

PENGARUH SUHU DAN WAKTU AKTIVASI ARANG AKTIF KAYU JABON MERAH (*Anthocephalus macrophyllus* (Roxb.) Havil) UNTUK MENINGKATKAN KUALITAS AIR

Henrikus Prasetyo Cahyo Santoso¹, Denny Irawati², Sri Sunarti³

INTISARI

Indonesia merupakan negara yang masih mengimpor kebutuhan arang aktifnya. Dilain pihak Indonesia memiliki potensi biomassa yang cukup banyak sebagai bahan baku sebagai bahan baku arang aktif, salah satunya kayu jabon merah. Kayu jabon merah (*Anthocephalus macrophyllus* (Roxb.) Havil) memiliki potensi sebagai bahan baku arang aktif karena mengandung unsur karbon seperti selulosa dan lignin yang cukup tinggi. Tujuan penelitian ini untuk menyediakan informasi mengenai sifat dan kualitas arang aktif dengan bahan baku kayu jabon merah serta pengaruh pengaplikasiannya dalam peningkatan kualitas air sumur.

Kayu jabon merah digunakan sebagai bahan baku arang aktif yang diaktivasi menggunakan cara fisika. Penelitian ini menggunakan metode Rancangan Acak Lengkap (RAL) dengan perlakuan suhu aktivasi (750°C, 800°C, dan 850°C) dan waktu aktivasi (30, 60, dan 90 menit) dengan ulangan sebanyak 3. Proses karbonisasi kayu jabon merah dilakukan dengan menggunakan retort Listrik dengan suhu 500°C selama 3 jam. Hasil pengujian arang aktif selanjutnya dibandingkan dengan Standar Nasional Indonesia 06-330-1995 (SNI 06-330-1995). Arang aktif terbaik kemudian diaplikasikan untuk peningkatan kualitas air sumur dengan parameter warna, kekeruhan, pH, kadar besi (Fe), kadar mangan (Mn), dan kesadahan (CaCO₃).

Hasil Penelitian menunjukkan nilai rendemen arang aktif yaitu 79,869-83,057%, kadar air 0,481-0,863%, kadar zat mudah menguap 13,011-22,734%, kadar abu 3,472-5,688%, kadar karbon terikat 71,804-82,368%, daya serap terhadap benzena 11,266-13,499%, daya serap terhadap iodium 755,269-865,456 mg/g, dan daya serap terhadap metilen biru 136-138,363 mg/g, dengan arang aktif yang diaktivasi pada suhu 850°C selama 90 menit sebagai hasil arang aktif terbaik. Hasil penelitian ini menunjukkan bahwa arang aktif kayu jabon merah tidak memenuhi semua standar mutu arang aktif menurut SNI 06-3730-1995 yaitu pada daya serap terhadap benzena. Arang aktif yang diaktivasi pada suhu 750°C selama 30 menit kemudian diaplikasikan dalam peningkatan kualitas air sumur dengan hasil meliputi perubahan warna sebesar 70,588%, tingkat kekeruhan sebesar 64,382%, pH sebesar 5,164%, kadar besi (Fe) sebesar 96,667%, kadar mangan (Mn) sebesar 88,889%, dan kesadahan (CaCO₃) sebesar 17,143%.

Kata Kunci: arang aktif, kayu jabon merah, suhu aktivasi, waktu aktivasi, kualitas air

¹ Mahasiswa Departemen Teknologi Hasil Hutan, Fakultas Kehutanan, Universitas Gadjah Mada

² Dosen Departemen Teknologi Hasil Hutan, Fakultas Kehutanan, Universitas Gadjah Mada

³ Peneliti pada Badan Riset Inovasi Nasional (BRIN)

**EFFECT OF ACTIVATION TEMPERATURE AND DURATION ON THE
QUALITY OF RED JABON WOOD (*Anthocephalus macrophyllus* (Roxb.)
Havil) ACTIVATED CHARCOAL TO IMPROVE WATER QUALITY**

Henrikus Prasetyo Cahyo Santoso¹, Denny Irawati², Sri Sunarti³

ABSTRACT

*Indonesia is a country that still imports its activated charcoal needs. On the other hand, Indonesia has a lot of biomass potential as a raw material for activated charcoal, one of which is red jabon wood. Red Jabon (*Anthocephalus macrophyllus* (Roxb.) Havil) can be a raw material for activated charcoal because it contains quite high levels of carbon elements such as cellulose and lignin. The purpose of this research is to determine the properties and quality of activated charcoal using red jabon wood as raw material and the effect of its application to improve the quality of water.*

Red jabon wood is used as raw material for activated charcoal which is activated using physical methods. This research used the Completely Randomized Design (CRD) method with activation temperature treatment (750°C, 800°C, and 850°C) and activation time (30, 60, and 90 minutes) with 3 replications. The carbonization process of red jabon wood was carried out using an electric retort at a temperature of 500°C for 3 hours. The activated charcoal test results were then compared with the Indonesian National Standard 06-330-1995 (SNI 06-330-1995). The best activated charcoal is then applied to improve the quality of well water with the parameters of color, turbidity, pH, iron content (Fe), manganese content (Mn), and hardness (CaCO₃).

The results showed that the yield of activated charcoal 79.869-83.057%, the water content 0.481-0.863%, the volatile matter content 13.011-22.734%, the ash content 3.472-5.688%, the fixed carbon content 71.804-82.368%, benzene absorption 11,266-13,499%, iodine absorption 755,269-865,456 mg/g, and methylene blue absorption 136-138,363 mg/g, with activated charcoal activated at a temperature of 850°C for 90 minutes as the best activated charcoal result. The results of this study indicate that the activated charcoal of red jabon wood doesn't meet all the quality standards of activated charcoal according to SNI 06-3730-1995, namely in the benzene absorption. Activated charcoal which was activated at a temperature of 750°C for 30 minutes was then applied to improve the quality of well water with results including the colour change of 70.588%, turbidity level of 64.382%, pH of 5.164%, iron (Fe) content of 96.667%, manganese (Mn) content of 88.889%, and hardness (CaCO₃) of 17.143%.

Keywords: activated charcoal, red jabon wood, activation temperature, activation time, water quality

¹ Student of Forest Product Technology, Faculty of Forestry, Gadjah Mada University

² Lecturer of Forest Product Technology, Faculty of Forestry, Gadjah Mada University

³ Researcher of National Agency for Research and Innovation