

**KARAKTERISTIK ARANG AKTIF DARI TUNGGAK BAMBU PETUNG
(*Dendrocalamus asper* (Schult.f)) DAN PEMANFAATANNYA SEBAGAI
PENJERNIH AIR TERCEMAR LIMBAH PABRIK GULA**

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INTISARI

Bambu merupakan tanaman *fast growing species* dengan umur panen 4 sampai 5 tahun. Terdapat berbagai jenis bambu yang tersebar di Indonesia dengan potensi yang tinggi. Umumnya, pemanfaatan bambu dilakukan pada bagian batang sehingga pemanfaatan tunggak bambu belum tertangani dengan baik. Tujuan dilakukan penelitian ini adalah untuk mencari alternatif pemanfaatan tunggak bambu petung dalam bentuk arang aktif.

Penelitian ini dilakukan dengan menggunakan metode rancangan acak lengkap (*Completely Randomized Design*) dengan faktor yang diuji berupa suhu aktivasi (600 °C, 700 °C, dan 800 °C) dan lama waktu aktivasi (60 menit, 80 menit, dan 100 menit) dengan lima kali pengulangan pada masing-masing faktor. Dilakukan proses pengarangan tunggak bambu menggunakan *retort* dengan suhu 400 °C selama 3 jam. Setelah itu dilakukan pengujian kualitas arang aktif terhadap rendemen, kadar air, kadar zat mudah menguap, kadar abu, kadar karbon terikat, daya serap terhadap benzena, daya serap terhadap biru metilen, dan daya serap terhadap iodium. Arang aktif terpilih (A3B2) dimanfaatkan untuk meningkatkan kualitas air tercemar limbah pabrik gula. Peningkatan kualitas air dilihat melalui parameter pH, warna, kekeruhan, kesadahan (CaCO_3), Besi (Fe), dan mangan (Mn).

Hasil penelitian menunjukkan rendemen arang aktif sebesar 80,107 %-85,237 %; kadar air 5,198 %-11,007 %; kadar zat mudah menguap 16,359 %-21,917 %; kadar abu 11,83 %-14,452 %, kadar karbon terikat 64,059 %-70,364 %; daya serap terhadap benzena 5,548 %-8,350 %; daya serap terhadap biru metilen 116,009 mg/g-125,342 mg/g; dan daya serap terhadap iodium 571,788 mg/g-636,268 mg/g. Arang aktif terpilih (A3B2) didapat dari kombinasi faktor suhu aktivasi 800 °C dan lama waktu aktivasi 80 menit. Hasil aplikasi arang aktif mampu menaikkan kualitas air tercemar limbah pabrik gula dengan peningkatan pH 22,54 %; penurunan warna 79,8 %; kekeruhan 51,65 %; kesadahan 16,67 %; besi 99,38 %; dan mangan 60 %.

Kata kunci: arang aktif, tunggak bambu, waktu aktivasi, suhu aktivasi

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CHARACTERISTICS OF ACTIVATED CHARCOAL FROM PETUNG BAMBOO STUMP (*Dendrocalamus asper* (Schult.f)) AND THE UTILIZATION AS WATER PURIFICATION CONTAMINATED BY SUGAR FACTORY WASTE

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ABSTRACT

Bamboo is a fast-growing species with a harvest period of 4 to 5 years. There are various species of bamboo in Indonesia with high potential. In general, the use of bamboo is carried out on the stem so that the utilization of bamboo stump has not been handled properly yet. The purpose of this research is to find alternative use of petung bamboo stump as activated charcoal.

This research conducted using completely randomized design method with factors being tested in; activation temperature (600 °C, 700 °C, 800 °C) and activation duration (60 minutes, 80 minutes, 100 minutes) with five repetition for each factor. Carbonization of bamboo stump waste was held using electric retort with 400 °C for 3 hours. The result of activated charcoal were tested in terms of their quality are yield, moisture content, volatile matter content, ash content, fixed carbon content, adsorption of benzena, absorption of methylene blue, and absorption of idoin. Selected activated charcoal (A3B2) will be used as water purification contaminated by sugar factory waste. The increase of water quality was seen through parameters of pH, color, turbidity, total hardness (CaCO₃), iron (Fe), and manganese (Mn).

The results showed that yield of activated charcoal ranged from 80.107 %-85.237 %; water content 5.198 %-11.007 %; volatile matter content 16.359 %-21.917 %; ash content 11.83 %-14.452 %, fixed carbon content 64.059 %-70.364 %; absorption of benzene 5.548 %-8.350 %; absorption of methylene blue 116.009 mg/g-125.342 mg/g; and absorption of iodine 571.788 mg/g-636.268 mg/g. The selected activated carbon (A3B2) was obtained from a combination with an activation temperature of 800 °C and activation period of 80 minutes. The results from the application of activated charcoal successfully increase the quality of water contaminated by sugar factory waste with an increase pH of 22.54 %; color reduction 79.8 %; turbidity 51.65 %; total hardness 16.67 %; iron 99.38 %; and manganese 60 %.

Keywords: Activated charcoal, bamboo stump, activation time, activation temperature.

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