Possibility of existence of unrevealed (new) halophilic archaea in halite or ancient hypersaline environment

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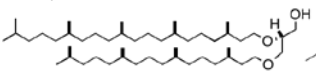
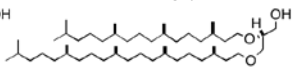
Archaea has a characteristic lipid-core, archaeol. The structure of archaeol is those in which two C_{20}-saturated isoprenoid are linked to glycerol by ether bond. Further, a characteristic diether (C_{25}-C_{20} diether (**1**)) which is constructed from one C_{25} and one C_{20} isoprenoid is produced by halophilic archaea. The regiochemisty of the hydrocarbon bonded with glycerol had been determined[1],[2]. The C_{25} (long) hydrocarbon is linked with the C-2 of the glycerol. On the other hands, Teixidor *et al*. showed that archaeol and **1** were existed in the halite[3]. However, the different regiochemical structure **2** (C_{25} hydrocarbon was linked with the C-3 of the glycerol)



1



2

for the structure of **1** were found in several literature (including lit. [3]).

During my experiments for the deterimination of the regiochemistry and carbon number of the hydrocarbon of the diether[4], the possibility of misreading of fragmentation analysis of **1** (**2**) in Teixidor's report were suspected. Therefore, the two regioisomers of **1** and **2** were chemically prepared and fragmentation analysis were carried out.

Then, **1** and **2** were chemically synthesized according to the reported method of an intermadiate in the synthesis of archael tetraether[5]. The analysis of the mass fragmentation of the TMS derivative of **1** and **2**, the mass spectrum in Teixidor's report was revealed to the mixture of **1** and **2**. It is suggested that the regiochemically different ether lipid were accumulated in the halite. Further, it is suggested that the unrevealed archaea which can biosynthesize regioisomeric C_{25}-C_{20} diether in halite and/or in ancient hypersaline environment were existed.

[1]De Rosa *et al*. (1982) *J. Gen. Microbiol*., **128**, 343. [2] Morita *et al*. (1998) *Biosci. Biochem. Biotechnol*., **62**, 596. [3] Texidor et al. (1993) *Geochim. Cosmochim. Acta*. **57**, 4479. [4] Yamauchi (2013) *Res. Org. Geochem*., **29**, 71. [5] Eguchi *et al*. (1997) *Bull. Chem. Soc. Jpn*., **70**, 2545.