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**Peningkatan Kualitas Air Hujan Sebagai Sumber Air Minum Melalui Metode Filtrasi dan Adsorpsi**

xix + 112 halaman + 21 tabel + 11 gambar, dan 11 lampiran

**RINGKASAN**

Secara global, sekitar 1,1 miliar orang tidak terakses sumber air yang sehat. Air hujan merupakan salah satu sumber air minum yang belum banyak digunakan. Namun, namun kualitasnya harus ditingkatkan akibat polusi udara. Penelitian bertujuan meningkatkan kualitas air hujan sebagai sumber air minum, melalui proses filtrasi dan adsorpsi.

Penelitian menggunakan *system batch* dengan Rancangan Acak Lengkap Faktorial dan dua kali pengulangan. Sampel air hujan dari atap rumah penduduk di kawasan industri dengan tingkat polusi udara tinggi. Tiga variasi ketebalan digunakan pada setiap media filtrasi dan adsorpsi: pasir silika (0 cm, 10 cm, 20 cm), Zeolit (0 cm, 20 cm, 40 cm), dan karbon aktif (0 cm, 20 cm, 40 cm). Waktu kontak setiap perlakuan selama lima menit. Kualitas air diukur pada parameter kesadahan, nitrat, nitrit, dan sulfat. Uji ANOVA Two-way diterapkan ( $\alpha=0,05$ ) menggunakan SPSS 24.0.

Hasil penelitian menunjukkan bahwa ketebalan media memberikan pengaruh signifikan ( $p\text{-value}<0,05$ ) terhadap seluruh parameter uji. Efek tertinggi pada kombinasi ketebalan 20 cm (silika), 40 cm (zeolit) dan 40 cm (karbon aktif). Efektivitas penurunan sebesar 82% (kesadahan), 100% (nitrit), 95% (nitrat), dan 99% (sulfat). Penelitian lanjutan diperlukan pada pengolahan *system continue*.

**Kata kunci** : Air hujan, filtrasi, adsorpsi, silika, zeolit, karbon aktif

**Daftar Bacaan** : 30 (2009-2021)

**TANJUNGPUR HEALTH POLYTECHNIC  
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**Improving the Quality of Rainwater for Drinking Water through Filtration and Adsorption Methods**

xix + 112 pages + 21 tables + 11 pictures, and 11 appendices

**ABSTRACT**

Globally, around 1.1 billion people do not have access to healthy water sources. Rainwater is one of the sources of drinking water that has not been widely used. However, the quality must be improved due to air pollution. The research aims to improve rainwater quality as a source of drinking water through filtration and adsorption processes.

The study used a system batch with a completely randomized factorial design and two replications. Samples of rainwater from the roofs of residents' houses in industrial areas with high levels of air pollution. Three thickness variations were used for each filtration and adsorption medium: silica (0 cm, 10 cm, 20 cm), Zeolite (0 cm, 20 cm, 40 cm), and activated carbon (0 cm, 20 cm, 40 cm). The contact time for each treatment was five minutes. Water quality is measured on the parameters of hardness, nitrate, nitrite, and sulfate. A two-way ANOVA test was applied ( $\alpha=0.05$ ) using SPSS 24.0.

The results showed that the thickness of the media had a significant effect ( $p\text{-value} < 0.05$ ) on all test parameters. The highest effect was at a combination of thicknesses of 20 cm (silica), 40 cm (zeolite), and 40 cm (activated carbon). The reduction effectiveness was 82% (hardness), 100% (nitrite), 95% (nitrate), and 99% (sulfate). Further research is needed on continuous system processing.

**Keywords** : Rainwater, filtration, adsorption, silica, zeolite, activated carbon\  
**Reading list** : 30 (2009-2021)