

EFEKTIVITAS BERBAGAI MODEL FILTER DALAM MENURUNKAN KADAR NITRAT (NO_3^-) AIR SUMUR DI KAMPUNG JOGOYUDAN, GOWONGAN, JETIS, YOGYAKARTA

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INTISARI

Latar Belakang: Peningkatan aktivitas penduduk di kawasan perkotaan sering menyebabkan penurunan kualitas air sumur, salah satunya akibat pencemaran nitrat (NO_3^-). Nitrat dalam konsentrasi tinggi berisiko menimbulkan gangguan kesehatan seperti methemoglobinemia dan gangguan pencernaan. Berdasarkan studi pendahuluan di Kampung Jogoyudan, Gowongan, Jetis, Yogyakarta, kadar nitrat dalam air sumur mencapai 17,243 mg/L, mendekati ambang batas baku mutu menurut Permenkes No. 2 Tahun 2023 sebesar 20 mg/L. Kondisi ini menunjukkan perlunya metode pengolahan air yang efektif, seperti filtrasi dengan media adsorben alami.

Tujuan: Mengetahui efektifitas berbagai model filter yang menggunakan kombinasi media zeolit dan arang aktif dalam menurunkan kadar nitrat air sumur di kampung Jogoyudan, Gowongan, Jetis, Yogyakarta.

Metode: Penelitian ini adalah quasi eksperimen dengan desain *non-equivalent control group*. Tiga model filter diuji, yaitu Filter A (zeolit 40 cm dan arang aktif 60 cm), Filter B (zeolit 60 cm dan arang aktif 40 cm), dan Filter C (zeolit 50 cm dan arang aktif 50 cm). Sampel air sumur diambil menggunakan purposive sampling dengan 6 ulangan per perlakuan.

Hasil: Penelitian menunjukkan bahwa ketiga model filter secara signifikan mampu menurunkan kadar nitrat (NO_3^-). Filter A berhasil menurunkan kadar nitrat (NO_3^-) dari rata-rata 17,957 mg/L menjadi 2,344 mg/L, Filter B menjadi 2,749 mg/L, dan Filter C menjadi 4,876. Analisis statistik dengan *One Way Anova* dan uji *LSD* menegaskan perbedaan signifikan antar model filter, dengan Filter A sebagai model paling efektif.

Kesimpulan: Penggunaan kombinasi media zeolit dan arang aktif efektif dalam menurunkan kadar nitrat (NO_3^-) air sumur, dengan Filter A yang paling efektif untuk pengolahan air sumur di daerah pencemaran nitrat (NO_3^-) tinggi.

Kata kunci: Nitrat (NO_3^-), Filtrasi, Zeolit, Arang Aktif, Air Sumur, Efektivitas

**EFFECTIVENESS OF VARIOUS FILTER MODELS IN REDUCING
NITRATE (NO_3^-) LEVELS OF WELL WATER IN JOGOYUDAN VILLAGE,
GOWONGAN, JETIS, YOGYAKARTA**

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ABSTRACT

Background: Increased population activity in urban areas often causes a decrease in well water quality, one of which is due to nitrate (NO_3^-) pollution. Nitrate in high concentrations has the risk of causing health problems such as methemoglobinemia and digestive disorders. Based on a preliminary study in Jogoyudan Village, Gowongan, Jetis, Yogyakarta, nitrate levels in well water reached 17,243 mg/L, close to the quality standard threshold according to Permenkes No. 2 Year 2023 of 20 mg/L. This condition shows the need for effective water treatment methods, such as filtration with natural adsorbent media.

Objective: To determine the effectiveness of various filter models using a combination of zeolite and activated charcoal media in reducing well water nitrate (NO_3^-) levels in Jogoyudan village, Gowongan, Jetis, Yogyakarta.

Methods: This study was a quasi-experiment with a non-equivalent control group design. Three filter models were tested, namely Filter A (zeolite 40 cm and activated charcoal 60 cm), Filter B (zeolite 60 cm and activated charcoal 40 cm), and Filter C (zeolite 50 cm and activated charcoal 50 cm). Well water samples were taken using purposive sampling with 6 replicates per treatment.

Results: The study showed that the three filter models were significantly able to reduce nitrate (NO_3^-) levels. Filter A succeeded in reducing nitrate levels from an average of 17.957 mg/L to 2.344 mg/L, Filter B to 2.749 mg/L, and Filter C to 4.876. Statistical analysis with One Way Anova and LSD test confirmed significant differences between filter models, with Filter A as the most effective model.

Conclusion: The use of a combination of zeolite and activated charcoal media is effective in reducing well water nitrate (NO_3^-) levels, with Filter A being the most effective for well water treatment in nit polluted areas.

Keywords: Nitrate (NO_3^-), Filtration, Zeolite, Activated Charcoal, Well Water, Effectiveness