

Electromethanogenesis performance on methyl viologen and reactor types for
'Power-to-Gas' and biogas upgrading process

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The microbes responsible for methane production, hydrogenotrophic methanogens may benefit from induced bioelectrochemical hydrogen production, while acetoclastic methanogens are susceptible to inhibition at high hydrogen concentration. Also direct methanogenesis can occur on the electrode surface, in which methanogenic archaea are able to convert the CO₂, electrons and protons into methane. Thus the methane formation through electromethanogenesis has been focused for the prospective process of Power-to-Gas and biogas upgrading using surplus wind and solar generation. In this study, performance of the methane production was compared with the presence or absence of methyl viologen (MV) and reactor type for electromethanogenesis. Seed culture was carried out via 15L reactor supplying H₂/CO₂ gas. H-type reactors were used to compare the activity of methanogen with the use of MV as an electron mediator. And multi electrode reactor was used to compare the activity of methanogen with H-type reactor. Methane production, current density, TN, pH and O.D. were measured. The results of this study can be suggested the application of MV and reactor type for good performance in bioelectrochemical system.