

ABSTRAK

Metode elektrokoagulasi telah banyak dikembangkan untuk mengolah berbagai macam limbah cair industri dengan cara elektrolisis menggunakan elektroda logam. Metode ini dianggap cukup efektif dan efisien. Pada penelitian ini, sel elektrokoagulasi dirancang menggunakan elektroda besi yang disusun secara paralel. Sel elektrokoagulasi tersebut digunakan untuk menghilangkan warna pada larutan lignin dan limbah cair *pulp* dan kertas. Efektivitas metode elektrokoagulasi dikaji melalui beberapa parameter seperti waktu elektrokoagulasi, pH, tegangan, penambahan NaCl, dan interval dosis H₂O₂. Analisa hasil elektrokoagulasi dilakukan menggunakan spektrofotometer UV-Vis. Kondisi optimum untuk larutan lignin dicapai pada waktu elektrokoagulasi selama 75 menit, pH 7, tegangan 10 volt, penambahan NaCl dengan konsentrasi 1 g/L, dan interval dosis H₂O₂ [0,66g/L] sebanyak 2 mL setiap 5 menit dengan efisiensi penghilangan warna lignin sebesar 98,63%. Pada limbah cair *pulp* dan kertas, proses elektrokoagulasi dilakukan pada pH 3, tegangan 3 volt, dan penambahan dosis H₂O₂ [0,66g/L] sebanyak 2 mL setiap 5 menit dengan efisiensi penghilangan warna pada panjang gelombang 250 nm, 280 nm dan 350 nm masing-masing sebesar 79,54%, 77,39%, dan 84,38% setelah 75 menit elektrokoagulasi.

Kata kunci: elektrokoagulasi, elektroda, besi, lignin, limbah cair *pulp* dan kertas, H₂O₂

ABSTRACT

Electrocoagulation methods have been widely developed to treat various kinds of industrial wastewater by electrolysis using metal electrode. This method is considered quite effective and efficient. In this study, electrocoagulation cell was designed using iron-metal electrode arranged in parallel. This electrocoagulation cells are used to remove color in lignin solution and of pulp and paper wastewater. The effectiveness of the electrocoagulation process is assessed through several parameters such as electrolysis time, pH, voltage, concentration of NaCl and H₂O₂ dose interval. Analysis of electrocoagulation results was performed using a UV-Vis spectrophotometer. The optimum conditions for the lignin solution were achieved at electrocoagulation time for 75 minutes, pH 7, 10 volt of voltage, 1 g/L of NaCl, and 2 mL H₂O₂ dose interval (0.66g/L) every 5 minutes with efficiency removal of lignin was 98.63%. For pulp and paper wasterwater, electrocoagulation process was performed at pH 3, 3 volt of voltage, and the addition of dose of 2 ml H₂O₂ (0.66g/L) every 5 minutes. The efficiency of color removal at 250 nm, 280 nm, and 350 nm were 79,54%, 77,39%, and 84.38% respectively after 75 minutes electrocoagulation.

Keyword: *electrocoagulation, electrode, iron, lignin, pulp and paper wastewater, H₂O₂*