CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J1613

Project Title
Bacteria Fear, Medicine Is Here!

Abstract

Objectives/Goals
The objective of my experiment was to determine whether E.coli would be inhibited more by natural herbs (turmeric, coriander, ginger) or commonly prescribed antibiotics (Amoxicillin, Cefoxitin, Cephalosporin).

Methods/Materials
To start, I combined 500 mL of bottled water in .4 g of turmeric in a pot over a stovetop, then mixed the solution for 10 min. After opening a petri dish, I dipped a sterile swab into an E.coli culture tube and rubbed the swab on the agar in a triangular pattern. Then, I placed a filter disc in the turmeric solution for 30 sec. Next, I placed it in the center of the bacteria triangle and sealed the petri dish. Afterward, I placed the petri dish upside down in an incubator for 3 days. I repeated the procedure for ginger, coriander and 1 tablet of each antibiotic (Amoxicillin, Cefoxitin, Cephalosporin). After three days, without opening the petri dish, I measured and recorded the zone of inhibition for each of the three sides of the bacteria triangle with a caliper. 15 petri dishes for each of the 6 solutions were used.

Results
Antibiotics were more effective than herbs. The most effective solution was Amoxicillin with a zone of inhibition of 17.1 mm on avg. The second most effective was Cephalosporin; the zone of inhibition was on avg. 16.06 mm. The third most effective, Cefoxitin, had a zone of inhibition 16.03 mm on avg. Turmeric was the fourth most effective; the zone of inhibition was on avg. 16 mm. The fifth most effective solution was ginger with an avg. zone of inhibition of 14.73 mm. The coriander solution proved to be the least effective with a zone of inhibition of 13.18 mm, on avg.

Conclusions/Discussion
The results rejected my hypothesis that E.coli would be inhibited more by herbs rather than antibiotics due to an enzyme called beta-lactamase produced by E.coli causing antibiotic resistance and that ginger would be more effective than turmeric or coriander because it has therapeutic properties and gingerols that are effective towards E.coli symptoms. The results showed that antibiotics were more effective than herbs. E.coli, a top reason for food poisoning in the world, comes from undercooked beef (hamburgers/steak) also touching animals and not washing your hands. E.coli strains can be deadly. People may not have access/afford antibiotics. Over the past 10 years, antibiotic resistance has been growing; therefore, like our ancestors, we can use herbs as an alternative.

Summary Statement
The purpose was to determine whether natural herbs (turmeric, ginger, coriander) or commonly prescribed antibiotics (Amoxicillin, Cefoxitin, Cephalosporin) were more effective in inhibiting E.coli bacteria.

Help Received
My science teacher (Ms.Fisher) provided me supplies, allowed me to do the experiment in her classroom, and provided me tips throughout the experiment; Mother helped me by obtaining supplies and supported me through the experiment; Classmates took photos throughout the experiment.