

QUANTITATIVE ESTIMATION OF METHANOGENIC POTENTIAL USING FACTOR F430

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Methanogenesis is a final step of decomposition of organic matter by organisms, which is mediated by methanogenic archaea. It is suggested that a large proportion of methane in marine gas hydrate originates from the microbially mediated methanogenesis, based on isotopic compositions of methane. Therefore, investigations of distribution and activities of methanogenic archaea are important for better understanding of carbon cycles and mechanisms of gas hydrate formation. So far presence and activities of methanogenic archaea have been inferred using molecular biologic techniques, membrane lipids and tracer experiments with isotopically-labelled substrates however, it was difficult to clarify their in situ distribution and activities quantitatively.

Coenzyme F430 that is a Ni porphinoid with five carboxyl groups catalyses a final step of methanogenic reactions (Thauer, 1998). Because of its unique structure, functionality and lability, F430 can be a biomarker for a quantitative estimation of in situ methanogenic potential and activities of living methanogens (Takano et al., in press). In this study, we developed quantitative analysis of F430 and applied the method into methanogenic industrial sludge and environmental samples.

[References]

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