

# Enhancement of biogas production from swine wastewater via adding acidification-stage

\*Chiu-Yue Lin<sup>1,2,3</sup>, Hung-Wei Shei<sup>2</sup>, Chi-How Lay<sup>2,3</sup>

1. Department of Environmental Engineering and Science, Feng Chia University, Taiwan, 2. Green Energy Development Center, Feng Chia University, Taiwan, 3. APEC Research Center for Advanced Biohydrogen Technology

## 1. Background

Anaerobic digestion to obtain biogas as a renewable fuel is promising from the viewpoint of circular economy. It has been reported that two-stage anaerobic digestion would recover more 8-43 % energy than a conventional one-stage anaerobic digestion (Schievano et al., 2014). The purpose of this study is to evaluate the potential of adding an acidification stage to promote the biogas production in the conventional anaerobic treatment of swine wastewater.

## 2. Methods

A batch mode of anaerobic digestion was used in acidification and methanogenesis. Taguchi method was applied for obtaining optimal operation temperature, pH and acidification time. Tested temperatures were 25, 35, 45 and 55 °C. Tested pH values were 5.5, 6.0, 6.5 and 7.0. Tested acidification times were 6, 12, 18 and 24 h.

## 3. Results

In methane production batch test, the highest methane production rate (140 mL/d-L) was at acidification time 18 h, pH 5.5 and 35°C and the highest methane production yield (905 mL/g COD<sub>removed</sub>) was at acidification time 12 h, pH 6.0 and 25°C. The highest COD degradation rate 80% was at acidification time 24 h, pH 6.5 and 35°C. According to data obtained by Taguchi method it was found that the best effective factors to produce methane was acidification time 18 h, pH 6.5 and 35°C.

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