



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Kiran Suryadevara	Project Number 31065
Project Title Avoid Foodborne Illness Naturally, Using Neem, Guava, Turmeric, and Honey	
Objectives/Goals Foodborne illness affects an estimated 48 million people each year in the United States, as well as countless millions all over the world. The most commonly recognized foodborne illnesses are those caused by bacteria such as Salmonella and E. coli. The purpose of this experiment was to determine if neem, guava, turmeric, and honey have an antibacterial effect on raw chicken. In addition, I wanted to find out if these natural substances were effective against E. coli and Salmonella bacteria, so I could determine their possible potential in preventing foodborne illness. It is specifically hypothesized that neem will be the most effective at discouraging bacterial growth on raw chicken since multiple studies have implied its wide uses as an antibacterial. Abstract Foodborne illness affects an estimated 48 million people each year in the United States, as well as countless millions all over the world. The most commonly recognized foodborne illnesses are those caused by bacteria such as Salmonella and E. coli. The purpose of this experiment was to determine if neem, guava, turmeric, and honey have an antibacterial effect on raw chicken. In addition, I wanted to find out if these natural substances were effective against E. coli and Salmonella bacteria, so I could determine their possible potential in preventing foodborne illness. It is specifically hypothesized that neem will be the most effective at discouraging bacterial growth on raw chicken since multiple studies have implied its wide uses as an antibacterial. Methods/Materials Equally massed chunks of raw chicken meat were treated with the neem, guava, turmeric, and honey for a controlled amount of time. Using appropriate dilutions, bacteria present on the surface of the meat was taken and cultured in petri dishes in order to determine the effectiveness of each "spice". The second part of my experiment included testing of E. coli and Salmonella bacteria; six petri dishes with bacterial lawns were created. Inhibition dots treated with neem, guava, and turmeric were placed on the lawns to observe the inhibition zones. Results Of the four substances tested, neem was the most ineffective at inhibiting bacterial growth. The chicken treated with honey had the least amount of bacteria present after treatment. Of the four substances, guava had the least bacteria diversity. Sub experiment 2 yielded no significant results as there were no visible zones of inhibition present on either the Salmonella or E. coli bacterial lawns. Conclusions/Discussion It can be conclusively determined that neem, guava, turmeric, and honey reduced the number and variety of bacteria present on raw chicken meat. However, the treatment of the chicken with neem proved to be a largely ineffective method for reducing the bacteria. As far as quantitatively inhibiting bacterial growth, honey would be the most effective natural substance to use. These findings suggest that all four substances have potential in preventing foodborne illness, honey being the most useful. This may address the real-world concern of illnesses due to foodborne pathogens, and lead to conclusive evidence to help people in preventing foodborne illnesses world-wide.	
Summary Statement This project tested the potential of natural substances in the prevention of commonly problematic foodborne illnesses caused by such bacteria as E. coli and Salmonella, as well as the potential benefits in the food industry.	
Help Received Arcata high school chemistry and biology teachers, Mr. Earl Peters and Ms. Cindy Condit, provided oversight and guidance. Additional assistance was provided by Ms. Andrea Yip at Humboldt State University who provided bacteria cultures and advice on experimental design.	