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Geomicrobiological study of microbialites in hypersaline lakes in Saskatchewan, Canada

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Microbialites are biosedimentary structures formed by the precipitation of carbonates and/or trapping of mineral particles by microbial mats. Microbialites are widespread throughout the rock record until the early Ordovician and are relatively rare in modern environments. In the Canadian prairies, microbialites have been identified and described in two hypersaline lakes located *ca* 50 km south of Lloydminster, SK: the sodium sulfate type Manitou Lake and the sodium chloride type West Reflex Lake. Previous research by W. Last and his group included extensive isotopic, petrographic, and imaging work to characterize the textures and describe the mineralogy of microbialites from the two sites as well as other biosedimentary features of the lakes, and they also developed a model for the limnological history of Manitou Lake over the past 2300 years [1,2,3,4]. To our knowledge, however, microbial communities in these two lake systems have not previously been examined with molecular biology or culturing approaches. We are examining samples of microbialites, underlying sediments, and microbialite surface communities using high-throughput sequencing approaches. We have also collected lake water chemistry samples for comparison to historic data. Planned research includes additional field sampling of living microbialites for microbial community analyses, growth experiments in aquaria, chemical and mineralogical analyses using synchrotron spectroscopic approaches and XRD, and imaging including epifluorescence microscopy and scanning electron microscopy (SEM). This study will contribute to expanding our knowledge of microbialite formation in northern climates, and add to our understanding of the microbial ecology of microbialites more broadly.

References:

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