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Examination for lipid biomarker compositions in culture samples of Parmales.

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Palmales is very small marine microalga, in which cell size is 2-5 um, and is classified as picoplankton. It is pointed out that this alga is one of main primary producer in restricted subarctic regions. Palmales has siliceous tests, and may be closely related to diatom, which is a main important primary producer in the Cenozoic ocean. In 2008, Kuwata's research group can succeed in isolation of the Palmales collected from the Oyashio region. In the present study, we try to search lipid biomarkers of the Palmales, and to give understanding for first appearance and first processes of evolution of diatom. There have been no reports for siliceous fossil of Palmales. It is known to well preserve siliceous diatom fossil in ancient sediment, and however, such fossil is frequantly lost through its dissolution by diagenesis during postdeposition. Therefore, very small siliceous tests of Palmales must be easily dissolved by diagenesis, and it cannot evaluate the timing of first appearance and reconstruct productivity of Palmales by using its siliceous fossil. Thus, we clarified the Palmales biomarkers and their compositions, and these biomarkers are used as molecular fossils for giving understanding evolution processes and historical variations of productivity of this alga.

We use a cultural strain NIES-2565(TOY-0807) of Palmales Triparma sp. (Triparma laevis) for analysis of lipid biomarker. We can identify unsaturated alkene, unsaturated alkenoic acids, C27-C29 sterols as Palmales biomarkers, which have detected from culture samples of diatoms. In particular, this strain is found to be characterized by overwhelmingly abundance of C29 beta-sitosterol. In addition, we can detect a number of unknown polar lipids with higher molecular weight. In the present study, we report preliminary results for Palmales biomarker study and discuss its geosientific significance as molecular fossil.

Keywords: Parmales, lipid biomarker, evolution of diatom, chemotaxonomy, culture, steroid