

PERBEDAAN KETEBALAN FILTER ARANG AKTIF AMPAS KOPI DALAM MENURUNKAN KADAR BESI (Fe) PADA AIR BERSIH

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ABSTRAK

Minuman kopi merupakan minuman yang banyak diminati masyarakat. Tingkat konsumsi minuman kopi yang tinggi berbanding lurus dengan jumlah ampas kopi yang dihasilkan. Ampas kopi merupakan limbah yang jarang dimanfaatkan. Kandungan karbon pada ampas kopi dapat dimanfaatkan sebagai bahan baku pembuatan arang aktif. Penelitian ini bertujuan mengetahui kemampuan berbagai ketebalan filter arang aktif ampas kopi dalam menurunkan kadar besi (Fe) yang merupakan salah satu kontaminan sekunder pada air bersih.

Penelitian yang dilakukan adalah jenis *True Experiment* dengan desain *Pretest-Posttest with Control Group Design*. Objek penelitian berupa larutan besi buatan dari garam FeCl_3 . Pada kelompok perlakuan larutan besi di alirkan dalam filter arang aktif ampas kopi berukuran 40-60 *mesh* dengan variasi ketebalan 40 cm, 60 cm dan 80 cm. Sedangkan pada kelompok kontrol tidak dialirkan dalam filter arang aktif dari ampas kopi.

Arang aktif yang dikarbonisasi pada suhu 500°C selama 20 menit dan diaktivasi dengan HCl 0,5 M selama 48 jam, memiliki kadar air (0,21%), kadar abu (0,11%) dan daya serap terhadap iodium (874,80 mg/g). Filter arang aktif ampas kopi dapat menurunkan kadar besi awal dari nilai 8,5 mg/l menjadi 6,02 mg/l pada ketebalan 40 cm (efektifitas penurunan 29,18%); 1,21 mg/l pada ketebalan 60 cm (efektifitas penurunan 85,76%); dan 1,04 mg/l pada ketebalan 80 cm (efektifitas penurunan 87,76%). Berdasarkan hasil analisa SPSS uji beda dengan metode *One Way ANOVA* dan uji lanjutan dengan metode *Games-Howell* didapatkan hasil yaitu filter dengan ketebalan 80cm memberikan pengaruh paling signifikan terhadap rata-rata kadar besi yang dihasilkan.

Kesimpulan dalam penelitian ini adalah mutu arang aktif ampas kopitelah memenuhi SNI No. 06-3730-1995. Seluruh varian ketebalan filter arang aktif mampu menurunkan kadar besi dalam air. Ketebalan filter yang memberikan pengaruh paling besar terhadap rata-rata kadar besi yang dihasilkan yaitu sebesar 80 cm. Perlu dilakukan penelitian lebih lanjut dalam rangka pengembangan penelitian seperti penggunaan jenis ampas kopi yang lebih spesifik sebagai bahan pembuatan arang aktif, peningkatan suhu karbonisasi dan konsentrasi aktivator.

Kata kunci : Ampas kopi, arang aktif, kadar besi dalam air bersih

THE DIFFERENCE OF ACTIVATED CHARCOAL FILTER THICKNESS COFFEE GROUNDS IN REDUCING IRON CONDITION (Fe) ON CLEAN WATER

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ABSTRACT

Coffee drink is a beverage that many people demand. High consumption of coffee drinks is directly proportional to the amount of coffee produced. Coffee grounds is a waste that rarely used. Carbon content in coffee grounds can be utilized as raw material for making activated charcoal. The purpose of this research is to know the ability of various thickness of activated charcoal filter in reducing iron content (Fe) which is one of secondary contaminant in clean water.

This research is a type of True Experiment with Pretest-Posttest with Control Group Design. The object of the research is an artificial iron solution from FeCl₃ salt. In the treatment group the iron solution was distributed in an activated charcoal filter of 40-60 mesh coffee grounds with a thickness variation of 40 cm, 60 cm and 80 cm. While in the control group it was not channeled in the activated charcoal filter from coffee grounds.

The activated charcoal was carbonized at 500°C for 20 minutes and was activated with 0.5 M HCl for 48 hours, having moisture content (0.21%), ash (0.11%) and absorption capacity of iodine (874.80 mg / g). The activated carbon filter of coffee grounds can lower the initial iron content from 8.5 mg / l to 6.02 mg / l at a thickness of 40 cm (effectiveness decrease 29.18%); 1.21 mg / l at 60 cm thickness (effectiveness of 85.76% decrease); and 1.04 mg / l at a thickness of 80 cm (effectiveness of the decrease of 87.76%). Based on the result of SPSS analysis of different test with One Way ANOVA method and further test with Games-Howell method obtained result namely filter with thickness of 80cm gives the most significant influence to the average of iron content produced.

The conclusion in this research is the quality of activated charcoal of coffee grounds has fulfilled SNI No. 06-3730-1995. All variants of active charcoal filter thickness can decrease iron content in water. The thickness of the filter that gives the most influence to the average iron content produced is equal to 80 cm. Further research is needed in order to develop research such as the use of more specific types of coffee grounds as active charcoal making materials, increasing carbonization temperature and activator concentration.

Key words: Coffee grounds, activated charcoal, iron content in clean water