ABSTRAK

Metode elektrokoagulasi saat ini telah banyak dikembangkan pada pengolahan limbah cair berbagai industri. Pada penelitian ini, dirancang sel elektrokoagulasi dengan elektroda alumunium. Alumunium dipotong menjadi tiga bagian lalu disusun secara paralel. Sel elektrokoagulasi yang berhasil dirakit kemudian diuji menggunakan larutan model metilen biru dengan parameter pengujian waktu elektrolisis, pH, konsentrasi NaCl, dan tegangan. Pada penelitian ini, dilakukan analisa spektrometri sinar tampak terhadap larutan model metilen biru dan limbah cair industri pulp dan kertas setelah elektrokoagulasi. Hasil analisa menunjukkan pada waktu elektrolisis 40 menit, pH larutan 6, konsentrasi NaCl 600 ppm, dan tegangan 15 V menghasilkan penghilangan warna larutan metilen biru hingga 96,55%. Sel elektrokoagulasi kemudian diaplikasikan pada pengolahan limbah cair industri pulp dan kertas. Penghilangan warna limbah cair sebesar 91,31% dan COD sebesar 83,53% diperoleh pada waktu elektrolisis 40 menit, pH larutan 8, tegangan 2 V, dan konsentrasi NaCl 600 ppm. Sel elektrokoagulasi yang telah dirakit menunjukkan potensi untuk diimplementasikan pada pengolahan limbah cair industri pulp dan kertas.

Kata kunci : elektrokoagulasi, metilen biru, elektroda, alumunium, limbah, pulp, kertas

ABSTRACT

Currently, electrocoagulation (EC) method has been widely investigated for the treatment of wastewaters from various industries. In this research, a simple EC apparatus has been constructed using aluminum electrode. Aluminium was cut into three parts then arranged in parallel. The EC was tested using synthetic methylene blue solutions in batch tests. Various parameters such as electrolysis time, current density, pH and salt concentration were investigated and quantified using spectronic 20+. From the experimental results, 96,55% maximum reduction of methylene blue was achieved when 40 minute of electrolysis time, pH of 6, 600 ppm of NaCl concentration, and 15 V were used. EC apparatus then applied to treat wastewater of pulp and paper industry. From the experimental results, 91,31% maximum reduction of color and 83,53% maximum reductio of COD were achieved when 40 minute of electrolysis time, pH of 8, 600 ppm of NaCl concentration, and 2 V were used. The experimental results proved that EC cell that has been constructed have a potential for treating wastewater from pulp and paper industry.

Keywords : aluminium, electrocoagulation, electrode, methylene blue, pulp, paper, wastewater