

PENGARUH SUHU AKTIVASI DAN KONSENTRASI NH₄HCO₃ TERHADAP RENDEMEN DAN KUALITAS ARANG AKTIF DARI TANDAN KOSONG KELAPA SAWIT (*Elaeis guineensis* Jacq) SEBAGAI PENJERNIH AIR SUMUR DI KABUPATEN MUSI RAWAS (SUMSEL)

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INTISARI

Arang aktif merupakan salah satu produk olahan hasil hutan yang berpotensi sebagai komoditi ekspor. Indonesia mempunyai potensi bahan baku arang aktif yang melimpah. Salah satunya adalah limbah hasil perkebunan kelapa sawit, yaitu berupa tandan kosong kelapa sawit yang belum dimanfaatkan secara optimal. Pengolahan tandan kosong kelapa sawit ini, diharapkan dapat diperoleh nilai tambah ekonomi. Penelitian ini bertujuan untuk mengetahui pengaruh interaksi, suhu aktivasi dan konsentrasi NH₄HCO₃ terhadap rendemen dan kualitas arang aktif tandan kosong kelapa sawit (*Elaeis guineensis* Jacq) serta kemungkinan penggunaan salah satu arang aktif terbaik hasil penelitian sebagai penjernih air sumur di kabupaten Musi Rawas.

Penelitian ini menggunakan rancangan acak lengkap yang disusun secara faktorial dengan dua faktor yaitu suhu aktivasi (700 °C dan 800 °C) serta konsentrasi NH₄HCO₃ (0%; 0,025%; 0,05%; 0,075% dan 0,1%) dengan masing-masing perlakuan 5 ulangan. Penelitian dilakukan dengan mengarangkan tandan kosong kelapa sawit (*Elaeis guineensis* Jacq) dalam *retort* listrik pada suhu 450 °C selama 3 jam. Arang diaktivasi secara kimia dengan direndam dalam larutan NH₄HCO₃ selama 24 jam, lalu dicuci sampai netral dan selanjutnya dipanaskan pada suhu 700 °C dan 800 °C selama 1 jam sesuai perlakuan. Nilai rata-rata dianalisis dengan analisis varians dan apabila berbeda nyata, diuji lanjut dengan uji HSD.

Hasil penelitian menunjukkan bahwa rendemen berkisar antara 72,081%-91,796%; kadar air 5,760%-10,640%; kadar zat mudah menguap 26,370%-36,090%; kadar abu 11,110%-15,200%; kadar karbon terikat 50,160%-61,040%; daya serap uap benzena 4,740%-10,100%; daya serap iodium 272,678 mg/g-573,610 mg/g; daya serap metilen biru 62,640 m/g-75,787 mg/g; dan bilangan iodium 205,000 mg/g-511,391 mg/g. Nilai kadar air arang aktif memenuhi SNI 06-3741-1995 sedangkan kadar zat mudah menguap, kadar abu, kadar karbon terikat, daya serap benzena, daya serap iodium, dan daya serap metilen biru arang aktif tidak memenuhi SNI 06-3741-1995. Interaksi antara kedua faktor berpengaruh nyata terhadap kadar air, kadar abu, kadar karbon terikat dan daya serap arang aktif terhadap iodium. Suhu aktivasi berpengaruh nyata terhadap kadar zat mudah menguap, kadar karbon terikat, daya serap iodium dan daya serap arang aktif terhadap metilen biru. Konsentrasi NH₄HCO₃ berpengaruh nyata terhadap semua parameter kecuali daya serap terhadap metilen biru. Air sumur setelah dijernihkan dengan arang aktif yang diaktivasi pada suhu 700 °C dan konsentrasi NH₄HCO₃ 0,1%, kualitasnya menjadi lebih baik yaitu warnanya lebih jernih, tingkat kekeruhan, kadar seng (Zn), mangan (Mn), dan besi (Fe) mengalami penurunan tetapi kadar pH nya lebih tinggi daripada sebelum penjernihan. Parameter air sumur setelah dijernihkan memenuhi Standar Baku Air Bersih menurut Permenkes No 416/IX/1990 yaitu kadar pH, kekeruhan, kadar seng (Zn), Besi (Fe), dan Mangan (Mn) sedangkan warna tidak memenuhi.

Kata kunci : Arang aktif, tandan kosong kelapa sawit, *Elaeis guineensis* Jacq, suhu aktivasi, konsentrasi NH₄HCO₃, air sumur

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THE INFLUENCES OF ACTIVATION TEMPERATURE AND CONCENTRATION OF NH₄HCO₃ TOWARD THE YIELD AND QUALITY OF ACTIVATED CHARCOAL FROM THE EMPTY OIL PALM BUNCHES (*Elaeis guineensis* Jacq) AS THE WATER PURIFIER IN MUSI RAWAS REGION (SOUTH SUMATERA)

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ABSTRACT

Activated charcoal is one of forest product who has potention as export comodity. Indonesia has the potention of abundant activated charcoal's raw materials. One of it is the waste of oil palm plantation product, means empty oil palm bunches that did not used optimally yet. The used of this empty oil palm bunches, might be increase the economic value. The aim of this experiment was to learn the influences of interaction, activation temperature and concentration.of NH₄HCO₃ toward the yield and quality of activated charcoal from the empty oil palm bunches (*Elaeis guineensis* Jacq) and also probability to use one of the highest quality of activated charcoal as the water purifier in Musi Rawas region.

This experiment was use Completely Randomized Designed (CRD) who arranged factorially consist of two factors, those are activaton temperature (700 °C and 800 °C) also concentration of NH₄HCO₃ (0%; 0,025%; 0,05%; 0,075% and 0,1%) with each variables are 5 repetitions. At first, the empty oil palm bunches was carbonized into charcoal, temperature at 450 °C for 3 hours. Then charcoal was activated chemically by soaking into NH₄HCO₃ solution for 24 hours. Then charcoal was activated using the activation temperatures at 700 °C and 800 °C for 1 hour. The average value was analyze with analysis of variance and if it significant, continued by HSD test.

The result of this experiment showed that empty oil palm bunches activated charcoal obtained yield 72,081%-91,796%; moisture content 5,760%-10,640%; volatile matter content 26,370%-36,090%; ash content 11,110%-15,200%; fixed carbon 50,160%-61,040%; benzene adsorption 4,740%-10,100%; iodium adsorption 272,678mg/g-573,610mg/g; methylene blue adsorption 62,640mg/g-75,787mg/g; and iodium value 205,000mg/g-511,391mg/g. The value of moisture content has been met the Indonesia National Standard 06-3741-1995, while volatile matter content, ash content, fixed carbon, benzene adsorption, iodium adsorption and methylene blue adsorption's activated charcoal has not met the Indonesia National Standard 06-3741-1995. The interaction between both factors has significant influences toward moisture content, ash content, fixed carbon and iodium adsorption. The activation temperature has significant influences toward volatile matter content, fixed carbon, iodium adsorption and methylene blue adsorption, while concentration of NH₄HCO₃ has significant influences toward all parameters except methylene blue adsorption. The water after purified by activated charcoal that was activated using temperature at 700 °C and concentration of NH₄HCO₃ 0.1%, has better quality, means better color and has decrease value of turbidity, Zn, Mn, and Fe but acidy value (pH) beeing more higher than before purified. The water after purified has been met Clean Water Standard according Health Minister Regulation number 416/IX/1990 except the color value.

Keywords : activated charcoal, empty oil palm bunches, *Elaeis guineensis* Jacq, activation temperature, concentration of NH₄HCO₃, water

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