

PENGOLAHAN AIR LIMBAH LABORATORIUM MENGGUNAKAN BIOKOAGULAN KACANG ARAB (*Cicer arietinum*)

INTISARI

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Telah dilakukan penelitian pengolahan air limbah laboratorium menggunakan proses koagulasi dengan koagulan alami kacang arab (*Cicer arietinum*). Parameter proses koagulasi yaitu dengan variasi dosis 0,5; 0,75; 1; 1,25; 1,5 g dengan ukuran partikel yaitu 150; 200; 250 mesh. Kemampuan koagulan alami dalam mengolah limbah dibandingkan dengan koagulan kimia PAC (*poly aluminium chloride*). Karakterisasi koagulan alami dilakukan dengan FTIR (*Fourier Transform Infra-Red*) dan analisis proksimat. Hasil penelitian menunjukkan bahwa kinerja koagulan alami yang ditunjukkan dengan nilai *sludge mass* sebesar 72,38% dan *sludge volume index* (SVI) sebesar 2,21 mL/g. Hal ini menunjukkan bahwa koagulan alami tersebut mampu mengikat partikel koloid dengan baik. Kinerja proses biokoagulasi dengan kacang arab pada dosis 1,5 g dengan ukuran partikel 200 mesh menunjukkan penurunan konduktivitas listrik (EC) sebesar 4,58 $\mu\text{S}/\text{cm}$, *total dissolved solid* (TDS) sebesar 2357 mg/L, penurunan turbiditas sebesar 1,26 NTU dan meningkatkan intensitas cahaya (efek Tyndall) sebesar 1372 lux serta menurunkan konsentrasi logam berat Pb dan Cu secara berturut-turut sebesar 84,54%; 63,07%. Kinerja PAC pada dosis 1,5 g mampu menurunkan konduktivitas listrik (EC) sebesar 3,24 $\mu\text{S}/\text{cm}$, *total dissolved solid* (TDS) sebesar 2173 mg/L, penurunan turbiditas sebesar 0,54 NTU dan meningkatkan intensitas cahaya (efek Tyndall) sebesar 1243 lux serta menurunkan konsentrasi logam berat Pb dan Cu secara berturut-turut sebesar 84,54% dan 63,07%. Hasil tersebut menunjukkan bahwa kinerja koagulan alami kacang arab dan koagulan kimia PAC tidak menunjukkan perbedaan yang signifikan, sehingga koagulan alami kacang arab mampu menggantikan koagulan kimia PAC dalam pengolahan air limbah laboratorium.

Kata kunci: Koagulasi, Kacang arab (*Cicer arietinum*), Air limbah laboratorium, PAC

LABORATORY WASTEWATER TREATMENT USING CHICKPEA (*Cicer arietinum*) AS BIOCOAGULANT

ABSTRACT

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Research has been carried out on laboratory wastewater treatment using a coagulation process with biocoagulant of Chickpeas (*Cicer arietinum*). The parameters of the coagulation process with a dose variation of 0.5; 0.75; 1; 1.25; and 1.5g with a particle size of 150; 200; and 250 mesh. The ability of biocoagulants in treating the wastewater was compared to chemical coagulants of PAC (poly aluminium chloride). The characterization of biocoagulants was carried out by FTIR (Fourier Transform Infra-Red) and proximate analysis. The results of this research showed that the performance of biocoagulants has value of sludge mass of 72.38% and sludge volume index (SVI) of 2.21 mL/g. These values indicated the biocoagulant was able to precipitate colloid particles. The performance of the biocoagulation process with Chickpea at a dose of 1.5 g with a particle size of 200 mesh showed a decrease in electrical conductivity (EC) of 4.58 S/cm, a total dissolved solid (TDS) of 2357 mg/L, a decrease in turbidity of 1.26 NTU and increased light intensity (Tyndall effect) by 1372 lux and decreased the concentrations of the heavy metal of Pb and Cu respectively by 84.54%; 63.07%. PAC performance at a dose of 1.5 g was able to reduce electrical conductivity (EC) by 3.24 S/cm, total dissolved solid (TDS) by 2173 mg/L, turbidity decrease by 0.54 NTU and light intensity increase (Tyndall effect) by 1243 lux and reduction of the concentration of heavy metals of Pb and Cu by 84.54% and 63.07%, respectively. These results indicated that the performance of biocoagulant of Chickpea and chemical coagulant of PAC did not show a significant difference, so that the biocoagulant of Chickpea was able to replace the chemical coagulant of PAC in laboratory wastewater treatment.

Keywords: Coagulation, Chickpea (*Cicer arietinum*), Laboratory wastewater, PAC