The precise structure of “unsaturated” archaeol derivatives in the halophilic archaea lipid-core

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Archaea has a characteristic lipid-core, archaeol. Further, a characteristic diether lipid-core (C_{20}-C_{25} diether (**1**)) which is constructed from one C_{25} and one C_{20}isoprenoid is produced by halophilic archaea[1]. Recently, Dawson et al. showed the existence of several unsaturated isoprenoid diethers (such as tentative structure **2**) in the lipid-core of several halophilic archaea which was incubated with very high salt concentration[2].
Then, **2**, and the regioisomeric structure about the double bond and ether bond with a glycerol, **3**to **5** were chemically synthesized according to the reported method and the comparison of the mass spectrum of trimethylsilyl (TMS) ether were presented previously at this meeting[3].Further, **3** or **4**may be a possible structure of the real compound Dawson et al. shown at the mass spectrum.
About these unsymmetrical diether. The halophilic archaea *Haloferax sulfrifonis* was incubated and the lipid core was extracted and isolated.The analysis of the lipic core was perforemd by the GC-MS of the TMS ether. At first, **1** was detected as a main core lipid compornent. And the compound almost identical the mass specrum with the synthetic structure **2** was detected with a second minor compornent. Careful analysis of the compornent, the srtucture almost identical with **4** is also detected. This result showed the double bond in the unsaturated archaeol in *H. sulfrifonis*is the mixture of **2** and **4**. Dawson's unsaturated diether does not have a double bond at the methyl group branching position resulting from the usual isoprenoid biosynthesis (e.g. phytol), probably unsaturation is formed after the saturated isoprenoid formation with a unspecific fasion. The result of the analysis of lipid core of the archaea having unsaturated C_{20}-C_{25}diether will be presented.
[1]De Rosa *et al., J. Gen. Microbiol.*, **128**, 343 (1982).
[2] Dawson *et al. Org. Geochem.*, **48**, 1 (2012).
[3] Yamauchi (2018) *JpGU meeting 2018* BBG03-P08.

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