

Kanokwan Noochouy 2009: Biological Methanol Production from Biogas by Methanotroph Attached on Floating Media in Semi Continuous Bioreactor. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Wilai Chiemchaisri, D.Tech.Sc. 107 pages.

The objective of this study is to find optimal type of media, hydraulic retention time (HRT) and liquid recirculation rate (LRR) for methanol production by the semi-continuous bioreactor consisting of methanotrophs attached on floating media in phosphate buffer solution containing magnesium chloride. Types of floating media were plastic beads and sponge cubes. The hydraulic retention time was varied at 1, 3 and 5 days and the liquid recirculation rate was varied at 2, 20 and 200 mL/min.

The results showed that methanol production was increasing at the HRT of 5 days and gave maximum concentration at day 14th, and then it was decreasing. The methanotroph attached on both floating media gave slight differences in methanol production (5,699 and 5,032 μM , respectively) during 30 days operation. But sponge media gave higher methanol concentration than beads media (39.68 and 27.63 $\mu\text{M/day}$, respectively). The methanotroph attached on sponge at the HRT of 1 and 3 days gave maximum methanol concentration at day 11st and 15th. Methanol production at the HRT of 1 and 3 days were 1,575 and 1,641 μM , respectively. The methanotroph attached on sponge at the LRR of 200, 20 and 2 mL/min gave methanol production of 8,648 5,699 and 5,297 μM , respectively. These results indicated that increasing liquid recirculation rate yielded higher methanol concentration. Besides, types and quantities of methanotroph was studied by FISH technique, Type II was found more than Type I and was 26.87% and 12.67% in average for microbial population of all operation. When Type II was found more than 20%, methanol was produced at all HRTs. While Type II was found less than 10%, methanol was not produced. Methanol gave stable concentration trend after day 20th every liquid recirculation rate of which Type II was found to be 20%.

Student's signature

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