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Electrochemical degradation of dairy effluent using novel Sn/Sb/Ni-Ti anodes

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The application of Sn-Sb-Ni electrodes for the treatment of waste streams is too limited in literature. Sn/SbNi-Ti anodes are tested for electrochemical ozone generation. Sn/Sb/Ni-Ti anodes are promising alloys for ozone production by electrolysis of water because of their stability and over potential for the oxygen evolution reaction. These series of anodes have high electrochemical ozone generation potential at ambient conditions (approximately 40% current efficiency). Dairy plant wastewaters are generally high-strength wastes containing soluble, colloidal, and suspended solids at high concentrations, with several sources of chemical and biochemical oxygen demand, but mainly of organic origin. Serious environmental problems can arise if dairy wastewater is not treated properly. According to our knowledge, electrochemical treatment of dairy effluent using Sn/Sb/Ni-Ti anodes is missing in literature. In this study, titanium mesh substrate coated with Sn-Sb-Ni alloy was used as anode immersed in wastewater at room temperature with platinised titanium cathode. Five operational parameters (initial dye concentration, pH, COD, applied voltage/current and the contact time) were evaluated for the electrochemical degradation of dairy effluent. Before the electrochemical degradation experiments, all dairy effluents were pre-treated with acid craking step for the removal of oil&grease content. At this step, 20% COD and 91% oil and grease have been removed. Following the acid craking, electrochemical oxidation results revealed that after 15 min the degradation efficiency of COD could reach upto 99% at pH 4 and temperature of 25°C as the optimum conditions.

Biography

Taner Yonar has done his BSc (1996) degree in Environmental Engineering, Uludag University, and MSc (1999) degree in Environmental Science, Uludag University, Institute of Sciences. He has completed his PhD (2005) in Environmental Technology, at Uludag University, Institute of Sciences, where he also worked as a Research Assistant. He did his Post-doctoral Research in Chemical Engineering and Advanced Materials department (2011) from Newcastle University, UK. He is currently working as an Associate Professor at the Environmental Engineering department of Uludag University, Turkey.

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