

Post treatment of palm oil mill effluent using electrocoagulation-peroxidation (ECP) technique

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Abstract:

Global demand of palm oil and palm oil derivatives lead to generate a huge quantity of palm oil mill effluent (POME). A post treatment is an essential step to a polish biologically treated POME before final discharge. In this study, the performance of employing hydrogen peroxide to enhance electro coagulation process in polishing POME was investigated. Operational variables including current density, contact time, initial pH, and H₂O₂ dosage were applied and optimized using Response Surface Methodology (RSM). An optimized condition of 40.21 mA/cm² of current density, 45.67 min of contact time, initial pH of 4.4 and 0.5 g/L of H₂O₂ was able to achieve removal of 71.3%, 96.8%, and 100% for Chemical Oxygen Demand (COD), colour, and Total Suspended Solid (TSS), respectively. The parameters of polished POME were found below discharge limits of 1000 mg/L and 400 mg/L for COD and TSS, respectively. The biodegradability of POME increased from 0.037 to 0.14 by electrocoagulation-peroxidation (ECP) process. Compared with electrocoagulation alone, employing ECP in polishing POME can reduce current density by 28.2% and reaction time by 30%.