

Interaction of Sulfate-Reducers with Hydrous Sulfate Minerals in Water-Restricted Terrestrial Gypsic settings: Implication for the Habitability of Martian Gypsic Environments

On Earth the presence of sulfate reducing bacteria (SRB) within extremely arid gypsic environments has led to inquiries as to the effect of SRB on the habitability of gypsic environments by their potential to scavenge sulfate and to free trapped crystallization water in hydrous sulfate minerals [i.e., gypsum ($\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$)]. Relationships of SRB with the rest of existing microbial communities and with dominant mineral phases in gypsic environments can be addressed through integrated geochemical, mineralogical, and microbiological approaches. Through the current study, we intend to obtain an overall understanding of the occurrence and abundance of SRB in terrestrial gypsic setting, the interactions of SRB with hydrous sulfate minerals (i.e., gypsum), and the relationship of SRB with other microbial communities through field measurements and sampling followed by laboratory analyses of the field samples. As analogs to Martian gypsic environments, White Sands National Monument, NM and the Badwater Basin of Death Valley, CA have been selected to carry out this study with samples being analyzed for mineralogical and microbiological contents using nucleic acid extraction, qPCR, XRD, and high-resolution electron microscopy. The results of this work has direct implication for the habitability and potential metabolic pathways in Martian gypsic environments, such as *Olympia Undae* (Szynkiewicz et al., 2010) and *Olympia Planum* (Massé et al., 2010).

Abstract References

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