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pH-dependent ammonia removal pathways in microbial fuel cell system

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Abstract

In this work, ammonia removal paths in microbial fuel cells (MFCs) under different initial pH conditions (pH 7.0, 8.0, and 8.6) were investigated. At a neutral pH condition (pH 7.0), MFC used an electrical energy of 27.4% and removed 23.3% (30.2 mg/L) of total ammonia by electrochemical pathway for 192 h. At the identical pH condition, 36.1% of the total ammonia was also removed by the biological path suspected to be biological ammonia oxidation process (e.g., *Anammox*). With the initial pH increased, the electrochemical removal efficiency decreased to less than 5.0%, while the biological removal efficiency highly increased to 61.8%. In this study, a neutral pH should be maintained in the anode to utilize MFCs for ammonia recovery via electrochemical pathways from wastewater stream.

Keywords: microbial fuel cell; ammonia removal; ammonia recovery; *Anammox*; pH

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