



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Zahra A. Aziz	Project Number 36388
Project Title The Effects of High and Low pH Levels and Sodium Citrate on Spherification for Human Health	
Objectives/Goals My goal was to determine whether changing the pH level of cherry juice, carrot juice, water, and vinegar with the addition of sodium citrate affects the ability of liquids to undergo spherification. Spherification is the process of liquids turning into semi-solid spheres using chemical bondings. My hypothesis was if I added sodium citrate to the liquids if the pH levels weren't in a range from 5-7, it would affect the ability to undergo spherification because sodium citrate increases pH levels. Abstract Methods/Materials I created a solution with water and 2 grams of calcium chloride. Then, I blended cherry juice with 2 grams of sodium alginate, found the pH of the solution, and dropped the solution with a syringe into the calcium chloride bath. I repeated this with carrot juice, water, and vinegar. If spheres didn't form for any of these liquids, I blended them again with sodium alginate but kept adding sodium citrate in 0.5 gram increments until spheres formed. I found the pH levels of those liquids again after the additions of sodium citrate. I repeated all of this 2 more times for a total of 3 trials. Once the sodium alginate solution touches the calcium chloride, the sodium alginate separates from the liquid and bonds with the calcium chloride, forming a film around the liquid and trapping it in a sphere. Results The liquids water and carrot juice underwent spherification without sodium citrate because the pH levels were 7 and 6. Cherry juice had a pH of 3 before sodium citrate for 3 trials and had to have an addition of 1.3 grams in average to successfully undergo spherification. After the addition, the pH was 5. Vinegar had a pH of 1 before and had to have an average addition of 3.3 grams of sodium citrate to undergo spherification. After the addition, the pH was 4. Conclusions/Discussion The data proved my hypothesis of sodium citrate increasing pH levels was supported. The more sodium citrate I added for cherry juice and vinegar, the higher the pH levels were. In my experiment, a way to decrease the pH levels of liquids was determined. Decreasing pH levels of liquids could help ulcer patients, children, and GI patients.	
Summary Statement I explored the effect of the addition of sodium citrate on pH levels of different liquids so that spherification could occur, which has many benefits for human health.	
Help Received My science teacher helped me understand the process of spherification and my mother helped me find potential applications in the medical field for my project.	