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REMOVAL OF AMMONIA NITROGEN FROM SWINE WASTERWATER BY ELECTROOXIDATION USING Ti/Mn-Ni/SnO₂-Sb-CeO₂ ANODE

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Abstract

An electrochemical oxidation system using Titanium-based material as anode was setup and used to remove ammonium nitrogen (NH₄-N) from swine wastewater. The effects of electrode material, current density, pH, and chlorine ion concentration were evaluated by removal rate of NH₄-N and energy consume. The results showed that the NH₄-N removal rate reached 98.5% using Ti/Mn-Ni/SnO₂-Sb-CeO₂ material as anode under the conditions: detention time of 60 minutes, pH of 8-10, current density of 20 mA/cm², chlorine ion concentration of 1500 mg/L, and initial NH₄-N concentration of 1000 mg/L. The NH₄-N removal was carried out mainly through indirect oxidation. Compared with the raw swine wastewater, the system using Ti/Mn-Ni/SnO₂-Sb-CeO₂ material as anode presented the superior performance for the NH₄-N removal of the biologically pretreated swine wastewater under the optimal conditions. The final NH₄-N concentration for biologically pretreated swine wastewater was lower than the 80 mg/L, and met the requirement of discharge standard of pollutants for livestock and poultry breeding in China (GB-18596, 2001).

Key words: ammonia nitrogen removal, electrochemical oxidation, swine wastewater, titanium-based electrode

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