



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Amelia R. Talkington	Project Number 34920
Project Title The Impact of Simulated Stomach Acid on Microorganism Growth in Organic and GMO Soybean/Yogurt Cultures	
Abstract Objectives/Goals The goal of this study is to understand how the genetic modification to make soybeans Roundup Ready impacts how nutrients are absorbed in the human human gut - specially how microorganism growth in yogurt/organic soybean and yogurt/Roundup Ready (RR) soybean mixtures that have been through the stomach and the duodenum are different. Methods/Materials I grew organic and RR soybean sprouts. Then I created a control and two mixtures: 1) yogurt (control), 2) ground organic soybean sprouts and yogurt, and 3) ground RR soybean sprouts and yogurt. The amount of yogurt was the same in the mixtures and in the control. The amount of soybeans was the same in the soybean/yogurt mixtures. I added hydrochloric acid (HCl) to the yogurt until it reached the approximate pH of chyme. Then I added the same amount of HCl to the soybean/yogurt mixtures and recorded the pH of each mixture. Then I placed the containers into the incubator at body temperature for 45 minutes. At the end of that period, I added baking soda to the yogurt until the pH was 8 (approx. pH leaving the duodenum) and recorded the amount added. The I added the same amount of baking soda to each yogurt/soybean mixture and recorded the pH. Finally, I dropped small loops of the yogurt (control) mixture onto 5 grids of an MRS agar plate and repeated the same process on 9 other plates. Then I repeated the procedure to create 10 plates with the organic soybean yogurt mixture and 10 plates with the RR/yogurt mixture. Then I placed the plates in the incubator. I measured and photographed the microorganism growth daily for 8 days. Results The RR soybean/yogurt mixture was more acidic than the organic soybean/yogurt mixture after the baking soda was added . The microorganisms that grew on the RR soybean/yogurt mixture and organic soybean/yogurt mixture appeared similar. The microorganisms grew more rapidly on the organic soybean/yogurt plates than on the RR soybean/yogurt plates and there were more of them. Conclusions/Discussion The pH difference warrants more study, since some researchers believe the body is more disease prone when the body fluid/food mixture entering the intestine is more acidic. The differences in the microorganism growth rates between the organic soybean/yogurt and Roundup Ready soybean/yogurt samples warrants more study, since some researchers believe genetically modified foods can stunt the growth of beneficial microorganisms in the gut.	
Summary Statement The impact of stomach conditions on microorganism growth in organic & GMO/yogurt cultures	
Help Received Teachers, advisor, parent helped with chemicals, photos, data entry, sample disposal	