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BGM22-12 会場:415 時間:4 月 30 日 12:15-12:30

グルコースを電子供与体としたときの微生物硫酸還元過程で起こる硫黄同位体分別の温度依存性
Temperature effect of sulfur isotope fractionation by sulfate reducers when used glucose as electron donor

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Sulfate reducing microbe (SRM) is responsible for over 50 % of organic carbon remineralization in marine sediments and thus plays a prominent role in sulfur cycle. Based on a large number of culture experiments of SRM, sulfur isotope fractionation by SRM changes depending on environmental factors including temperature, sulfate concentration and availability of electron donor. The isotope fractionation is recorded in sedimentary sulfates and sulfides. Hence, the sulfur isotopic fractionation is useful to reconstruct ancient environmental condition. However, the mechanism controlling the degree of the sulfur isotopic fractionation is still unclear. Particularly, we have to consider the physiology. Previous culture experiments of SRM indicated that the temperature effect varies with species of SRM. However, there is little temperature control experiments using various electron donor with same strain. We carried out temperature control experiments at 25 ℃, 30 ℃ and 37 ℃, by sulfate reducing bacteria DSM 642 using glucose as electron donor. Our results revealed growth rate of DSM 642 is fastest at 30 ℃, when using glucose as electron donor. Growth rate is the fastest at 37 ℃ when using lactate as an electron donor. Sulfate reduction rate is thought to primary factor controlling isotope fractionation. In addition, growth rate and sulfate reduction rate have basically positive correlation. Accordingly, the shift of sulfur isotope fractionation by temperature must be changed when used glucose as electron donor. This result indicates that we should pay attention not only sulfate reduction pathway but also oxidation pathway of electron donor. We report temperature dependency of sulfur isotope fractionation by DSM 642 using glucose as electron donor at the first time, to elucidate the mechanism controlling the degree of the sulfur isotopic fractionation during microbial sulfate reduction.

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