

STUDI SIFAT FISIKA DAN KIMIA ARANG AKTIF DARI PELEPAH PINANG (*ARECA CATECHU* L)

Oleh :

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INTISARI

Kabupaten Dairi merupakan salah satu daerah penghasil tanaman pinang di Indonesia. Limbah hasil pertanian pinang yaitu pelepah pinang yang belum dimanfaatkan dengan optimal oleh masyarakat. Oleh karena itu, penelitian ini bertujuan untuk memanfaatkan limbah pelepah pinang menjadi bahan baku arang aktif, mengetahui pengaruh variasi suhu aktivasi dan waktu aktivasi yang optimal dalam pembuatan arang aktif, dan mengaplikasikan arang aktif dari kombinasi terbaik untuk penjernihan air sumur.

Bahan penelitian diperoleh dari Desa Sihorbo, Kecamatan Siempat Nempu, Kabupaten Dairi. Penelitian menggunakan rancangan acak lengkap (*compeletely Randomized Design*) dengan dua faktor perlakuan yaitu suhu aktivasi (725 °C, 775°C, 825°C) dan waktu aktivasi (30 menit, 60 menit, dan 90 menit), dengan masing-masing perlakuan lima kali ulangan.

Hasil penelitian menunjukkan arang aktif yang dihasilkan memiliki kualitas sebagai berikut: rendemen 76,50 - 83,44%; kadar air 1,31 - 2,63%; kadar zat mudah menguap 9,26 - 29,06%; kadar abu 18,69 - 25,82%; karbon terikat 45,17 - 69,84%; daya serap benzena 7,16 - 9,90%; daya serap iodium 669,87 - 750,48 mg/L dan daya serap metilen biru 147,78 - 149,18 mg/g. Kombinasi perlakuan yang terbaik didapatkan pada suhu aktivasi 825°C dan waktu aktivasi 90 menit yang menghasilkan rendemen 76,87%; kadar air 1,76%; kadar zat mudah menguap 17,23%; kadar abu 25,82%; karbon terikat 55,19%; daya serap benzena 9,89%; daya serap iodium 750,48 mg/L; daya serap metilen biru 149,08 mg/g. Arang aktif dari hasil kombinasi terbaik diaplikasikan pada penjernihan air sumur sehingga memenuhi kualitas air minum pada parameter warna air 9,6%, pH 8,96%, air, kadar besi, 0,01%, kadar mangan 0,00%, kekeruhan 6,85% dan kesadahan 248,51%.

Kata kunci : Arang Aktif, Pelepah Pinang, Suhu Aktivasi, Waktu Aktivasi, Penjernihan Air.

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**STUDY OF THE PHYSICAL AND CHEMICAL PROPERTIES
OF ACTIVATED CHARCOAL FROM MIDRIB ARECA
(*ARECA CATECHU* L)**

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ABSTRACT

Dairi is Regency well known as a source of *areca catechu* in Indonesia. The waste from *areca catechu* cultivation has not been used optimally by society. This research aims to utilize midrib *areca catechu* as a raw material for activated charcoal, to evaluate the impact of optimum variations of temperature activation and time activation in activated charcoal making process, and to apply activated charcoal of the best combination for well-water purification.

The material for this research were collected from Sihorbo Village, Siempat Nempu Subdistrict, Dairi Regency. The research used completely randomized design with 2 factors which are activation temperature (725 °C, 775°C, and 825°C) and activation time (30 minutes, 60 minutes and 90 minutes) with five replications for each treatment.

The result showed that activated charcoal had the following properties: sucrose content of 76.50 – 83.44%; moisture content of 1.31 – 2.63%; volatile matter content of 7.16 – 9.90%; ash content of 8.69 – 25.82%; fixed carbon of 45.17 – 69.84%; benzene adsorptive capacity of .16 – 9.90%; iodine adsorptive capacity of 669.87 – 750.48 mg/L; methylene blue adsorptive capacity of 147.78 – 149.18 mg/g. The best activated charcoal obtained from combination of activation temperature 825°C and activation time 90 minutes that produce activated charcoal with sucrose content of 76.87%; moisture content of 1.76%; volatile matter content of 17.23%; ash content of 25.82%; fixed carbon of 55.19%; benzene adsorptive capacity of 9.89%; iodine adsorptive capacity of 750.48 mg/L and methylene blue adsorptive capacity of 149.08 mg/g. The result show that activated charcoal from the best combination had been applied for well-water purification thus fulfills the qualification for drinking water in parameter of water colour 9.6%, pH 8.96%, Mn 0.00%, Fe content 6.85% and Mg content 248.515%.

Keywords : Activated Charcoal, Areca Catechu, Utilitation of Activated Charcoal.

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