

**PROSES SIMULTAN ELEKTROFLOTASI-ADSORBSI DENGAN SERAT  
ALAMI KENAF (*Hibiscus cannabinus L.*) DAN PISANG (*Musa paradisiaca*)  
UNTUK PENGOLAHAN LIMBAH BATIK**

**INTISARI**

**Farokhatul Faikha**

**17612050**

Keberadaan industri batik di Yogyakarta memiliki manfaat bagi masyarakat dari sisi ekonomi, tetapi di sisi lain masih menimbulkan dampak lingkungan dari pencemaran air limbah batik. Pada penelitian ini dilakukan pengolahan limbah batik melalui gabungan proses simultan elektroflotasi-adsorpsi dengan serat kenaf (*Hibiscus cannabinus L.*) dan pisang (*Musa paradisiaca*). Proses elektroflotasi dilakukan dengan grafit sebagai anoda dan stainless steel sebagai katoda pada tegangan 20 V selama 30 menit. Karakterisasi serat alami menggunakan SEM dan FTIR. Evaluasi kinerja serat alami dilakukan dengan kapasitas adsorpsi, variasi massa dan pH larutan. Evaluasi efektivitas proses simultan elektroflotasi-adsorpsi dilakukan dengan kandungan analisis COD, konsentrasi logam Pb, pH larutan, turbiditas, TDS, dan intensitas cahaya. Hasil penelitian menunjukkan karakteristik serat alami menggunakan SEM dan FTIR setelah proses delignifikasi dengan NaOH menunjukkan tekstur permukaan kasar dan mengandung gugus -OH dari selulosa yang memiliki aktivitas sebagai adsorben. Kapasitas adsorpsi dari isothermal Langmuir untuk serat kenaf sebesar 26,9 mg/g dan pisang sebesar 29,5 mg/g. Gabungan proses simultan elektroflotasi-adsorpsi mampu menurunkan kandungan COD sebesar 258,9 mg/L (37,5%), konsentrasi logam Pb 0,801 (81%), pH larutan menjadi 6,5, turbiditas 0,91 NTU (91%), TDS 881 mg/L (+20%), dan intensitas cahaya 1379 Lux (+25,36%) yang lebih baik dibandingkan proses elektroflotasi. Hasil tersebut menunjukkan pengolahan limbah batik telah memenuhi kriteria pengolahan air limbah berdasarkan PERDA DIY No. 7/2016 dan PERMEN LH RI No. 5/2014.

**Kata kunci:** Adsorpsi, Elektroflotasi, Limbah batik, Serat kenaf, Serat pisang

**SIMULTANEOUS ELECTROFLOTATION-ADSORPTION PROCESS BY  
NATURAL FIBER USING KENAF (*Hibiscus cannabinus L.*) AND BANANA  
(*Musa paradisiaca*) FOR TREATMENT OF BATIK WASTEWATER**

**ABSTRACT**

**Farokhatul Faikha  
17612050**

Batik industry in Yogyakarta has benefits for society from an economic side, but on the other hand, it still causes an environmental impact of wastewater. In this study, the wastewater from batik industry was treated by a simultaneous process of electroflotation and adsorption by natural fiber namely kenaf (*Hibiscus cannabinus L.*) and banana (*Musa paradisiaca*) fibers. The electroflotation process was conducted by graphite as anode and stainless steel as cathode at constant voltage of 20 V for 30 minutes. Characterization of natural fibers was measured by scanning electron microscope (SEM) and infra-red (FTIR). The evaluation of natural fiber performance was measured by adsorption capacity, adsorbent dose, and pH solution. The effectiveness of simultaneous process of electroflotation and adsorption was evaluated by COD, Pb concentration, pH solution, turbidity, TDS, and light intensity. The results showed that the characteristics of natural fibers after delignification process with 1 M NaOH respectively observed a rough surface texture and an -OH group from cellulose content. which acted as adsorbent. The adsorption capacity of Langmuir isothermal was 26.9 mg/g for kenaf and 29.5 mg/g for banana fibers. The simultaneous process of electroflotation and adsorption was able to reduce as much as 258.9 mg/L (37.5%), 0.801 (81%), 6.5, 0.91 NTU (91%), 881 mg /L (+20%), and 1379 Lux (+25.36%) respectively for COD, Pb concentration, pH solution, turbidity, TDS, and light intensity which was better than the electroflotation process. These results concluded that the simultaneous pricess of electroflotation and adsorption has successful applied on the wastewater treatment of Batik effluent according to criterion of wastewater standard based on regional regulation of Yogyakarta Province No. 7/2016 and Minister of Environment of Republic of Indonesia's regulation No. 5/2014.

**Keywords:** Adsorbtion, Banana fibers, Batik wastewater, Electroflotation, Kenaf fiber