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The impact of salt concentration on the plasma membrane potential in the halotolerant fungus Hortaea werneckii

Hortaea werneckii is a black yeast that is found around the world but is most well known for inhabiting the harsh conditions in salterns. It is capable of surviving salt concentrations near saturation, where there is very little water and high UV exposure, gaining it the title of extremely halotolerant. The mechanisms and adaptations it utilizes to survive in these extreme conditions has been the subject of many studies. This project will continue that work by studying the changes in the plasma membrane potential as concentration of salt in the medium increases, which will contribute to understanding of eukaryotic adaptations to high salt environments. As climate change is challenging crop growth around the world a robust understanding of adaptations to extreme environments can aid in the creation of resistant crop species.

The yeast were grown at 5 conditions, 0M sodium chloride (NaCl) pH 6 and 8, 1M NaCl pH 6 and 8, and 2M NaCl pH 6. Growth was monitored spectrophotometrically to ensure the yeast were in mid-exponential growth phase for testing and growth curves were graphed to aid in timing of experiments. A potentiometric dye was used in combination with a microplate reader to preform a kinetic study of the fluorescence of the dye before and after the addition of potassium chloride, which depolarizes the cells. General trends in the plasma membrane potential were found which hint at the energetics and health of the yeast but the effects of depolarization on the cells were not elucidated. As the depolarization of the cells was unsuccessful no conclusions can be drawn from this study and the effect of changing salinity and pH on the plasma membrane potential in Hortaea werneckii remains unknown.

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