

Using Microbial Fuel Cell to Monitor Volatile Fatty Acids in an Anaerobic Process

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Volatile Fatty Acid concentration is a sensitive parameter which affects the optimization and control of the anaerobic digestion process. The research is focused on developing a reliable and a simplified method than the currently used complex methods to monitor Volatile Fatty Acid concentration in this process. A synthetic Volatile Fatty Acid, Acetic Acid was used to develop a Microbial Fuel Cell. First, a correlation was developed between acid concentration and the voltage generated using 0.1M Acetic Acid sample. Then the same procedure was repeated for 3 different Acetic acid samples to check whether the obtained correlation depends on the initial acid concentration. A correlation of $M = 0.0007V^2 + 0.0074V + 0.0769$ was obtained by using average concentration (M) and average voltage (V) of aforementioned repeated trials. After further analyzing this correlation, it was observed that the correlation between voltage and Volatile Fatty Acid concentration is independent of the initial acid concentration. Therefore, this correlation which was obtained using a synthetic Volatile Fatty Acid can be applied to any natural Volatile Fatty Acid sample, irrespective of its initial concentration.

Keywords: Microbial fuel cell, Volatile fatty acid, Salt bridge