CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Brian Coffey

Project Number
J1601

Project Title
Differences in Minimum Inhibitory Concentrations of Metalaxyl in Phytophthora

Abstract

Objectives/Goals
The purpose of this project is to determine the minimal inhibitory concentrations of the fungicide Metalaxyl in various strains of fungus-like Phytophthora (Kingdom Chromalveolata).

Methods/Materials
I used (11) strains of Phytophthora palmivera (which causes fruit rot in coconuts and betel nuts) with V-8 juice as a growth media. Different concentrations of Metalaxyl in PPMs were used and its effectiveness in growth of cultures was observed.

Results
I found that there were significant differences between the strains. The MIC for six of the eleven isolates was 1 PPM. Five of the isolates were not inhibited by Metalaxyl.

Conclusions/Discussion
Approximately 45% of the isolated strains of Phytophthora palmivera were not inhibited by Metalaxyl, while the other 55% were at concentrations of 1 PPM. This is significant in that given an even population distribution of these strains, the use of Metalaxyl would have to be very strain specific: a difficult task in field application.

Summary Statement
The purpose of this microbiology project is to determine the minimal inhibitory concentrations of Metalaxyl in various strains of Phytophthora.

Help Received
I was able to obtain strains of Phytophthora from the repository at UC Riverside and perform the experiment under a student immersion program in the labs at my own direction.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Manreet K. Dosanjh

Project Number
J1602

Project Title
Blinging Bacteria!: Analyzing the Oligodynamic Effect of Various Precious Metals

Abstract

Objectives/Goals

Focus Question 1: Determining if the antimicrobial properties of metals are a good test for whether or not a piece of jewelry is made out of real gold?

Focus Question 2: Determining if silver has a different antimicrobial property compared to gold?

Methods/Materials

In this experiment, I am using six different types of jewelry pieces. Five out of those six jewelry pieces are the different alloys of gold: 24k, 22k, 18k, 14k, and 10k. The sixth jewelry piece is silver.

To test my experiment, I will first have to obtain a few agar plates with E. coli culture on it. Second, I will swab the E. coli culture onto seven agar plates. Six of those seven agar plates will have the jewelry placed on them and the seventh plate will be the control group. Then, after labeling the agar plates the correct type of jewelry, I will place the pieces of jewelry onto the corresponding plates. Cover the lid of all plates and incubate them for 48 hours at 37°C in the incubator.After incubating the agar plats, examine the plates. The control plate should show bacteria lawns. The other six agar plates should show clear zones where the bacteria did not grow. Using a ruler, measure the zones of inhibition in millimeter. Measure the diameter of the clear zones for all six pieces of jewelry. After measuring the zones, record data.

Results

In my investigation, I found the least, the highest, and the average amount of clear zones for all six types of jewelry pieces. Silver had the most clear zone inhibition, followed by 24k gold, which also had a lot of clear zones, but not as much as silver. 22k and 18k gold also had many some clear zones. 14k gold and 10k gold had the least amount of clear zone inhibition when compared to the other jewelries, but still they had some clear zones. 24k gold had an average of 15.46 millimeters. Silver had the most clear zone inhibition. It averaged 18.73 millimeters

Conclusions/Discussion

In conclusion, all six jewelry pieces are toxic to E. coli. Out of those six, silver is the most toxic to E. coli followed by pure gold. People should know that precious metals are useful in so many ways. Many like to wear jewelry for beauty and wealth. Beyond these many uses of precious metals, they should know that gold and silver sanitizes itself. It kills the bacteria on their jewelry without having them doing anything.

Summary Statement

Determining if antimicrobial properties are a good test for whether or not a piece of jewelry inhibits the growth of bacteria.

Help Received

Mother helped with transportation and jewelry; high school teacher provided agar plates.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Rebecca G. Maglieri

Project Number
J1603

Project Title
Investigating the Inhibition Rate of Capsicum cultivars

Abstract

Objectives/Goals
The purpose of my science experiment is to determine which Capsicum Cultivars solution will inhibit the most bacteria. The reason that I am doing this experiment is to find out if a pepper solution will prevent bacteria growth and may have some medicinal value. I would like to figure out which pepper is the most helpful in preventing bacteria growth. There are many herbs and homeopathic types of vitamins that are supposed to either cure illnesses or make a recovery quicker. I would like to find out if peppers are an effective aid in stopping bacteria growth and may be used to either prevent bacteria infections or help people to recover quickly.

Methods/Materials
I plan to test 12 different peppers. After researching about the peppers and their health use, I will make a solution from the pepper and water. Using bacillus substillus, I will streak it on a Petri dish. Then I will measure 5 sections on each Petri dish. I will hole punch coffee filters and soak the filters in the pepper solution. After I soak the hole-punched coffee filters, I will place the filter pieces onto the sectioned Petri dishes. After 48 hours, I will measure the inhibition rate of the bacteria growth around each filter piece. I will have 20 trials for each pepper.

Results
After completing my investigation on the inhibition rate of different Capsicum Cultivars, I was able to determine that a pepper#s hotness doesn#t directly affect the inhibition rate of the pepper. My hypothesis stated that the Cayenne chili pepper would have the greatest inhibition rate. The Cayenne pepper has a hotness of 30,000 to 50,000 and is considered to be a hot pepper on the Scoville scale. My hypothesis was incorrect. In fact the Chipotle had the greatest inhibition rate while the Pasilla had the least inhibition rate. The Chipotle and Pasilla are both mild peppers.

Conclusions/Discussion
I have learned that the different varieties of Capsicum Cultivars have varying degrees of inhibition rates. I hypothesized that the inhibition capabilities were based on the degrees of hotness that the varieties possessed. What I found was that the mild peppers had a greater inhibition rate.

Summary Statement
Testing the inhibition rate of culturally diverse peppers on bacteria growth.

Help Received
Mrs. Loflin helped edit final papers.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Varun R. Mandi

Project Number
J1604

Project Title
The Ancients' Answer to E. coli

Abstract

Objectives/Goals
The objective is to determine which form of a natural, Ayurvedic cure, amongst cinnamon, garlic, pomegranate, and wasabi, is most effective against E. coli bacteria.

Methods/Materials
I boiled 23 gms of nutrient agar powder, in 1000 mL of water and poured the agar liquid into 40 petri dishes. I prepared the natural antimicrobial solutions, by adding 75 mL of bottled water to each natural product,(garlic, cinnamon, wasabi, pomegranate), and blended them to get 4 separate solutions. I placed a filter paper circle in each of the solutions, and let them soak for 10 secs. I then dipped a sterile cotton swab in the E. coli bacteria vial, and rubbed the swab over the agar surface in a triangular pattern. Next, I placed the soaked paper circles, in the center of the bacterial triangle and pressed down gently. I then covered, labeled and placed the petri dishes in the incubator, upside down for 2 days to allow bacteria to develop. After every 2 days, I recorded the distance from each side of the bacterial triangle to the centre of filter paper (3 side measures were recorded per dish). 10 petri dishes for each of the 4 natural solutions were used.

Results
Cinnamon solution proved to be the most effective natural cure to E. coli infection. On avg, the zone of inhibition with cinnamon measured 11.68 mm. With the garlic solution, an avg zone of 7.54 mm was formed to prevent bacterial growth, making cinnamon the most effective. The pomegranate solution measured an avg of 5.17 mm, making it third most beneficial and wasabi solution proved to be the least effective with an avg of 4.52 mm. The avgs were measured every alternate day and collected over a span of 6 experimental days.

Conclusions/Discussion
My hypothesis that cinnamon solution would be the most effective against E. coli, due to the cinnamaldehyde chemical was supported. Initially, cinnamon showed the most effectiveness, and tapered off towards the end. Through out the experiment garlic maintained an overall resistance and came 2nd. This knowledge possessed by ancient, herbal doctors proves extremely useful in today#s world, given the recent E. coli O157:H7 breakouts, which killed many and caused trillion-dollar losses in trade. Residents of rural and remote areas who cannot afford antibiotics, now have herbal alternatives. Therefore, even though cinnamon is most effective, there are other natural ingredients which may be beneficial during an E. coli infection.

Summary Statement
To determine which form of a natural, Ayurvedic cure, amongst cinnamon, garlic, pomegranate, and wasabi, would be most the effective against E. coli bacteria.

Help Received
ScienceTeacher (Ms Christina Fisher) provided tips and encouragement; EnglishTeacher (Mrs. Elena Diaz)instructed how to write research report and annotated bibliography; Mother helped with transport and obtaining supplies, as well as inspiration; fellow Classmates helped to accomplish tasks such as taking

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Vinisha D. Prajapati

Project Number
J1605

Project Title
Bacteria vs. Turmeric: Does Turmeric Have Anti-bacterial Effects?

Abstract

Objectives/Goals
Antibiotic resistance is a big problem and there is a great need for new antibiotics. Turmeric is a natural spice commonly used in Eastern cultures. Curcumin, the active component of turmeric, has been shown to have many medicinal properties, including possibly antimicrobial activity. The goal of my project was to see if turmeric has anti-bacterial effects.

Methods/Materials
Using the scientific resources available to me, I made a pilot project using a modified Kirby- Bauer method to test my hypothesis. I made a turmeric paste using ¼ tsp. of turmeric powder and ½ tsp. of water. A petri dish with agar was swabbed with contaminated water. Then 5, small 5 mm filter discs were heat sterilized, and were dipped in the turmeric paste and placed on the agar petri dish. I made 3 such petri dishes; each with 5 discs (Trial #1, #2, #3) and I made a control dish using 5 filter discs without any turmeric. I placed the covered petri dishes in clear plastic bags and placed them in a dark, room temperature room for 6 days. The growth of the bacteria on the dishes was observed and photographed daily. On the 6th day, I measured the diameter of the zone of inhibition around each of the discs. I recorded the diameters of the zone of bacterial inhibition around each of the discs in trial and the control groups and calculated the average.

Results
There was evidence of some antibacterial effect from the turmeric in the petri dishes. The average zone of bacterial inhibition for the 3 turmeric petri dishes was 9.3mm. The control dish had no zone of inhibition. In Trial #1 there was a zone of inhibition of 10.5mm, in Trial #2 the zone of inhibition was 6.6 mm, and in Trial #3 the zone of inhibition was 10mm.

Conclusions/Discussion
My hypothesis was supported by my experiment; there was antibacterial effect of turmeric in a petri dish, with an average zone of inhibition of 9.3mm. The zone of inhibition may have been smaller than those of typical antibiotics (15-20mm) because the turmeric was tested against a mixture of bacteria, using home-based equipment. The concentration of turmeric may need to be different for more antibacterial effect. This pilot project will lead to further testing of turmeric in a more scientifically rigorous setting, using specific bacteria and different concentrations of turmeric. If further antibacterial activity is confirmed, then research into curcumin as an antibiotic may be warranted.

Summary Statement
The goal of my project is to determine if turmeric has anti-bacterial effects in a petri dish.

Help Received
My mother helped me with the poster; my father helped me with the safety aspects with the experiment.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Ziyaad Qureshi

Project Number
J1606

Project Title
Soybean Polya-whats? As a Treatment for Parkinson's Disease?

Abstract

Objectives/Goals
The objective of this project was to find a possible safer treatment for Parkinson's Disease. My hypothesis was that soybean polyamines will delay the breakdown and destruction of mitochondrial DNA in yeast, yielding a possible treatment for Parkinson's Disease.

Methods/Materials
Materials: Test tubes, pipettes, nutrient agar plates, soybean extract (in concentrations of 2%,4%,8%,16%), MPP, sterile streaking loops, nepholometer, incubator, test tube rack, nutrient broth.

Methods: Mix each of the different concentrations of soybean extract, yeast, and MPP. Streak onto nutrient agar plates. Incubate for 24 hours at 35 degrees C. Count the yeast colony growth. Record data. Repeat twice for each soybean extract concentration.

Results
After adding MPP, the average yeast colony counts decreased. When different concentrations of soybean extract were added, the yeast colony counts increased on average.

Conclusions/Discussion
Can polyamines found in soybeans be used as a possible treatment for Parkinson's? My research shows that my hypothesis is correct and that polyamines in soybeans delay the breakdown and destruction of mitochondrial DNA in yeast and may someday lead to a possible treatment for Parkinson's Disease.
The purpose of this project was to determine if there could be a safer, more natural alternative treatment for Parkinson's. In order to test this, yeast and soybeans were used. Yeast is a very common organism and is rich in mitochondrial DNA and is very easy to grow. Polyamines are naturally occurring organic compounds commonly found in plants. Soybeans contain large amounts of polyamines.
In this project, soybean extract containing polyamines was tested to determine if they inhibit or slow down the death of mitochondrial DNA in yeast. After yeast colonies were killed using MPP, soybean extract was added, and the yeast colony count increased. This shows that soybean extract prevents mitochondrial DNA from being destroyed. Higher concentrations of soybean extract may need to be tested to get clearer results, but I think the results show that it may be possible to use soybean polyamines to treat Parkinson's.

Summary Statement
My project is about a possible new way to treat Parkinson's Disease.

Help Received
Mom: helped with project and drove me to lab; Butch Aying helped conduct experiments; Hemet Hospital lab-used their equipment;Mrs. Serrano for her helpful advice and insight.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Serena N. Sampson

Project Number
J1607

Project Title
Got Bad Breath? The Effects of Polyphenol on Oral Bacterial Growth

Abstract

Objectives/Goals
The objective of my project is to determine which solution of tea containing polyphenols, black or green, will inhibit the growth of halitosis forming oral bacteria when compared to the activity of Listerine and Crest Mouthwash.

Methods/Materials
To conduct my research, I swabbed the inside of my mouth and two other test subjects using sterile cotton swabs and streaked blood agar plates. One plate per subject was streaked with nothing added and used as a control to show normal growth pattern, size and variations of the colonies. Blank disks were allowed to soak in tea and mouthwash solutions and then placed on another set of blood agar plates. I added mouthwash to the procedure because they are known to kill bacteria in the mouth and this can be used to demonstrate inhibition of growth on the plates. All plates were incubated in my oven at 37 degrees Celsius and observed for zone of inhibition at 24 and 48 hours. The procedure was performed using sterile technique and temperatures were carefully monitored.

Results
After each trial I observed that there was only one zone of inhibition on each test plate and it belonged to the Crest Mouthwash. The green tea, black tea and Listerine did not have a zone of inhibition. Therefore, they did not inhibit the growth of bacteria.

Conclusions/Discussion
Studies have shown that polyphenols an antioxidant found in tea leaves, can kill a significant amount of bacteria in your mouth and prevent halitosis and bad breath. I hypothesized that the polyphenols in teas would not inhibit the growth of oral bacteria as well as mouthwash. Based on my results, I have concluded that neither the black tea, green tea nor the Listerine Mouthwash killed a significant amount of bacteria as proven by the lack of a zone of inhibition. My hypothesis was partially correct since one of the mouthwashes did have a zone of inhibition.

Summary Statement
The purpose of my project is to determine the effects of polyphenols found in teas on oral bacterial growth

Help Received
The staff at Glendale Memorial Hospital Laboratory for the lesson in microbiology techniques and procedures

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Haley H. Shim

Project Number
J1608

Project Title
Which Food Can Inhibit Bacteria that Cause Food Poisoning?

Abstract

Objectives/Goals
My goal was to find out which food can inhibit Escherichia coli and Staphylococcus aureus. 4 food materials were mugwort, garlic, coffee, and green tea.

Methods/Materials
I had to prepare mugwort, garlic, coffee, and green tea. Then, I grinded coffee, and blended other food materials by using handmill and blender and measured the weight of food materials, then mix them with water. The Wonkwang University Hospital(Iksan, South Korea) gave me S. aureus and E. coli, then I had to Gram Stain the bacteria. Then the professor(works in that hospital) helped me to insert the bacteria into the nutrient broth and adjusted turbidity by using McFarland Standard. Then I learned how to inoculate the bacteria into the Muller Hinter agar, and I performed it under supervision. Then, I treated the food materials on the agar by using pipette. And I put the S. aureus and E. coli into the incubator (16hours). Next morning, I came to the hospital and checked the inhibition circle by using Vernier Callipers. All the methods were under supervision of my father, and the professor (Ji Hyun Cho). They are both doctors and professors in Wonkwang University Hospital in Iksan, South Korea.

Results
Garlic inhibits S. aureus and E. coli the significantly. Garlic inhibits S. aureus more than E. coli. Coffee and green tea inhibits S. aureus only. Mugwort cannot inhibit both of them.

Conclusions/Discussion
My discussion during the project was that agar plate number 3 of S. aureus seemed like E. coli so I had to Gram stain S. aureus and E. coli and the agar plate number 3 of S. aureus then I found out that the agar plate number 3 of S. aureus was E. coli. And I also found out that garlic helps the lactic acid bacteria to grow, and during the Orange County Science Fair juding, one of the judges explained that garlic, coffee, and green tea is little acidic but mugwort is not so maybe that's why the mugwort didn't work on both bacteria.

Summary Statement
I wanted to see if mugwort, garlic, coffee and green tea inhibits Staphylococcus aureus and Escherichia coli .

Help Received
Dad helped me with the charts, and providing the materials; learned from Ji Hyun Cho M.D.; Supervision of my dad, and Ji Hyun Cho M.D.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Chip M. Thompson

Project Number
J1609

Project Title
Lemon-Aid

Abstract

Objectives/Goals
The objective is to find a solution to the large amounts of bacteria found in reused water bottles by determining if 4 millimeters of lemon juice will significantly inhibit the bacterial growth in water in reused water bottle

Methods/Materials
Twenty-three grams of dehydrated nutrient agar were prepared for used and poured into 12 petri dishes. After 24 hours, the lemon was cut in half. The lemon halves were squeezed into a bowl. All fourteen of the refresh# water bottles were emptied out and refilled with tap water. A dropper was used to add 4 milliliters of lemon juice into half of the water bottles. All of the bottles were shaken. After 5 hours, 12 unused droppers were used to transfer a 2-milliliter sample from each water bottle into the petri dishes. The droppers were used only once each to prevent cross-contamination. The observations of bacterial growth were recorded each day by the diameter and color.

Results
During the first day, there was no bacteria growth, but during the second and third days, the lemon water had less bacteria than the regular water. For seven out of the eight last days, the lemon water had more bacteria than the regular water.

Conclusions/Discussion
My conclusion is that 4 milliliters of lemon juice do not significantly inhibit bacterial growth in the water in reused water bottles. Even though lemon water does not completely stop bacterial growth in water, based on the results of the first few days, lemon juice may have a short-term effect on bacterial growth.

Summary Statement
My project involves the effect of lemon juice on bacterial growth in water in reused water bottles.

Help Received
Mother, father, and Mr. Mullen helped obtain supplies; Father helped prepare agar

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Chanel B. Tracey Pessin

Project Number
J1610

Project Title
Glove Wars

Abstract

Objectives/Goals
My project was to determine how the sterility of the economical medical grade exam gloves including latex, nitrile, and PVC vinyl compare to the six times more costly sterile surgical grade gloves and ungloved hands. I believe the exam gloves will show a significant amount of contamination and will compare more closely to an ungloved hand than to sterile surgical grade gloves. And therefore are not worth the up to 85% cost savings.

Methods/Materials
Nine unopened boxes of exam gloves (3 latex, 3 nitrile, and 3 PVC vinyl) and five pairs of sterile surgical grade gloves were obtained. Five randomly selected gloves obtained from various depths within each box were tested for a total of 45 gloves. Five sterile surgical gloves were also tested. In addition, 6 ungloved hands were tested, three freshly washed hands and three unwashed hands after handling everyday office equipment. Prepared sterile, nutrient LB agar plates were exposed by lightly pressing the fingertips of a gloved or ungloved hand to the agar. To prove initial sterility of the agar plates, one agar plate was left unexposed. All 57-test dishes were incubated inverted at 37 degree Celsius in a humidified CO(2) incubator for 72 hours. The dishes were examined and scored for contaminate colony growth and the findings evaluated.

Results
As expected, the sterile surgical grade gloves exhibited the lowest overall colony growth. The highest contaminate growth, with counts over 100, were regularly observed in the ungloved hands, both washed and unwashed and accounted for approximately 96% of all the colony growths seen. Of the three types of exam gloves tested, the latex and PVC vinyl gloves both consistently exhibited the lowest contamination with a mean of less than 1 growth per glove, each accounting for 0.5% of the total colony growths seen. The nitrile gloves# outcomes were varied, however, in general they showed a slight increase in contamination over the other gloves and constituted 3% of the total colony growth observed.

Conclusions/Discussion
My conclusion is that examination gloves compare closely in sterility to the pricey sterile surgical glove and are significantly cleaner than an ungloved hand even if that hand has just been washed. Therefore, I believe exam gloves are a safe, more economical, and eco-friendly choice for the exam room. Leave the surgical gloves in the surgical suite.

Summary Statement
An extensive comparison of three types of bulk (non-sterile) examination gloves and (sterile) surgical grade gloves and how these gloves compare to ungloved hands, both washed and unwashed.

Help Received
Mother hot glued the frame of my two boards; Used lab equipment at Genesis Laboratories under the supervision of Dr. Clark.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

Lauren M. Weetman

Project Number

J1611

Project Title

Electrolyzed Water: Cleaning Our Environment into a Better Future? The Study of Electrolysis of Water

Abstract

Objectives/Goals

My three objectives were to: 1) Determine the antimicrobial effect of commercially produced electrolyzed water, specifically hypochlorous acid (HOCl), on E. coli; 2) Produce my own electrolyzed water and test the antimicrobial effect of hypochlorous acid produced on E. coli; 3) Determine the efficacy of hypochlorous acid over time.

Methods/Materials

1) I collected a sample of electrolyzed water from the Sheraton Delfina hotel in Santa Monica, CA, that uses electrolyzed water for cleaning and disinfecting purposes. I tested the antimicrobial properties of the hypochlorous acid sample against E. coli by streaking agar plates with E. coli and measuring the line of inhibition surrounding sterile disks dipped in hypochlorous acid. I compared the results to E. coli streaked petri dishes with disks dipped in Lysol. 2) I produced my own electrolyzed water using an electrolysis cell and tested the hypochlorus acid#s ability to inhibit the growth of E. coli. 3.) I tested the efficacy of hypochlorous acid over time by measuring free chlorine using chlorine testing strips.

Results

Neither the commercially produced sample of hypochlorous acid nor my own sample inhibited the growth of E. coli whereas Lysol was effective in inhibiting the growth of E. coli. The efficacy of the hypochlorous acid was diminished over a two-week period.

Conclusions/Discussion

1) Hypochlorous acid produced by electrolyzing water did not inhibit the growth of E Coli. Lysol is effective in inhibiting the growth of E. coli. 2) Electrolyzed water has a relatively short shelf life and does not retain its efficacy. 3) Overall, I do not recommend using Hypochlorous acid as a disinfecting solution against E Coli. My results indicate it does not have an antimicrobial effect against E Coli.

Summary Statement

The purpose of my project is to discover if electrolyzed water inhibits the growth of E. coli, if I can electrolyze water, and if the electrolyzed water retains its efficacy over a two-week period.

Help Received

I received supervision for my science teacher, Ms. Margulis. I also contacted the President of Viking Pure, a company specializing in the electrolysis of water, Mr. Larry Smith, to help me acquire the electrolysis cell.

CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Jenna B. Deutschman

Project Number
J1699

Project Title
Poison Agar, Dying Germs

Abstract

Objectives/Goals
The point of this experiment was to learn about ways to kill bacteria using aluminum potassium sulphate and monoammonium phosphate.

Methods/Materials
An incubator was built so that there could be a warm place to grow bacteria in Petri dishes. Next, Bacto agar was poured into seven Petri dishes. Bacteria was then abstracted from a kitchen sponge and placed in one of the Petri dishes, this was the control. Next, monoammonium phosphate was placed in three Petri dishes and aluminum potassium sulfate was placed in the remaining three Petri dishes. Bacteria was then taken from the control and placed into the six Petri dishes. Observations were recorded daily.

Results
The result of the experiment showed that aluminum potassium sulfate kills the bacteria and monammonium phosphate slows the bacteria's growth.

Conclusions/Discussion
My hypothesis was correct because the aluminum potassium sulfate does in fact kill the bacteria. Monoammonium phosphate slows the growth of bacteria. The control had more than twice the amount of bacteria clusters than the Petri dishes containing monoammonium phosphate. The Petri dishes containing aluminum potassium sulfate had no clusters of bacteria from begining to end.

Summary Statement
During this lab, I grew bacteria and then killed it using aluminum potassium sulfate and slowed the growth with monoammonium phosphate.

Help Received
Mom helped mount display board.