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TURBIDITY REMOVAL FROM PISTACHIO PROCESSING WASTEWATER BY ELECTROOXIDATION: INVESTIGATION OF EFFICIENCY AND ENERGY CONSUMPTION OF TI/MMO ANODE

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Abstract

The aim of this study is to remove turbidity from pistachio processing industry wastewater (PPIW) by electro-oxidation method and to test the energy consumption of the system. Turbidity must be treated before being introduced to the receiving environment because it hinders the transmission of light. It aims to eliminate aesthetic problems such as turbidity, color, and odor caused by suspended solids in water. In the studies, stainless steel was used as the cathode and sieve type mixed metal oxide coating (Ti/MMO) as the anode. The most suitable operational conditions for wastewater were investigated by carrying out studies under different conditions. Supporting electrolyte (SE) type (Na₂SO₄, NaNO₃, NaCl KCl), SE concentration (0-0.75), initial wastewater pH (3-11), current density (5-15 mA/cm²), and the effects of different parameters such as dilution rate (1/1-1/15) on turbidity removal were investigated. The most effective electrolyte type was found to be NaCl. Optimum conditions were determined to be 0.5 M, natural pH of wastewater, and current of 5 mA/cm². Besides, it was observed that the removal efficiency increased as the dilution rate was increased. In the study carried out with 0.5 M NaCl SE, 5 mA/cm² current, and natural pH value of wastewater (5.3), turbidity removal fraction (Ct/C₀) was found to be 87.181%, and energy consumption was 175.000 kWh/m³. The efficiency increased to 99.231% at the highest current.

Key words: electrochemical treatment, energy consumption, turbidity removal, Ti/MMO anode, wastewater treatment

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