



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Emily A. Hsi	Project Number 36785
Project Title Increasing the Longevity of Cut Roses	
Objectives/Goals My project's goal was to see if different substances (nutrients, antimicrobials, or both) different stem heights, and different water levels increase the longevity of cut red roses. Abstract Methods/Materials 21 dozen red roses were purchased to conduct 4 trials to assess rose longevity: 1) stem height and water level, 2) nutrients (sugar, Sprite, flower food, aspirin), 3) antimicrobials (copper bleach, vinegar, vodka), and 4) best of nutrients and antimicrobials combined. Each assessment was evaluated with a dozen roses, which were checked twice daily for stem turgor and petal wilt on a scale of 0-3. Longevity was determined by time from start until a score of 3 in either category. Averages of survival were compared using a two-tailed Student t-test at $P \leq 0.05$. Sample size (12) per assessment was based on 80% power to detect a half day (12 hour) difference in rose longevity assuming the average rose lives one week. Results For Trial 1, a shorter stem height of 15 inches and a lower water level of 5 inches significantly prolonged rose life. For Trial 2, Sprite (1:3 ratio with water) significantly improved rose longevity by 47 hours. In Trial 3, no antimicrobial substance significantly improved rose longevity over water control. Vinegar and bleach were toxic to roses. Water, copper, and vodka were carried into Trial 4. For Trial 4, Sprite alone (1:3 ratio with water) again significantly prolonged rose longevity. Conclusions/Discussion For cut red roses with a 15 inch stem in 5 inches of water, Sprite (1:3 ratio with water) was the only substance that significantly increased rose life. Flower food was not beneficial and vinegar and bleach were toxic, even in small quantities. Limitations included placing only 3 roses per vase, which may have minimized microbial activity and limited antimicrobial benefit. Results are applicable to the millions of people who receive cut red roses each year.	
Summary Statement After evaluating a variety of nutrient and antimicrobial substances, only Sprite in a 1:3 ratio with water significantly increased the life of cut red roses by up to 2 days.	
Help Received I conceived of the project, searched online rumors for substances to test, and conducted all experiments, but I received training on t-test and sample size calculations from my mother (Dr. Susan Huang, Professor of Infectious Diseases at UC Irvine). I also received help purchasing all materials.	