Ministry of Health of the Republic of Indonesia Jambi Polytechnic
Department of Environmental Health
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TYASARA MARUNI
"THE ABILITY OF CHARCOAL, ZEOLITE AND SILICA SAND TO REDUCE Pb IN RAINWATER"

ABSTRAC

Rainwater is often used as an alternative clean water source in areas with limited access, but it is at risk of lead (Pb) contamination from air pollution and zinc roofs. Therefore, a simple and effective method is needed to reduce Pb levels to make rainwater safer to use. This study aims to determine the ability of activated charcoal, zeolite, and silica sand to reduce Pb levels in rainwater.

The study was an experiment with a one-group pretest-posttest design. Rainwater samples were taken from household reservoirs and tested before and after treatment with activated charcoal, zeolite, and silica sand. Pb levels were analyzed using Atomic Absorption Spectrophotometry (AAS). Data were statistically analyzed using ANOVA to determine differences in the effectiveness of the three media.

The results showed that activated charcoal, zeolite, and silica sand were able to reduce Pb levels with varying effectiveness. Zeolite and activated charcoal reduced Pb by up to 60% at a certain discharge, with an average reduction of 44%, while silica sand was only able to reduce Pb by a maximum of 40% with an average reduction of 16%. ANOVA tests showed a significant difference between the media ($p = 0.021$), with zeolite being more effective than silica sand ($p = 0.027$).

The study concluded that zeolite and activated charcoal were more effective than silica sand in reducing lead levels in rainwater.

Keywords : Rainwater, Lead (Pb), Activated Carbon, Zeolite, SilicaSand
Reading List: 16 (2010-2024)

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KEMAMPUAN ARANG, ZEOLIT DAN PASIR SILIKA MENURUNKAN Pb PADA AIR HUJAN

xvii + 39 Halaman + 8 Tabel + 2 Gambar + 6 Lampiran

ABSTRAK

Air hujan sering dimanfaatkan sebagai sumber air bersih alternatif di daerah dengan keterbatasan akses, namun berisiko tercemar timbal (Pb) yang berasal dari polusi udara dan atap seng. Oleh karena itu, diperlukan metode sederhana dan efektif untuk menurunkan kadar Pb agar air hujan lebih aman digunakan. Penelitian ini bertujuan untuk mengetahui kemampuan arang aktif, zeolit, dan pasir silika dalam menurunkan kadar Pb pada air hujan.

Jenis penelitian adalah eksperimen dengan rancangan one group pretest-posttest design. Sampel air hujan diambil dari penampungan rumah tangga dan diuji sebelum serta sesudah perlakuan dengan media arang aktif, zeolit, dan pasir silika. Analisis kadar Pb dilakukan menggunakan Atomic Absorption Spectrophotometry (AAS)**.** Data dianalisis secara statistik dengan uji ANOVA untuk melihat perbedaan efektivitas ketiga media.

Hasil penelitian menunjukkan bahwa arang aktif, zeolit, dan pasir silika mampu menurunkan kadar Pb dengan efektivitas berbeda. Zeolit dan arang aktif menurunkan Pb hingga 60% pada debit tertentu, dengan rata-rata penurunan 44%, sedangkan pasir silika hanya mampu menurunkan maksimal 40% dengan rata-rata 16%. Uji ANOVA menunjukkan adanya perbedaan signifikan antar media ($p = 0,021$), dengan efektivitas zeolit lebih baik dibandingkan pasir silika ($p = 0,027$).

Kesimpulan penelitian ini adalah zeolit dan arang aktif terbukti lebih efektif dibandingkan pasir silika dalam menurunkan kadar Pb pada air hujan.

Kata Kunci : Air hujan, Timbal (Pb), Arang aktif, Zeolit, Pasir silika
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