Attempt to the structure determination of unsaturated archaeol derivatives characteristic for the halophilic archaea lipid-core produced at very high salt concentration

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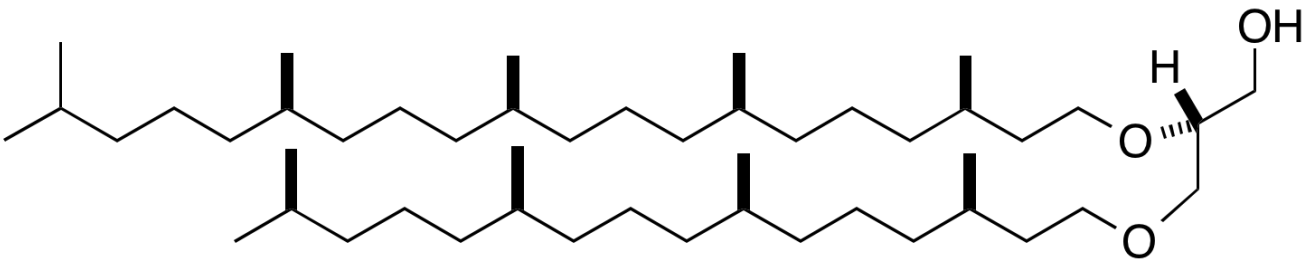
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Archaea has a characteristic lipid-core, archaeol. The structure of archaeol is those in which two C_{20}-saturated isoprenoid are linked to glycerol by ether bond. Further, a characteristic diether lipid-core (C_{20}-C_{25} diether (1)) which is constructed from one C_{25} and one C_{20} isoprenoid is produced by halophilic archaea. The 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.
Existence of archeol derivatives having unsaturated isoprenoid were reported at the lipid-core of psychrophilic[3] and thermophilic[4] archaea. 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[5]. Further, the relation of salinity and the ratio of unsaturated lipid-core was discussed. On the other hands, C_{20} -C_{25} diether and unsaturated derivatives were existed in the lipid-core in this literature. However, the different regiochemical structure 3 were presented (C_{25} hydrocarbon was linked with the C-3 of the glycerol).
During my experiments for the deterimination of the regiochemistry and carbon number of the hydrocarbon of the diether, the general chemical synthetic method for the unsymmetric diether was developed[6]. Therefore, the unsymmetric diether 1 and 2 were prepared in my experiments for the confirmation/determination of the structure of several diether reported at Dawson's literature. Then, 1 and 2 were chemically synthesized according to the reported method of an intermadiate in the synthesis of archael tetraether. The analysis of the mass fragmentation of the TMS derivative, the mass spectrum in Dawson's report was revealed to the isomer 1. The structure of microbiological sample derived from halophilc archaea was confirmed as 1. The determination of precise structure of the varaiety of unsaturated isoprenoid diethers will be presented by the comparision of the mass spectra of 2 with those of Dawson's unsaturated diether.

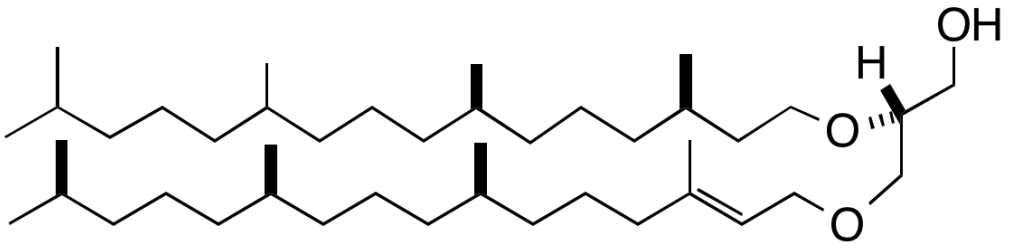
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Keywords: halophilic archaea, lipid-core, structure determination

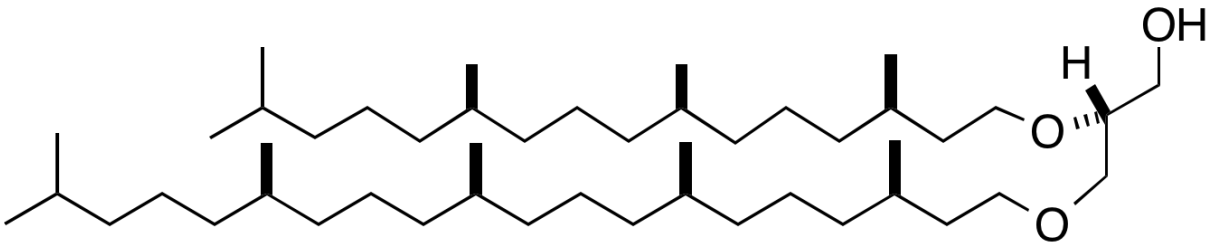
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