CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Safa S. Moinuddin

Project Number
J2314

Project Title
Salty Seeds: The Effect of Salinity on Lettuce Seed Germination and Growth

Abstract

Objectives/Goals
The purpose is to determine the effect of salinity in the water supply on the seed germination and growth of two different species of lettuce seeds to determine which species is better suited to be grown in California considering the increase in salt content of our irrigation water.

Methods/Materials
A base salt solution with molarity 0.35M was prepared using table salt and distilled water. Petri dishes were marked with their seed type and concentration of salt solution, and lined with filter paper. Romaine and Iceberg lettuce seeds were bleached, rinsed, and seven seeds were placed in each Petri dish. The base salt solution was diluted to concentrations of 0.0004M, 0.004M, 0.04M, 0.09M, 0.18M, 0.26M, and 0.35M, and 2ml of each solution was added to the corresponding Petri dishes. A control sample with 0M (distilled water) was also used. All samples were sealed in plastic bags and placed in a cool, dark environment for 3 days. All samples were then inspected for number of seeds germinated, and the radicle length of each seed was measured.

Results
For Iceberg lettuce seeds, almost all of the seeds germinated at nearly all of the salt water concentrations studied. Average radicle length increased from 19.3mm in the 0M control to 24.1mm in the 0.004M solution and then decreased down to 6.9mm in the 0.35M solution.

For Romaine lettuce seeds, almost all of the seeds germinated at all of the salt concentrations studied except for the highest concentration of 0.35M at which only 4 seed germinated. Average radicle length was highest at 24.3mm in the 0M control, and dropped drastically at concentrations higher than 0.004M to a low of 2mm at the 0.35M concentration.

Conclusions/Discussion
Although the seeds seem to prefer some salt in the irrigation water over none, higher levels of salinity cause less growth in both Romaine and Iceberg lettuce seeds. The ideal salt concentration seems to be around 0.004M. Overall, Iceberg lettuce seemed to tolerate higher concentrations of salt better than Romaine lettuce.

Summary Statement
Iceberg and Romaine lettuce seeds grow best with some salt in the irrigation water, and growth is inhibited when salt concentration is high, but Iceberg lettuce tolerates higher salt concentrations better.

Help Received
My mother helped me to understand molarity and purchased materials for me.