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[JJ] Evening Poster | B (Biogeosciences) | B-BG Biogeosciences & Geosphere-Biosphere Interactions

## [B-BG03] Microbial ecology in earth and planetary sciences

convener: Michinari Sunamura (University of Tokyo Dept. of Earth & Planetary Science), Natsuko

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Microbes have exerted the great influences on earth environments through the history of earth.

Microbial ecology is a study of interaction between microbes and surrounding environments. Research target of Microbial ecology covers most of environments on the earth and planet, e.g. soil, subsurface, subseafloor, ocean, river, lake, air, space, volcano, fault and earthquake, minerals, and more. In this session, we aim to exchange informations of microbial distribution, population dynamics, function, effect on material cycles between microbial ecologist and earth&planetary scientist. We hope effective discussion from interdisciplinary approaches in this session.

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## [BBG03-P08] The structure determination of 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 [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** were chemically synthesized according to the reported method [3] and the comparison of the mass spectrum of trimethylsilyl (TMS) ether were presented previously at this meeting [4]. **2** is apparently different from those of Dawson's unsaturated diether.

About these unsymmetrical diether, 1) the "real" structure of Dawson's unsaturated archaeol derivative were assumed to be the structure **3** or **4** from the intermediate of biosynthesis of tetraether lipid in thermophilic archaea [5], 2) **5**, the regioisomer of **2** about the unsaturated ether bond linked at the glycerol 5 has the possibility of Dawson's unsaturated diether because of the relation of hydroxyarchaeol in the methanogenic archaea. Then, the chemical synthesis and mass fragmentation analysis of the 4 isomer (**2** to **5**) was completed.

The comparison and analysis of the mass spectrum of TMS ether was conducted for the 4 compound. The structure **2** and **5** is different from the "Dawson's unsaturated diether". The structure **3** and **4** are relatively similar compared with the structure **2** and **5**, however, difference of the Dawson's diether were observed. So, the all of the supposed four structure were not the real structure. 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. Or, it is a mixture of **3** and **4** (including further double bond isomers).

[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] Nemoto et al. (2003) *Extremophiles*, **7**, 235.