

## ABSTRAK

Nama : Ullan Nurmanita  
Rivena Romaina Rachadian  
Program Studi : Teknik Kimia  
Judul : Efektivitas Adsorben Dari Ampas Kopi Dalam Pengolahan Limbah Cair Berwarna  
Pembimbing : Netty Kamal, Dra., M.S.  
Vibianti Dwi, S.T., M.T.

*Tingginya minat masyarakat terhadap minuman kopi menyebabkan kedai kopi menjamur dan mudah ditemui. Limbah ampas kopi dapat dimanfaatkan menjadi karbon aktif. Percobaan dilakukan untuk mengetahui pengaruh dari kondisi operasi dan metode aktivasi terhadap daya serap karbon aktif. Dalam percobaan ini karbon aktif dibuat melalui proses pirolisis dengan variasi suhu 400°C, 500°C, 600°C, dan 700°C hingga 90 menit dengan ukuran 40-20 mesh dan di aktivasi dengan HCl dan NaOH selama 24 jam. Karbon aktif yang dihasilkan digunakan sebagai adsorben dan diujikan pada limbah cair zat warna Begacron Yellow-Brown. Adsorpsi dilakukan dengan variasi waktu selama 6 jam, 12 jam, 24 jam, dan 36 jam. Adapun analisis yang akan dilakukan adalah Bilangan Iod, penurunan konsentrasi zat warna dan analisis adsorpsi yaitu Isoterm Freundlich. Karbon aktif yang memenuhi standar diperoleh pada proses pirolisis suhu 400°C dan 500°C serta pada proses aktivasi kimia dengan HCl dengan daya serap terhadap Iodium sekitar 835,9 mg/g – 1089,7 mg/g, kadar air 3,79% - 8,98%, dan kadar abu 5% - 5,18%. Pada poses penyerapan zat warna Begacron Yellow-Brown kesetimbangan tercapai pada waktu 36 jam dengan massa adsorbat terserap per satuan adsorben yang paling besar pada proses pirolisis suhu 400°C yaitu 1089,7 mg/g dan pada proses kimia dengan larutan HCl yaitu sebesar 835,9 mg/g. Adsorpsi zat warna Begacron Yellow-Brown oleh karbon aktif memenuhi persamaan Freundlich diperoleh nilai  $K_f$  pada proses pirolisis suhu 400°C yaitu 6,8865 dan pada proses aktivasi kimia dengan larutan HCl yaitu 8,0316.*

**Kata Kunci:** adsorben, adsorpsi, karbon aktif, limbah ampas kopi, limbah cair zat warna

## **ABSTRACT**

*Name* : Ullan Nurmanita  
Rivena Romaina Rachadian  
*Study Program* : *Chemical Engineering*  
*Title* : *The Effectiveness of Adsorbents from Coffee Pulp in Waste Colored Liquid*  
*Counsellor* : Netty Kamal, Dra., M.S.  
Vibianti Dwi, S.T., M.T.

*High public interest in coffee drinks has caused coffee shops to flourish and is easily found. Coffee pulp waste can be utilized as activated carbon. Experiments were conducted to study the interaction of the operating methods and activation methods on the absorption of activated carbon. In this experiment activated carbon was made through a pyrolysis process with temperature variations of 400°C, 500 °C, 600°C, and 700°C for up to 90 minutes with a size of 40-20 mesh and activated with HCl and NaOH for 24 hours. The activated carbon produced is used as an adsorbent and tested on Begacron Yellow-Brown color liquid waste. Adsorption is done with a variation of time for 6 hours, 12 hours, 24 hours, and 36 hours. While the analysis will be done is the Iod Number, the decrease in the concentration of the dye and the adsorption analysis is the Freundlich Isotherm. Activated carbon that meets the standard is obtained in the pyrolysis process temperature of 400°C and 500°C and in the chemical activation process with HCl with absorption of Iodine around 835.9 mg / g - 1089.7 mg / g, water content 3.79% - 8, 98%, and ash content of 5% - 5.18%. In the activation of Begacron Yellow-Brown dyes the equilibrium is obtained at 36 hours with the mass of adsorbate absorbed per unit of adsorbent which is the largest in the pyrolysis process temperature of 400°C which is 1089.7 mg / g and in the chemical process with the help of HCl which is 835.9 mg / g. Adsorption of Begacron Yellow-Brown dyes by activated carbon meets the Freundlich equation obtained by Kf value in the pyrolysis process temperature of 400°C, 6.8865 and in the chemical validation process with a HCl solution of 8.0316.*

*Keywords: adsorbent, adsorption, active carbon, waste coffee pulp, waste liquid color substance.*