

EXECUTIVE SUMMARY: *(State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project for California.)*

Extremophiles are microorganisms that can survive in a range of very harsh environments, from hot springs, to polar ice caps to salt crystallizing ponds. In our project, we will be characterizing cultures of extreme salt-loving microorganisms (halophiles) isolated from evaporation ponds in two commercial saltworks: one in Baja, MX and one in Newark, CA. Halophiles have previously been isolated from a number of salty places on Earth, but are still not well understood in terms of their diversity, physiology and potential for biotechnological applications. We aim to elucidate the cellular changes that occur in these microbes when they are placed under different salinities. Understanding the fundamental differences in response to salinity among these different cultures is of great interest in terms of understanding the ways by which these halophiles have evolved to live under such extreme conditions. A large part of what we will also be doing is looking for important cellular proteins that change in response to different conditions as a potential source of information about the ways in which they survive and indeed thrive under these conditions. Overall, this study will benefit the state of California by funding basic research in the study of these novel microorganisms, but studying these extremophiles will also have good potential for identifying novel enzymes of potential biotechnological interest that may be developed into patentable, commercially viable products or processes.