

THE EFFECT OF ACTIVATED CARBON PARTICLE SIZE FROM KEPOK BANANA PEEL ON REDUCING IRON (FE) CONCENTRATION IN DUG WELL WATER IN MORANGAN HAMLET, NGEMPLAK, SLEMAN

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ABSTRACT

Background of study : *High levels of iron (Fe) in dug well water can cause health issues and affect water quality, such as taste, color, and digestive disorders. Kepok banana peel contains lignin, cellulose, and active functional groups (-OH, -COOH) that have potential as heavy metal adsorbents, making it a promising eco-friendly filtration medium.*

Aim of study : *This study aimed to determine the effect of different particle sizes of activated carbon from kepok banana peel on the reduction of iron (Fe) concentration in dug well water in Morangan Hamlet, Ngemplak, Sleman.*

Research method : *This experimental research applied three variations of activated carbon particle sizes: 1–0.5 cm (Filter A), 0.5–0.2 cm (Filter B), and 0.2–0.1 cm (Filter C). Water samples from the dug well were tested before and after filtration, with three replications for each treatment. Data were analyzed descriptively and inferentially using normality test, Wilcoxon, and Kruskal-Wallis test.*

Results : *The findings showed a decrease in Fe concentration across all filters. Filter A reduced Fe from 1.21 mg/L to 0.247 mg/L (80%), Filter B from 1.08 mg/L to 0.19 mg/L (82%), and Filter C from 1.19 mg/L to 0.207 mg/L (83%). However, statistical analysis revealed no significant differences among the filters (p -value = 0.059 > 0.05).*

Conclusion : *Activated carbon from kepok banana peel effectively reduced iron (Fe) levels in dug well water by 80–83%. Nevertheless, variations in particle size did not show statistically significant differences. This study highlights the potential of utilizing organic waste as a simple, low-cost, and environmentally friendly technology for water treatment.*

Keywords: *Activated Carbon from Banana Peel, Filtration, Water Sanitation*

PENGARUH DIAMETER ARANG AKTIF KULIT PISANG KEPOK UNTUK
MENURUNKAN KADAR BESI (FE) DALAM AIR SUMUR GALI DI DUSUN
MORANGAN, NGEMPLAK, SLEMAN

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INTISARI

Latar Belakang : Kadar besi (Fe) yang tinggi dalam air sumur gali dapat menimbulkan masalah kesehatan dan kualitas air, seperti rasa, warna, serta potensi gangguan pencernaan. Kulit pisang kepok memiliki kandungan lignin, selulosa, serta gugus fungsi aktif ($-OH$, $-COOH$) yang berpotensi sebagai adsorben logam berat, sehingga dapat dimanfaatkan sebagai media filtrasi ramah lingkungan.

Tujuan : Penelitian ini bertujuan mengetahui pengaruh variasi diameter arang aktif kulit pisang kepok terhadap penurunan kadar besi (Fe) dalam air sumur gali di Dusun Morangan, Ngemplak, Sleman.

Metode : Penelitian eksperimental ini menggunakan tiga variasi diameter arang aktif kulit pisang kepok, yaitu 1–0,5 cm (Filter A), 0,5–0,2 cm (Filter B), dan 0,2–0,1 cm (Filter C). Sampel air sumur gali diuji sebelum dan sesudah filtrasi dengan tiga kali pengulangan. Analisis data dilakukan secara deskriptif dan inferensial menggunakan uji normalitas, *Wilcoxon*, serta *Kruskal-Wallis*.

Hasil : Hasil penelitian menunjukkan adanya penurunan kadar Fe pada semua variasi filter. Filter A menurunkan kadar Fe dari 1,21 mg/l menjadi 0,247 mg/l (80%), Filter B dari 1,08 mg/l menjadi 0,19 mg/l (82%), dan Filter C dari 1,19 mg/l menjadi 0,207 mg/l (83%). Meskipun demikian, hasil uji statistik menunjukkan tidak ada perbedaan signifikan antar variasi filter ($p\text{-value} = 0,059 > 0,05$).

Kesimpulan : Arang aktif kulit pisang kepok mampu menurunkan kadar besi (Fe) dalam air sumur gali dengan efektivitas 80–83%. Namun, variasi diameter arang aktif tidak memberikan perbedaan signifikan secara statistik. Penelitian ini mendukung potensi pemanfaatan limbah organik sebagai teknologi sederhana, murah, dan ramah lingkungan dalam penyehatan air.

Kata Kunci: Arang Aktif Kulit Pisang, Filtrasi, Penyehatan Air