

Effect of electrolyte components on electrochemical generation and disinfection efficiency of active chlorine

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ABSTRACT

Electrochemical generation of active chlorine (AC) from chloride bearing electrolytes of different constituents and different initial pH values has been studied in this paper. The research involved three stages. In the first stage, sodium chloride electrolytes were used, and the effect of electrolyte concentration and pH value on AC generation rate was studied. The second stage involved the combined effect of adding calcium chloride and sodium fluoride to the electrolyte on AC current efficiency. The disinfection efficiency of the generated AC from electrolytes of different constituents was investigated in the final stage. Use of electrolytes of low initial pH value and with low concentrations (less than 25 mg/L) decreased the generation rate of AC. Adding calcium chloride to the electrolyte in ratios up to 25% increased both disinfection and current efficiencies of AC. However, adding sodium fluoride to the electrolyte in concentrations up to 1 g/L did not affect AC current efficiency, which means that water disinfection and fluoridation of water can be conducted simultaneously. Because sodium and calcium chlorides are available as by products of potassium manufacturing in the Dead Sea area in Jordan, generation of AC from electrolytes containing both sodium and calcium chloride is highly feasible.

Keywords: Active chlorine; Electrolyzer; Current efficiency; Generation rate; Cathode
