Survey of glycerol dialkyl glycerol tetraethers (GDGTs) in Nevada and California hot springs and selected thermophiles

Julienne J. Paraizo, Amanda J. Williams, Brian P. Hedlund, Chuanlun L. Zhang

University of Nevada, Las Vegas, School of Life Sciences, University of Georgia, Department of Marine Sciences, Tongji University, State Key Laboratory of Marine Geology, China

ABSTRACT

Glycerol dialkyl glycerol tetraethers (GDGTs) are core membrane lipids of many Archaea and some Bacteria. We used a broad methodological approach to detect and determine GDGTs from a variety of hot spring ecosystems with different chemical-physical settings. Hot spring temperatures ranged from 31 to 95°C and pH values from 6.8 to 10.7. Parametric Pearson’s correlations were calculated to identify the relationships between GDGT profiles and geochemical analytes. Unsupervised cluster analysis and principal component analysis were used to compare GDGT profiles among hot springs and between hot spring and environmental samples. Our results revealed that iGDGTs are characteristic of hot springs. GDGTs might be produced by other organisms within the same phyla. A new negative relationship was identified between GDGTs and temperature. No new positive relationship was identified between GDGTs and temperature. Relationships between GDGTs and pH, NO₃/hyphen.superscript, and NO₂/hyphen.superscript,13th ed.  Brock Microbiology (Pearson)