Analysis of Community Sturctures and Population Dynamics in Anaerobic Processes Using Quantitative Real-time PCR

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Abstract

Real-time PCR is a highly sensitive method that can be used for the detection and quantification of microbial populations without cultivating them isolated from environmental samples including anaerobic processes. This work was conducted to design primer and probe sets for the detection of methanogens using a real-time PCR with TaqMan system. Six group-specific methanogenic primer and probe sets were designed for the first time. These sets separately detect four orders (*Methanococcales, Methanobacteriales, Methanomicrobiales*, and *Methanosarcinales*) along with two families (*Methanosarcinaceae* and *Methanosaetaceae*) of the order *Methanosarcinales*. We also designed the universal primer and probe sets which specifically detect the 16S rDNA of *Prokaryotes* and of the domain *Bacteria* and *Archaea*. In conclusion, the real-time PCR assay was very specific to the corresponding target methanogenic group. The primer and probe sets designed in this study were successfully used to quantify group-specific methanogens in various anaerobic processes. A community structure and population dynamics of the four orders of methanogens using methanol and acetate as different substrates will be discussed.

References

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