The diversity and structure determination of saturated and unsaturated archaeol derivatives characteristic for the halophilic archaea lipid-core

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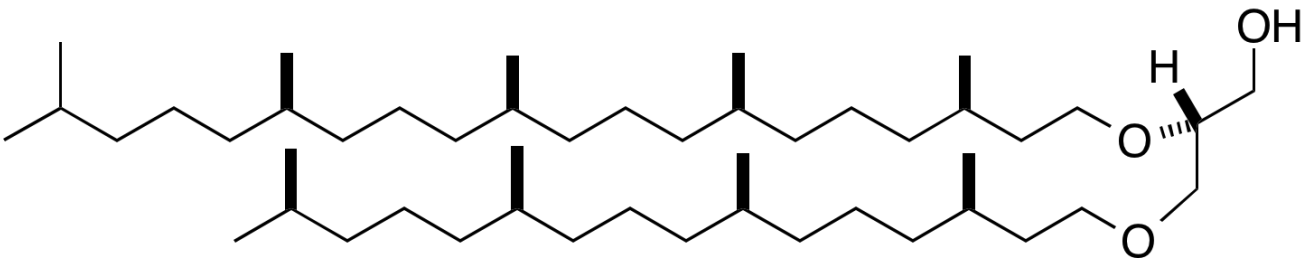
Archaea has a characteristic lipid-core, archaeol. Further, a characteristic diether lipid-core (C_{20}-C_{25} diether (**1**)) which is constructed from one C_{25} and one C_{20} isoprenoid is produced by halophilic archaea. The C_{25} (long) hydrocarbon is linked with the C-2 of the glycerol[1]. Recently, 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, **1** and **2** were chemically synthesized according to the reported method[3] and the results were presented at the last year's this meeting[4]. The analysis of the mass fragmentation of the TMS derivative, the structure of microbiological sample derived from halophilc archaea was confirmed as **1**. Further, **2** is different from those of Dawson's unsaturated diether.
About the diversities of these unsymmetrical diether, 1) The isomer of the C_{25} (long) hydrocarbon is linked with the C-3 of the glycerol **3** was synthesized and mass fragmentation of the TMS ether of **1** and **3** were observed. Teixidor's report[5] of archaeol derivative from halite were decided to the mixture of **1** and **3** with almost equal amounts. It is suggested that the existence of the unrevealed halophilic archaea which can biosynthesize regioisomeric C_{25}-C_{20} diether in halite and/or the ancient hypersaline environment. 2) The "real" structure of Dawson's unsaturated archaeol derivative were assumed to the structure **4** or **5** from the intermediate of biosynthesis of tetraether lipid in thermophilic archaea[6]. Then, the chemical synthesis and mass fragmentation analysis of **4** and **5** 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 *Res. Org. Geochem.*, **29**, 71 (2013).
[4] Yamauchi (2016) *JpGU meeting 2016* BA001-P05.
[5] Texidor *et al.* (1993) *Geochim. Cosmochim. Acta.* **57**, 4479.
[6] Nemoto et al. (2003) *Extremophiles,* **7**, 235.

Keywords: archaea, isoprenoidal dither, structure determination, halophilic, halite



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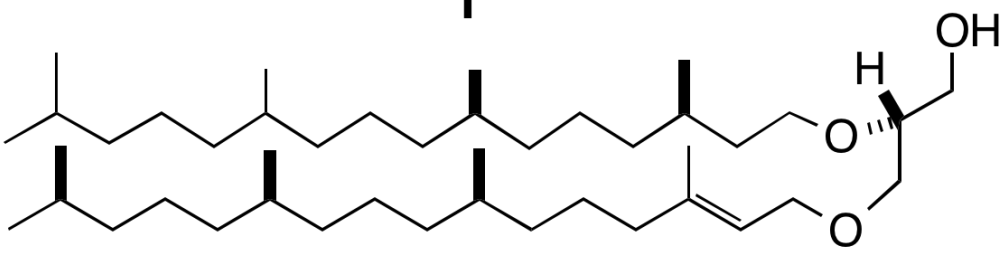

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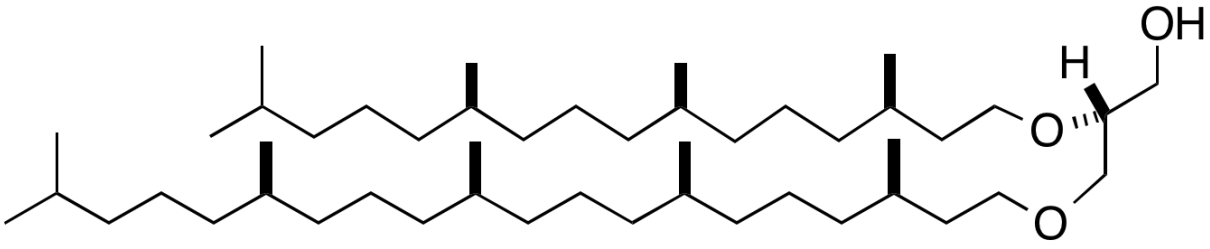

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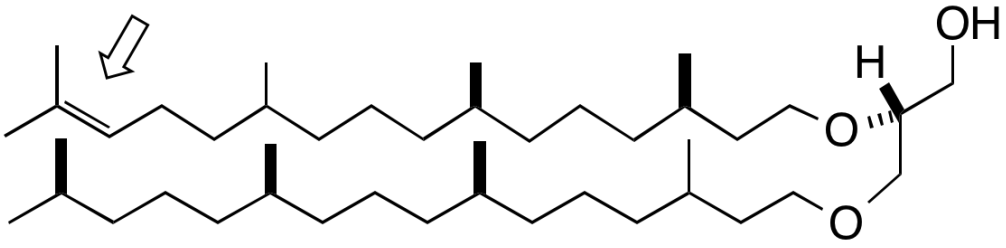

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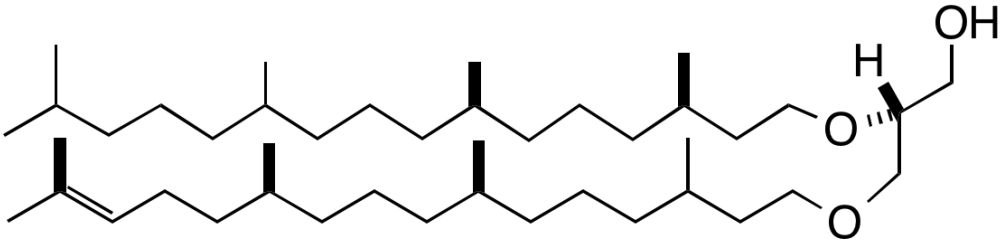

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