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Optimization of Electrocoagulation Process Using Duelist Algorithm

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Abstract : The main objective of this research is optimizing the electrocoagulation process design as a post-treatment for biologically vinasse effluent process. The first principle model with three independent variables that affect the energy consumption of electrocoagulation process i.e. current density, electrode distance, and time of treatment process are chosen as optimized variables. The process condition parameters were determined with the value of pH, electrical conductivity, and temperature of vinasse about 6.5, 28.5 mS/cm, 52 oC, respectively. Aluminum was chosen as the electrode material of electrocoagulation process. Duelist algorithm was used as optimization technique due to its capability to reach a global optimum. The optimization results show that the optimal process can be reached in the conditions of current density of 2.9976 A/m2, electrode distance of 1.5 cm and electrolysis time of 119 min. The optimized energy consumption during process is 34.02 Wh.

Keywords : optimization, vinasse effluent, electrocoagulation, energy consumption
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