



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s) Sarah L. Nothnagel	Project Number 22710
Project Title Salt of the Earth: Inhibition of Corn and Pea Germination by Chloride Salts	
Objectives/Goals The purpose of this project was to determine how much salt a plant can tolerate before germination and growth are significantly inhibited; whether plants tolerate sodium chloride, potassium chloride, or calcium chloride better; and whether corn or peas can tolerate more salt. Abstract Methods/Materials Corn and pea seeds were grown in glass trays lined with paper towels soaked in distilled water, 50 mM salt solution, 200 mM salt solution, 350 mM salt solution, or 500 mM salt solution and covered with Saran wrap. Each salt was tested at each of the concentrations. The seeds were observed for germination and measured for root length for eight days and then discarded. Each trial was repeated twice for a total of three trials. The germination percentage and root length for each day of the trials were averaged. Graphs were made to display the results. Results The results show that germination and growth become significantly inhibited when salt concentration reaches 350 mM. The seeds appeared to tolerate potassium chloride better than sodium chloride and sodium chloride better than calcium chloride at equal molarities. Corn seemed better able to resist the effects of the salt than the peas did. However, there was not much difference between the two. Conclusions/Discussion Although germination and growth became significantly inhibited when salt concentration reached 350 mM, that was not a sharp threshold. Effects of the salts were already visible at 50 mM, and they gradually increased with the concentrations. This shows that even small amounts of salt affect plants. The seeds tolerated potassium chloride better than sodium chloride and sodium chloride better than calcium chloride in terms of molarity. However, in terms of osmosis, the effects of the three salts were nearly the same, with sodium chloride being slightly more inhibitory in some situations. This suggests that the identity of the solute did not affect the seeds as much as amount of the solute did.	
Summary Statement This project was an investigation of the inhibitory effects of three chloride salts on germination and early growth of corn and peas, a problem that is important in irrigated agriculture.	
Help Received Dad helped obtain materials and references, and showed me how to graph.	