

# LONG-TERM EVALUATION OF METHANE PRODUCTION IN A BIO-ELECTROCHEMICAL ANAEROBIC DIGESTION REACTOR ACCORDING TO THE LOADING

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In this study, the effects of differing organic loading rates (OLRs) on methane production were evaluated via long-term operation of a bio-electrochemical anaerobic digestion (BEAD) reactor and an anaerobic digestion (AD) reactor. In the anaerobic digestion (AD) reactor, the maximum OLR was 4 kg/m<sup>3</sup>.d, whereas the electro-active microbial community in bulk and on the biofilm of the BEAD reactor produced methane even at 10 kg/m<sup>3</sup>.d. The BEAD reactor rapidly removed volatile fatty acids (VFAs) and reduced H<sup>+</sup> to H<sup>2</sup> at high OLRs, thereby preventing VFA accumulation and pH decrease. After the steady state was achieved, both the AD and BEAD reactors exhibited similar organic matter removal and methane production at a low OLR. Thus, a BEAD reactor can stably produce methane under conditions of high OLR and severe OLR fluctuation, and can even shorten the stabilization period over the long-term.

## Biography

Hye-Jeong Kwon is in the Master program in the Department of Environmental Engineering at Chungbuk National University in Republic of Korea, and she is studying microbial electrolysis cells (MECs) to improve various efficiencies of anaerobic digesters. She has obtained her Bachelor's degree in Department of Environmental Engineering at Chungbuk National University, and she is studying the effect of biochemical reactions on anaerobic digestion. She is also studying about methods to proceed the high methane production efficiency and contents. Her areas of interest are power to gas, and she has researched them continuously. She is analysing the relevant mechanisms and application directions for practical use.

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