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Treatment of winery wastewater by electrochemical methods and advanced oxidation processes

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Abstract

The aim of this research was development of new system for the treatment of highly polluted wastewater (COD = 10240 mg/L; SS = 2860 mg/L) originating from vine-making industry. The system consisted of the main treatment that included electrochemical methods (electro oxidation, electrocoagulation using stainless steel, iron and aluminum electrode sets) with simultaneous sonication and recirculation in strong electromagnetic field. Ozonation combined with UV irradiation in the presence of added hydrogen peroxide was applied for the post-treatment of the effluent. Following the combined treatment, the final removal efficiencies of the parameters color, turbidity, suspended solids and phosphates were over 99%, Fe, Cu and ammonia

approximately 98%, while the removal of COD and sulfates was 77% and 62%, respectively. A new approach combining electrochemical methods with ultrasound in the strong electromagnetic field resulted in significantly better removal efficiencies for majority of the measured parameters compared to the biological methods, advanced oxidation processes or electrocoagulation. Reduction of the treatment time represents another advantage of this new approach.

Keywords:

- Winery wastewater
- electrochemical treatment
- ultrasound
- ozonation
- H₂O₂
- COD
- SS electrode
- iron anode
- aluminum anode

Related Research Data

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Source: Water Research

Treatment of winery wastewater using a photocatalytic/photolytic reactor

Source: Chemical Engineering Journal

Characterization and treatment of water used for human consumption from six sources located in the Cameron/Tuba City abandoned uranium mining area

Source: Journal of Environmental Science and Health Part A

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Source: Ecological Engineering

Preparation of drinking water used in water supply systems of the towns Zrenjanin and Temerin by electrochemical methods

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