Electrochemical Removal of Cefazolin from Aqueous Media by Novel Composite Anodes: Effects of Electrolytes and Operating Parameters

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In this study, we aimed to investigate the capability of novel stable Ni-based anodes with platinized titanium cathodes to eliminate cefazolin antibiotics from aqueous media. For this purpose, different types of electrolytes were compared, and potassium chloride was found to be the optimal electrolyte for promoting the elimination of antibiotics, even at low concentrations. Thus, it may be possible to obtain higher removal efficiencies with real water/wastewaters, even without the addition of extra electrolytic chemicals, assuming the water being treated includes chloride ions. A pH of 7, which is the neutral pH value of the aqueous solution containing antibiotics, was defined as the optimal pH value as it provided the highest removal efficiencies. Thus, it may be possible to operate the process more easily and more economically by working at neutral pH values, as no additional chemical costs are incurred due to pH adjustment. Moreover, more efficient results were obtained at lower current densities with this anode in comparison to other studies on the electrochemical treatment of antibiotics in the literature. As a result of this study, electrochemical oxidation with Sb-doped SnO₂ anodes was found to be very useful and successful for the removal of cefazolin from water in terms of both removal efficiency and cost effectiveness.

Keywords: Cefazolin, Electrochemical oxidation, Nickel-based anode, Platinized cathode, Electrolyte, Current density

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