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A novel electrocoagulation process using insulated edges of Al electrodes for enhancement of urban wastewater treatment: Techno-economic study

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Research Highlights

- A comparison between conventional process and novel electrocoagulation process was performed for enhancement of urban wastewater treatment.
- Insulated edges electrode process exhibited the ability to reduce the cost to 0.62 \$.kg⁻¹ for COD and to 0.58 \$.kg⁻¹ for P.
- The high removal efficiencies of COD and P using insulated edges of electrodes were achieved 91% for COD and 99.5% for P.
- The characterization generated sludge confirmed that metal hydroxides and oxyhydroxides can play the key role in removing COD and P from urban wastewater.
- The novel process involved in the present study could be an efficient alternative to conventional EC reactor for urban wastewater treatment.

Abstract

A comparison between conventional process and novel process of insulated edges electrodes in a batch electrocoagulation (EC) reactor for the treatment of urban wastewater was undertaken to investigate the effect of current density, operating time and initial temperature on the treatment efficiency. The optimal experimental conditions are found to be: current density of 20mA.cm⁻², operating time of 6 min and initial temperature of 45°C for phosphorous (P) and 55 °C for chemical oxygen demand (COD). The high removal efficiencies of COD and P using conventional electrodes system were found to be 89% and

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