

# Carbon isotope fractionations during chemoautotrophy in sulfur-oxidizing bacteria dominant in global deep-sea hydrothermal vents

# Yohey Suzuki[1]

[1] SUGAR, JAMSTEC

It is now recognized from molecular ecological surveys that members of the epsilon subdivision of Proteobacteria represent the most predominant bacterial components at low-temperature habitats in global deep-sea hydrothermal vent environments. Previously, the physiologies of the members of the epsilon-Proteobacteria were largely unknown due to the lack of isolates resulting from their resistance to cultivation. However, a recent success in isolation of some members belonging to the epsilon-Proteobacteria and subsequent physiological characterizations of the isolates revealed that they are strict chemolithoautotrophs using chemical energy from reduced sulfur compounds for fixation of carbon dioxide. In addition, it was discovered that the deep-sea hydrothermal vent gastropods *Alviniconcha* spp. are able to establish a nutritionally mutualistic relationship with an epsilon-proteobacterial endosymbiont. Bulk- and compound specific-carbon isotopic analyses were conducted for several species of the epsilon-Proteobacteria grown under chemolithoautotrophic conditions as well as the epsilon-proteobacterial endosymbiont to clarify carbon isotope fractionations associated with carbon fixation and biosynthesis of lipids. It was revealed from these analyses that the free-living and endosymbiotic members of the epsilon-Proteobacteria produce their biomass and lipid components slightly depleted in  $^{13}\text{C}$ . From the result, it is suggested that organic matters with significantly heavy carbon isotopic compositions might be of epsilon-proteobacterial origin.