Carbon isotopic compositions of bacteria-derived biomarkers: Application to marine environment and bacterial ecology studies

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Stable carbon isotopic compositions of bacteria-derived biomarkers are a useful means to evaluate marine paleoenvironment and biological activity. Stratified deep anoxic ocean as well as photic zone anoxia have been revealed by the carbon isotope ratios of hopanoids and aromatic isoprenoids, respectively. Large isotopic variations of biomarkers in geological shale samples are also indicative of various inputs by bacterial activity, including not only chemoautotrophic, methanogenic and methanotrophic but also heterotrophic bacteria. This paper summarizes recent advances of isotope studies of bacteria biomarkers, and notes the importance that biomarker isotope will clarify bacterial community of hydrothermal vents in deep ocean.