# EFFECTIVENESS OF VARIOUS CERAMIC MEMBRANE MEDIA IN REDUCING Fe LEVELS IN DUG WELL WATER IN MORANGAN HAMLET, NGEMPLAK, SLEMAN

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## ABSTRACT

***Background :*** *Clean water is an essential need for life, but dug wells are often contaminated with iron (Fe) that exceeds the safe limit of 0.2 mg/L according to the regulations of the Indonesian Ministry of Health. Preliminary studies show that Fe levels in Dusun Morangan, Ngemplak, Sleman range from 0.3 mg/L to 2 mg/L, so an effective treatment method is needed to meet safe clean water quality standards.*

***Objective :*** *To determine the effectiveness of various clay ceramic membrane media in reducing Fe levels in dug well water.*

***Method :*** *The study used a Quasi Experiment with a "pre-test–post-test with control group" design conducted in May 2025, with the object of dug well water belonging to one of the residents of Morangan Hamlet, Ngemplak, Sleman. The analysis of filtration effectiveness was carried out using the One Way Anova test.*

***Results :*** *The results of the study using ceramic clay membranes with coconut shell charcoal (9: 1) showed an average decrease in Fe levels of 0,65 mg/L (60%), The average decrease in Fe levels using ceramic clay membranes with rice husk charcoal (9: 1) was 0,67 mg/L (62%). The average decrease in Fe levels using ceramic clay membranes (100%) was 0,72 mg/L (63%). The results of statistical tests showed no significant difference in the decrease in Fe levels between treatments (p = 0,898).*

***Conclusion :*** *Various ceramic membrane media have been proven effective in reducing iron (Fe) concentrations in dug well water. The most optimal result was obtained using a ceramic membrane composed of (100%) clay, which achieved a reduction of Fe concentration by up to 63%.*

***Keywords :*** *Clay, Coconut Shell Charcoal, Rice Husk Charcoal, Fe Content, Dug Well Water*

# EFEKTIVITAS BERBAGAI MEDIA MEMBRAN KERAMIK DALAM MENURUNKAN KADAR Fe AIR SUMUR GALI DI DUSUN MORANGAN, NGEMPLAK, SLEMAN

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## ABSTRAK

**Latar Belakang :** Air bersih merupakan kebutuhan penting bagi kehidupan, namun sumur gali sering terkontaminasi besi (Fe) yang melebihi batas aman 0,2 mg/L sesuai regulasi Kementerian Kesehatan RI. Studi pendahuluan menunjukkan kadar Fe di Dusun Morangan, Ngemplak, Sleman berkisar antara 0,3 mg/L hingga 2 mg/L, sehingga diperlukan metode pengolahan yang efektif agar memenuhi standar kualitas air bersih yang aman.

**Tujuan :** Mengetahui efektivitas berbagai media membran keramik tanah liat dalam menurunkan kadar Fe pada air sumur gali.

**Metode :** Penelitian menggunakan *Quasi Experiment* dengan desain "*pre test–post test with control group*" yang dilakukan pada Mei 2025, dengan objek air sumur gali milik salah satu warga Dusun Morangan, Ngemplak, Sleman. Analisis efektivitas filtrasi dilakukan menggunakan uji *One Way Anova*.

**Hasil :** Hasil penelitian menunjukkan bahwa membran keramik tanah liat dengan arang tempurung kelapa (9 : 1) rata – rata penurunan kadar Fe sebesar 0,65 mg/L (60%), Rata – rata penurunan kadar Fe menggunakan membran keramik tanah liat dengan arang sekam padi (9 : 1 ) sebesar 0,67 mg/L (62%). Rata – rata penurunan kadar Fe menggunakan membran keramik tanah liat (100%) sebesar 0,72 mg/L (63%). Hasil dengan uji statistik menunjukkan tidak ada perbedaan signifikan antar perlakuan ($p$ = 0,898).

**Kesimpulan :** Berbagai media membran keramik terbukti mampu menurunkan kadar Fe air sumur gali. Hasil paling optimal diperoleh pada penggunaan membran keramik tanah liat dengan komposisi (100%) yaitu penurunan mencapai 63%.

**Kata Kunci :** Tanah Liat, Arang Tempurung Kelapa, Arang Sekam Padi, Kadar Fe, Air Sumur Gali