CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
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Project Number
J1127

Project Title
Halophytes: A Potential Solution for the Remediation of Soil in Saline Wastelands

Abstract

Objectives/Goals
Halophytes are plants that can tolerate and grow in high levels of salinity and are also potentially a rich source of biofuel. The purpose of this study is to see if halophytes can be used in the process of remediation of saline wastelands. Based on my research, my hypothesis is that halophytes will grow in high saline conditions and will decrease the saline levels in the surrounding area.

Methods/Materials
I used eight varieties of halophytes and three non-halophytes as controls. I prepared solutions containing 0g/L, 1g/L, 5g/L, and 10g/L of sea salt. I placed seeds in saline solution in petri dishes and recorded the number of seeds germinating at each salinity level. Next, I measured the root and shoot length in triplicate in various salinity levels. The percent inhibition of growth relative to the control was calculated. I used an electrical conductivity meter to measure the salinity levels of the solution containing the seedlings to assess any reduction in salinity with seed incubation. Finally, ten halophyte and control seeds were soaked in 10g/L saline for two days, then five seeds were transferred to 0g/L and growth in both dishes were compared.

Results
In saline conditions, most halophyte seeds showed better germination and growth when compared to the non halophyte controls. Interestingly, certain halophytes germinated better in low salt when compared to no salt or high salt solutions. Root and shoot analysis indicated that the growth of Salicornia Europaea was improved in the presence of increasing saline levels and Quinoa had moderate growth in high saline levels. Electrical conductivity levels is reduced in solutions containing halophytes, with Quinoa showing the most reduction. Non-halophytes were able to recover from transient salt stress, whereas halophytes such as Salicornia Europaea and Pourpier Maraicher had better growth in sustained salt solution.

Conclusions/Discussion
The observations that halophytes grow in saline conditions and lower salinity support my hypothesis that halophytes can be used to reduce the salinity levels in surrounding areas, which will enable saline waste lands to be used for agriculture. Additionally, companies like NASA and Boeing are exploring halophytes as a rich source of biofuel, and by cultivating them, we can improve the productivity of the saline wastelands and produce a new renewable form of energy.

Summary Statement
My studies showed that halophytes can grow in high salinity and reduce the salt levels in the surrounding area.

Help Received
My parents guided me in my research and provided feedback on my presentation.