIVATED CHARCOAL MEDIA TO REDUCE IRON (Fe) LEVELS IN WELL WATER IN THE VILLAGE OF BLENDUNG, PURWODADI, PURWOREJO

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ABSTRACT

Background: Water is an essential substance for the human body. Water used for drinking must be of higher quality than water used for washing, cooking and other purposes. Water must meet physical, chemical, microbiological and radioactive requirements. High iron (Fe) levels in water have physical, technical and health implications. One way to reduce iron (Fe) levels is through filtration using a combination of zeolite and activated carbon media.

Objective: Determining the effect of variations in the thickness of zeolite and activated charcoal media on reducing iron (Fe) levels in drilled well water.

Research Method: This research is a quasi-experimental study with a pre-test–post-test group design. The object of this study is well water located in Blendung Village, Purwodadi, Purworejo. There are three variations in media thickness, namely Filter A (22.5 cm zeolite media and 22.5 cm activated charcoal), Filter B (15 cm zeolite media and 30 cm activated charcoal) and Filter C (30 cm zeolite media and 15 cm activated charcoal), with each variation repeated three times. Data analysis was performed using the *Shapiro-Wilk* normality test, followed by the *paired T-test*, *One-Way Anova*, and finally the *LSD* test.

Results: The descriptive analysis shows a decrease in iron (Fe) levels in Filter A to 3.96 mg/L, Filter B to 1.71 mg/L, and Filter C to 3.08 mg/L. The normality test results indicate that the data are normally distributed. The paired T-test indicates that there are significant differences between the treatments for each filter. The one-way ANOVA test indicates that there is a statistically significant effect of the treatment using the three filters, and the LSD test indicates that there are significant differences between the use of Filter A, Filter B, and Filter C in terms of the decrease in iron (Fe) levels.

Conclusion: The filter variation of zeolite and activated charcoal media is capable of reducing the iron (Fe) content in drilled well water.

Keywords: Iron (Fe), zeolite and activated charcoal media, thickness variations

VARIASI KETEBALAN MEDIA ZEOLIT DAN ARANG AKTIF UNTUK MENURUNKAN KADAR BESI (Fe) AIR SUMUR BOR DI DESA BLENDUNG, PURWODADI, PURWOREJO

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ABSRTAK

Latar Belakang: Air merupakan zat yang penting bagi tubuh manusia. Air yang digunakan untuk minum harus lebih baik dari air yang digunakan untuk mencuci, memasak dan kebutuhan lainnya. Air harus memenuhi persyaratan fisik, kimia, mikrobiologi dan radioaktif. Kadar Besi (Fe) yang tinggi pada air berdampak secara fisik, teknis dan kesehatan. Salah satu cara menurunkan kadar Besi (Fe) yaitu dengan metode filtrasi menggunakan kombinasi media zeolit dan arang aktif.

Tujuan: Mengetahui pengaruh variasi ketebalan media zeolit dan arang aktif untuk menurunkan kadar Besi (Fe) air sumur bor.

Metode Penelitian: Penelitian *Quasi Eksperiment* dengan desain *Pre Test – Post Test Group Design*. Objek penelitian ini adalah air sumur bor yang berlokasi di Desa Blendung, Purwodadi, Purworejo. Terdapat tiga variasi ketebalan media yaitu Filter A (Media zeolit 22,5 cm dan arang aktif 22,5 cm), Filter B (Media zeolit 15 cm dan arang aktif 30 cm) dan Filter C (Media zeolit 30 cm dan arang aktif 15 cm) dengan masing-masing dilakukan tiga kali pengulangan setiap variasinya. Analisis data menggunakan uji normalitas dengan uji *Shapiro-Wilk*, kemudian dilanjutkan dengan uji T-test terikat, *One Way Anova*, dan terakhir dengan uji LSD.

Hasil Penelitian: Secara deskriptif menunjukkan penurunan kadar Besi (Fe) pada Filter A 3,96 mg/L, Filter B 1,71 mg/L dan Filter C 3,08 mg/L. Hasil uji normalitas diketahui data terdistribusi normal, uji *T-test* terikat diketahui ada perbedaan yang bermakna perlakuan setiap filter, uji *one way anova* ada pengaruh yang bermakna secara statistik perlakuan menggunakan ketiga filter, dan uji LSD ada perbedaan yang signifikan penggunaan Filter A, Filter B dan Filter C terhadap penurunan kadar Besi (Fe).

Kesimpulan: Filter variasi media zeolit dan arang aktif mampu menurunkan kadar Besi (Fe) pada air sumur bor.

Kata Kunci: Besi (Fe), Media zeolit dan arang aktif, variasi ketebalan