

## **Characterization of anaerobic sulfur- and sulfate-reducing bacteria**

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The Near Infrared Mapping Spectrometer (NIMS) aboard the Galileo spacecraft revealed huge quantities of sulfur and sulfur compounds around the volcanoes of Jupiter's moon Io where extreme temperature variations are present, ranging from  $-100^{\circ}\text{C}$  to over  $+2000^{\circ}\text{C}$ . May be of great relevance in astrobiological studies to consider the possibility of the existence of active influences of microbiological processes to built sulfur and sulfur compounds on Io surface and not only geochemical factors. On Earth a biogeochemical sulfur cycle is present and, in particular, in anaerobic conditions sulfur-reducing bacteria play important roles either in the primary production of organic matter, as lithoautotrophs, or in the destruction of organic compounds, as heterotrophs. The systematics of sulfur- and sulfate-reducing microorganisms include over 100 species distributed into *Archaea* and *Bacteria* domains. Isolated from marine environments and fresh water, they are present as psychrophilic, mesophilic, thermophilic and hyperthermophilic microorganisms. Among them, halophilic and acidophilic microorganisms are also described.

Future research are needed in order to identify new species and to characterize enzymatically and genomically old and new species, given their high astrobiological significance:

- a) to identify new species that may help determine the environmental limits within which life can exist
- b) to study the origin of life on Earth, being these species probable dominant relic life forms present during the late Hadean and early Archaean periods, when an extensive volcanic activity was spread on Earth surface.

Last we may note that these researches may be of general interests: for industry, recalling the roles of sulfur- and sulfate-reducing microorganisms in the corrosion of metals and the destruction of gasoline and other oil products producing a detrimental economic effect, We can not also deny their therapeutic values, recalling their contribution in the production of medicinal mineral muds.