

Rapid detection of glycerol dialkyl glycerol tetraethers (GDGTs) in marine sediment using FT-ICR MS with different ionization techniques

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Introduction

Glycerol dialkyl glycerol tetraethers (GDGTs) lipids are important membrane constituents of Archaea, ubiquitous microorganisms thought to be limited to extreme environments [1]. GDGTs have potential to be directly detected by Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FT-ICR MS) with atmospheric pressure photoionization (APPI) source in positive mode [2]. In this study, we characterized and compared the detection of GDGTs extracted in marine sediment using FT-ICR MS with different ionization techniques (ESI+ with or without ammonium formate and APPI+).

Discussion of Results

In ESI+ mode, some GDGTs compounds with m/z 1292-1309 can be ionized by adding ammonium formate compared with that without adding ammonium formate. Therefore, the addition of ammonium formate can better promote the ionization of GDGTs in ESI+ mode. By comparing the FT-ICR MS mass spectra in APPI+ mode and ESI+ mode with ammonium formate, we can find that APPI+ mode can ionize the conventional GDGTs compounds (GDGTs 0-8), and m/z was between 1292-1310, while ESI+ mode can not only ionize the conventional GDGTs compounds, but also detect some undiscovered C₈₈ GDGTs analogs, that the range is m/z 1314-1340. These compounds have two more carbon atoms than general isoprene like GDGTs compounds, which has not been reported in the literature.

[1] F. Omar Holguin and Tanner Schaub (2014). *Algal Research* **2**, 43–50. [2] JagošR. Radović et al. (2015) *Analytical Chemistry* **88**, 1128-1137.