



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Irfan S. Habib	Project Number J1514
Project Title Toxic Impact of Household Chemicals on the Environment	
Abstract Objectives/Goals The purpose of this project was to determine how different concentrations of household chemicals (bleach, ammonia, rubbing alcohol) affect the growth of plant seeds. I think that ammonia will have the greatest impact because it gave off the worst toxic odor when the bottle was opened!	
Methods/Materials 9 dilutions of household bleach, ammonia, alcohol were made (eg. 1%, 3.2%, 10% of each). 20 seeds each of radish, lettuce, spinach seeds were planted into 90 dishes (30 dishes of each seed). 15ml of the dilutions were added to 81 dishes and labeled by seed/chemical/% (eg. radish/bleach/1%). 27 dishes radish, 27 dishes lettuce, 27 dishes spinach. 9 dishes were kept as controls (3 lettuce, 3 radish, 3 spinach). 15ml distilled water was added to each control. Emergence and shoot height were observed and recorded after day 5 and day 14.	
Results In the first few days the seeds exposed to the 1% solutions seemed to emerge sooner than the controls. This may be due to the chemical's loosening of the seed coat, allowing the shoot to break through more rapidly. Despite these effects, the controls presented the greatest number of seeds emerged in 5 days and in 14 days, and the highest average shoot height in 14 days. All results were recorded in data tables and graphed. From the graphs, it appears that the 10% concentration of all three chemicals had the greatest relative impact of emergence and seedling height for radish, lettuce, and spinach.	
Conclusions/Discussion My hypothesis was wrong. Bleach was the most toxic chemical that had the greatest impact across all three concentrations tested. Ammonia and alcohol were similar in toxicity; however, the data tables and graphs indicate that ammonia was more toxic. Out of the three seeds tested, spinach appeared to be the most sensitive. As the concentration of the contaminant solution increased, the percentage of emergence and average shoot height decreased.	
Summary Statement Impact of household chemicals (bleach, ammonia, rubbing alcohol) on the emergence and average shoot height of radish, lettuce and spinach.	
Help Received qualified scientist, Dr. N. Khandakar, handled hazardous substances; Mother helped with project	