

PENGARUH SUHU DAN WAKTU AKTIVASI TERHADAP KUALITAS ARANG AKTIF DARI SERESAH DAUN JATI (*Tectona grandis* Linn. f.)

Oleh:

Gagang Enggal Diposamodra¹, J.P. Gentur Sutapa²

INTISARI

Penelitian ini bertujuan untuk memanfaatkan seresah daun jati (*Tectona grandis* Linn. f.) menjadi arang aktif. Bahan penelitian seresah daun jati didapat dari hutan produksi perhutani di KPH Padangan. Proses karbonisasi seresah daun jati dengan kadar air $\pm 12\%$ menggunakan retort listrik dengan suhu 400°C selama tiga jam. Penelitian ini menggunakan rancangan acak lengkap (*Completely Randomized Design*) dengan dua faktor perlakuan yaitu suhu aktivasi (650°C , 700°C , dan 750°C) dan waktu aktivasi (30 menit, 60 menit, dan 90 menit) dengan masing-masing perlakuan lima kali ulangan. Arang aktif yang dihasilkan diuji kualitasnya dengan parameter sifat fisika (rendemen dan kadar air) dan sifat kimia (kadar abu, kadar zat mudah menguap, kadar karbon terikat, daya serap terhadap uap benzena, daya serap terhadap iodium, dan daya serap terhadap biru metilen). Arang aktif terbaik dimanfaatkan untuk menjernihkan air sumur.

Hasil penelitian menunjukkan arang aktif yang dihasilkan memiliki parameter kualitas sebagai berikut : rendemen: 86,94% - 90,68%; kadar air: 3,30% - 5,50%; kadar zat mudah menguap: 8,7% - 13,66%; kadar abu: 40,29% - 44,54%; kadar karbon terikat: 38,39% - 41,40%; daya serap terhadap uap benzena: 3,27% - 4,15%; daya serap terhadap iodium: 441,61 mg/g - 487,30 mg/g; daya serap terhadap biru metilen: 141,36 mg/g - 147,50 mg/g. Arang aktif terbaik diperoleh dari kombinasi suhu aktivasi 750°C dan waktu aktivasi 90 menit yang menghasilkan arang aktif dengan spesifikasi sebagai berikut : rendemen 85,19% kadar air 5,50%, kadar zat mudah menguap 8,56%, kadar abu 44,53%, kadar karbon terikat 41,39%, daya serap terhadap uap benzena 4,15%, daya serap terhadap iodium 487,29 mg/g, dan daya serap terhadap biru metilen 147,49 mg/g. Arang aktif dari hasil kombinasi terbaik diaplikasikan pada penjernihan air sumur dan diperoleh hasil parameter nilai kekeruhan 1,56 NTU (turun 85,24%), warna air 2 Pt-Co (turun 73,33%), pH air 8,1 (naik 5,19%), kesadahan 367,547 mg/L (naik 19,84%) kadar besi 0,017 mg/L (turun 83%), dan kadar mangan 0,017 mg/L (turun 66%), sehingga memenuhi standar Standar Mutu Air bersih Peraturan MENKES RI No. 32 Tahun 2017.

Kata kunci: daun jati, arang aktif, sifat fisika, sifat kimia

¹ Mahasiswa Departemen Teknologi Hasil Hutan Fakultas Kehutanan Universitas Gadjah Mada

² Dosen Departemen Teknologi Hasil Hutan Fakultas Kehutanan Universitas Gadjah Mada

EFFECT TEMPERATURE AND DURATION OF ACTIVATION ON CHARACTERISTIC OF ACTIVATED CHARCOAL FROM TEAK LEAF (*Tectona grandis* Linn. f.)

By:

Gagang Enggal Diposamodra¹, J.P. Gentur Sutapa²

ABSTRACT

The main purpose of this research is to utilize teak leaf (*Tectona grandis* Linn. F.) into activated charcoal. Research material are teak leaf was taken from Perhutani production forests at KPH Padangan. The carbonisation process (moisture content $\pm 12\%$) was done by using an electrical retort at 400°C temperature for three hours. This study used a completely randomized design with two factors: activation temperature (650°C , 700°C , dan 750°C); and activation duration (30 minutes, 60 minutes and 90 minutes) with five replications for each treatment. The quality of activated charcoal produced was evaluated by physical characteristics (yield and moisture content) and chemical characteristics (volatile matter, ash content, carbon fixed, adsorptive capacity of benzene, adsorptive capacity of iodine, and adsorptive capacity of methylene blue). Then the result show that activated carbon from the best combination had been applied for well-water purification.

The results showed that activated charcoal made from teak leaf had the following quality parameters: yield: 86.94% - 90.68%; moisture content: 3.30% - 5.50%; volatile matter: 8.7% - 13.66%; ash content: 40.29% - 44.54%; carbon fixed: 38.39% - 41.40%; adsorptive capacity of benzene: 3.27% - 4.15%; adsorptive capacity of iodine: 441.61 mg / g - 487.30 mg / g; adsorptive capacity of methylene blue: 141.36 mg / g - 147.50 mg / g. The best activated charcoal is obtained from a combination of an activation temperature of 750°C and an activation duration of 90 minutes which produces activated charcoal with the following specifications: yield 85.19% moisture content 5.50%, volatile matter 8.56%, ash content 44.53%, fixed carbon 41.39%, adsorptive capacity of benzene 4.15%, adsorptive capacity of iodine 487.29 mg / g, and adsorptive capacity of methylene blue 147.49 mg / g. The result show that activated carbon from the best combination had been applied for well-water purification, in parameter of water turbidity 1.56 NTU (decreased by 85.24%), water colour 2 Pt-Co (decreased by 73.33%), pH 8.1 (increased by 5.19%), water solubility 367.547 mg/L (increased by 19.84%), Fe content 0.017 mg/L (decreased 83%), and mangan content 0.017 mg/L (decreased 66%), this quality parameters fullfils according to the Indonesian Ministry of Health Regulation No. 32 (2017).

Keywords: teak leaf, activated charcoal, physical properties, chemical properties

¹ Student of Forest Product Technology Department, Faculty of Forestry Universitas Gadjah Mada

² Lecturer of Forest Product Technology Department, Faculty of Forestry Universitas Gadjah Mada