

**EFFECTIVENESS OF VARIOUS FILTER MODELS TO REDUCE IRON  
(Fe) LEVELS IN WELL WATER AT AL HIKMAH ORPHANAGE, PLUPUH,  
WUKIRSARI, CANGKRINGAN**

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**ABSTRACT**

**Background :** Water is one of the most important natural resources for human life. Pollution of clean water by iron (Fe) chemicals can cause various health problems. Based on preliminary tests on July 14, 2024 at the Al Hikmah Plupuh Orphanage, Wukirsari, Cangkringan, the results of iron (Fe) levels were 3 mg / L, the results of iron (Fe) levels exceeded the quality standards. Research with filters media ceramic shards and roof tile shards, with Filter A (40 cm ceramic shards and 60 cm roof tile shards), Filter B (50 cm ceramic shards and 50 cm roof tile shards), and filter C (60 cm ceramic shards and 40 cm roof tile shards) because it can reduce iron (Fe) levels.

**Objective :** To determine the effectiveness of various filter models to reduce iron (Fe) levels in well water at Al Hikmah Plupuh Orphanage, Wukirsari, Cangkringan.

**Method :** This type of research is a quasi-experiment with a pretest-posttest With Control Group Design. The samples of this study were 1 control and 3 treatments. The flow rate used is 1 liter/minute, with upflow flow. The object of this research is the well water of the Al Hikmah Plupuh Orphanage, Wukirsari, Cangkringan. Data analysis used a percentage using the formula  $\frac{co-ca}{co} \times 100\%$  to determine which filter is the most effective.

**Results :** Iron (Fe) levels were reduced using a filtration method with ceramic shards and roof tile shards as filter media. The ability to reduce iron (Fe) levels in filters A, B, and C was 76%, 79%, and 77%, respectively.

**Conclusion :** Filter B (50 cm ceramic shards and 50 cm roof tile shard) was able to reduce iron (Fe) levels most effectively because of the largest percentage reduction. However, it is still above the threshold value according to the Regulation of the Minister of Health Number 2 of 2023.

**Keywords :** Water, iron (Fe) levels, filtration, ceramic shards, broken roof tiles.

# EFEKTIVITAS BERBAGAI MODEL FILTER UNTUK MENURUNKAN KADAR BESI (Fe) PADA AIR SUMUR DI PANTI ASUHAN AL HIKMAH PLUPUH, WUKIRSARI, CANGKRINGAN

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## ABSTRAK

**Latar Belakang :** Air merupakan salah satu sumberdaya alam yang sangat penting bagi kehidupan manusia. Pencemaran air bersih oleh zat kimia besi (Fe) dapat menimbulkan berbagai masalah kesehatan. Berdasarkan uji pendahuluan pada tanggal 14 Juli 2024 di Panti Asuhan Al Hikmah Plupuh, Wukirsari, Cangkringan didapatkan hasil kadar besi (Fe) 3 mg/L, hasil kadar besi (Fe) melebihi baku mutu. Penelitian dengan filter media pecahan keramik dan pecahan genteng, dengan Filter A (pecahan keramik 40 cm dan pecahan genteng 60 cm), Filter B (pecahan keramik 50 cm dan pecahan genteng 50 cm), dan Filter C (pecahan keramik 60 cm dan pecahan genteng 40 cm) dikarenakan dapat menurunkan kadar besi (Fe).

**Tujuan :** Mengetahui besarnya efektivitas berbagai model filter untuk menurunkan kadar besi (Fe) pada air sumur di Panti Asuhan Al Hikmah Plupuh, Wukirsari, Cangkringan.

**Metode :** Jenis penelitian ini adalah *quasi experiment* dengan desain *pretest-posttest With Control Group Design*. Sampel penelitian ini adalah 1 kontrol dan 3 perlakuan. Debit aliran yang digunakan adalah 1 liter/menit, dengan aliran *upflow*. Obyek penelitian ini adalah air sumur Panti Asuhan Al Hikmah Plupuh, Wukirsari, Cangkringan. Analisa data menggunakan persentase dengan rumus  $\frac{co-ca}{co} \times 100\%$  untuk mengetahui filter yang paling efektif.

**Hasil :** Penurunan kadar besi (Fe) dengan metode filtrasi menggunakan media filter pecahan keramik dan pecahan genteng. Kemampuan menurunkan kadar besi (Fe) pada Filter A, B, dan C berturut-turut sebesar 76%, 79%, dan 77%.

**Kesimpulan :** Filter B (pecahan keramik 50 cm dan pecahan genteng 50 cm) mampu menurunkan kadar besi (Fe) paling efektif karena persentase penurunan terbesar. Namun, masih di atas nilai ambang batas sesuai Peraturan Menteri Kesehatan Nomor 2 Tahun 2023.

**Kata kunci :** Air, kadar besi (Fe), filtrasi, pecahan keramik, pecahan genteng.