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temperatures than at moderate ordinary ones. Discoveries of microorganisms in Siberian permafrost samples that are several million years old, in deep oil fields, mines and other extreme habitats seem to be consistent with the equation (1). Several examples have quantitatively been studied. So, spore enhanced resistance to extreme temperatures can be easily explained in terms of its high ΔG^* value.

Other implications on food sterilization practices and on exobiology have also been discussed by means of the above-mentioned equation.

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ISOTOPIC TRENDS ON RECENT CARBONATE STROMATOLITES FROM CUATRO CIÉNEGAS, COAHUILA

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In the Valley of Cuatro Cienegas, in the locality of Sierra La Madera, which is a small area within the Sierra Madre Oriental, several marshes with conspicuous recent microbialithes develop as result of the inundation patterns and precipitation rates. These reef-like microbialithes appear to form near the sediment-water interface, and occur as prominent calcareous dome-shaped stromatolites, composed among other microorganisms, by microbial mats of *in situ* calcifying cyanobacteria. Macrostructure of these intertidal microbialithes varies among nodular, columnar, cylindrical and dome morphologies, which can be found in groups as irregular micro-columns, smooth and bulbous micro-columns and weakly-laminated crusts, or isolated, exhibiting a recumbent altitude with a low-relief rugged surface and a μm to mm-sized thickness of laminae. In the upper layers of these stromatolites, several populations of predominantly cyanobacteria, diatoms, green algae and anoxygenic bacteria occur. The most conspicuous head-shaped microbialithes are between 95 and 70 cm in height and between 80 and 1.20 m wide, where dark-green biofilms fringing the stromatolitic heads immediately at the lake level are ranging from 500 μm up to 1,000 μm in thickness. Diatoms abundance further increases in submerged areas. Microstructures of the lithified micritic layers result from the constant dynamics of the several types of metabolisms involved that determine the fluctuation on the pH, CO_2 and O_2 gradients. Small-scale variations reflect the relief where protruding stromatolites are subject to degradation by ra-

diating microborings of cyanobacteria. Carbonate was removed by treatment with dilute hydrochloric acid. After decalcification, the upper crusts of these lithified stromatolites shows a large amount of residual organic material. The samples were extracted with organic solvents and the resulting extracts were evaporated for mass-spectrometry analysis. Preliminary isotopic data shows δC^{13} PDB values between 0.43 and 0.57 signifying an organic C source, predominantly from cyanobacteria, and $\delta 0^{18}$ PDB from –7.38 to –3.69, which are consistent with ranges described from continental carbonates. The input of organic matter derives from benthic organisms as microbial communities and algae, from the water columns, as zooplankton, higher plants and phytoplankton, early postsedimentary chemical and microbial alteration as the degradation of primary lipids and bacterial lipids.

CARBON ISOTOPIC VARIATION OF RECENT MICROBIAL MATS DEVELOPED AT SULFUROUS SPRINGS

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Sulfurous springs harbor a great abundance of modern microbial mats developing around hot sulfurous springs in several active sites of the area of LoS Azufres, Microhacan, Mexico. This locality lies within the Neovolcanic Eje at Central Mexico and has been active since the Recent. Microbial mats are mainly developing at the water-sediment interface, showing a well-defined distribution along a temperature gradient. Some of the most abundant microbiota includes filamentous LPP-cyanobacteria and coccoid Chroccocus cyanobacteria. Other abundant and diverse component are pennate diatoms aligned within these mats. Although microstructure development is incipient along the temperature gradient, it shows a regular orientation. The aim of this work was the description and analysis of the C-isotopic values along this gradient.

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MICROBIALITHES FROM A HIGHLY SALINE CRATER LAKE IN RINCON DE PARANGUEO, MEXICO

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