

Enhancement of Dissolved Oxygen Concentration during the Electrocoagulation Process Using an Innovative Flow Column: Electrocoagulation Reactor

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Abstract : Dissolved oxygen (DO) plays a key role in the electrocoagulation process (EC) as it oxidizes the heavy metals, ammonia, and cyanide into other forms that can be removed easily from water. Hence, many of the previous investigations used external aerators to provide the required DO inside EC reactors, especially when the water being treated had a low DO (such as leachate and high organic content waters), or when the DO depleted during the EC treatment. Although the external aeration process effectively enhances the DO concentration, it has a significant impact on energy consumption. Thus, the present project aims to fill a part of this gap in the literature by an innovative use of perforated flow columns in the design of an EC reactor (ECR1). In order to investigate the performance of ECR1, water samples with a controlled DO concentration were pumped at different flow rates (110, 220, and 440 ml/min) to the ECR1 for 10 min. The obtained results demonstrated that the ECR1 increased the DO concentration from 5.0 to 9.54, 10.53, and 11.0 mg/L, which is equivalent to 90.8%, 110.6%, and 120% at flow rates of 110, 220, and 440 mL/min respectively.

Keywords : flow column, electrocoagulation, dissolved oxygen, water treatment

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