

Dairy Wastewater Remediation Using Electrochemical Oxidation on Boron Doped Diamond (BDD) Anode

Authors : Arwa Abdelhay, Inshad Jum'h, Abeer Albsoul, Khalideh Alrawashdeh, Dina Al Tarazi

Abstract : Treated wastewater reuse has been considered recently as one of the successful management strategies to overcome water shortage in countries suffering from water scarcity. The non-readily biodegradable and recalcitrant pollutants in wastewater cannot be destructed by conventional treatment methods. This paper deals with the electrochemical treatment of dairy wastewater using a promising non-conventional Boron-Doped Diamond (BDD) anode. During the electrochemical process, different operating parameters were investigated, such as electrolysis time, current density, supporting electrolyte, chemical oxygen demand (COD), turbidity as well as absorbance/color. The experimental work revealed that electrochemical oxidation carried out with no added electrolyte has significantly reduced the COD, turbidity, and color (absorbance) by 72%, 76%, and 78% respectively. Results also showed that raising the current density from 5.1 mA/cm² to 7.7 mA/cm² has boosted COD, and color removal to 82.5%, and 83% respectively. However, the current density did not show any significant effect on the turbidity. Interestingly, it was observed that adding Na₂SO₄ and FeCl₃ as supporting electrolytes brought the COD removal to 91% and 97% respectively. Likewise, turbidity and color removal has been enhanced by the addition of the same supporting electrolytes.

Keywords : boron doped-diamond anode, dairy wastewater, electrochemical oxidation, supporting electrolytes

Conference Title : ICWPT 2018 : International Conference on Water Pollution and Treatment

Conference Location : London, United Kingdom

Conference Dates : May 14-15, 2018