CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Sonachi M. Agina

Project Number
J1401

Project Title
Comparing the Toxicity Levels of Various Beauty Products

Abstract

Objectives/Goals
The objective of my science project is to warn people who use beauty products that they are indeed harmful and dangerous to our bodies. The reason being that they are toxic and I want my project to give people the idea that they should be more careful of the amont they spray or put on. So after completing my project I would like to accomplish that goal, that would put a smile on my face knowing that my project made a diffrence to people. Also knowing that people have a better comprehension about perfumes, colognes, nail polishes.

Methods/Materials
Stopwatch
4x4 wash cloth
crickets
sterile container
3 perfumes, 2 colognes, 1 nail polish variables

Results
nail polish variable=on average took up to 2hours and 35 minutes for the crickets to die
least effective perfume variable =average of 22 minutes for crikets to die
most effective perfume variable=average of 12 minutes for crickets to die
Both cologne variables matched up to an average of 33 minutes for the crickets to die
So the perfumes,colognes that I used are toxic. The nail polished doesn't look like its toxic at all.

Conclusions/Discussion
From my results I've reached the conclusion that the perfumes and colognes that were used for my science project are toxic. The nail polish variable didn't seem toxic since it took up to two hours and thirty-five minutes for the crickets to die. This is very relevant that people take a look at my project and understand why I stand to my conclusion. Even children can be concerned about being harmed if they like spraying on perfumes and all. I just want to say becareful becuase these beauty products are toxic and might damage your health. I urge caution because my science project has proven that these products are toxic. Thankyou.

Summary Statement
My project is about testing to find out if such beauty products that we use are toxic to us, like perfumes,etc.

Help Received
Teacher helped with writting,graphs and etc; Parents gave me me money to buy the board, crickets; Mom stayed up all night helping with my experiments on the crickets and getting the pictures; Friend let me use a perfume variable

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Megan L. Barber

Project Number
J1402

Project Title
Is Hand Washing an Effective Way to Remove Contaminants?

Abstract

Objectives/Goals
There are many products on the market that claim to remove bacteria and other contaminants from our hands. We purchase and use these products and never really know how effective they are. My objective was to test the effectiveness of water alone, soap, and antibacterial gel for removing contaminants from my hands.

Methods/Materials
Hands were imprinted on agar plates four ways: dirty hands, hands washed with water alone, hands washed with soap, and hands washed with antibacterial gel. Untouched plates were also used as a control group. The plates were placed in a temperature and light controlled environment and observed for 14 days. The plates with the most growths in each of the four categories were photographed. The number of bacteria and fungi colonies were counted and recorded. Slides of the growths were prepared and photographed for display.

Results
The dirty hand plate contained 130 bacteria colonies and 5 fungi colonies. The hand washed with water plate contained 163 bacteria colonies and 5 fungi colonies. The hand washed with soap plate contained 104 bacteria colonies and 2 fungi colonies. The hand washed with antibacterial gel plate contained 32 bacteria colonies and 1 fungi colony. The untouched plate contained no growths. 75% of the contaminants were removed using antibacterial gel, 20% were removed using soap, and using water alone produced more contaminants.

Conclusions/Discussion
Washing with water alone opened the pores on my hands and released contaminants from my pores. This explains why washing with water alone is not effective. Soap and antibacterial gel products are effective for removing contaminants from my hands. Most antibacterial products contain triclosan or ethyl alcohol. These agents damage the cell walls of bacteria, slowing their growth so the bacteria eventually die. The antibacterial product that I used contained ethyl alcohol. Soap is also an effective hand cleaner, but it is not as effective for killing bacteria. It lifts dirt off the surface so that it can be scrubbed away. The scrubbing action when you wash helps to release dirt and oils on the surface of your skin and the soap picks up dirt and carries it away as you rinse your hands.

Summary Statement
The effectiveness of water, soap and antibacterial gel were tested for removing contaminants while washing hands.

Help Received
Mother proofread my data, Father showed me how to used his microscope and digital camera, and Aunt Cathy showed me how to make slides.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Lacey A. Benefiel

Project Number
J1403

Project Title
Lethal Concentrations of Environmentally Friendly Jalapeno Pesticides

Abstract

Objectives/Goals
The purpose of my science project is to find the smallest concentration of jalapeno pesticide that will still effectively kill the pests within the hour. This project is a continuation from my last year#s project, Environmentally Friendly Pesticides, which was to find a natural product that would work similarly to a chemical pesticide, but would not harm the environment. I found that the jalapenos worked most effectively by eliminating the most crickets in a timely fashion. In this year#s project, I am trying to find the lowest concentration of this natural pesticide that will still work effectively. This will help the understanding of others who would want to produce this environmentally friendly product in the most economical and efficient way possible.

Methods/Materials
I started out my concentrated pesticide by combining 3 oz. of jalapeños and 250 mL of water. I boiled this for 5 minutes, blended it, and strained out the solids. To set up my habitat for the pests, I placed 2 crickets in each of the 5 plastic storage bins for each trial. In each storage bin, I sprayed 5 full sprays onto each terrarium. To lower the concentration after each trial, I split the concentration in half by pouring out 125 mL of the pesticide and adding 125 mL of water. I continued to reduce the concentration until the pesticide was not effective within the hour. The materials I used while conducting this experiment are 3 jalapenos, 5 small plastic storage bins, 1 plastic spray bottle, a Food Processor, Knife, Cutting Board, Rubber Gloves, Plastic Goggles, Measuring Cup, and 70 crickets.

Results
After performing this experiment, I have found that 3/8 of a jalapeno per 250 mL of water is the smallest measurement of jalapeno pesticide that will still effectively kill more than half the crickets within 1 hour. During my experiment, 6 out of the 10 crickets died within 1 hour. This is the most profitable concentration of the jalapeno pesticide to put on the market for public use.

Conclusions/Discussion
After this experiment, I was able to find a lethal concentration of the jalapeno pesticides. My experiment indicated that a measurement of 3/8 oz. of a jalapeno and 250 mL of water would still effectively kill the pests within 1 hour. In conclusion, 3/8 oz. of a jalapeno and 250 mL of water can kill pests effectively within an hour. This will be useful to any company that would like to produce jalapeno pesticides for public use.

Summary Statement
The goal of my project, Leathal Concentrations of Evironmentally Friendly Jalapeno Peasicides, was to find the smallest concentration of jalapeno pesticides that could still effectively kill pests within 1 hour.

Help Received
Mother helped paste up the board; Father helped get the crickets;

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Krikor Bornazyan

Project Number
J1404

Project Title
Mitigating the Negative Impact of Different Medicines with Similar Effects

Abstract

Objectives/Goals
Can intake time of two different medicines with similar effects influence patient#s blood pressure and hence condition? Based on my research, I hypothesized that staggering the intake time of two different medicines with similar effects on blood pressure will mitigate negative impact on patient#s condition by stabilizing blood pressure.

Methods/Materials
79 year old hypertensive female patient#s medicines were categorized into four groups based on the doctor#s recommended intake times. In each group the medicines with similar effects on the blood pressure, taken concurrently, were identified and studied (coinciding intake method). The patient#s blood pressure was measured and condition observed before and after intake of each medicine group, four times a day, for sixteen days. Then the intake times of two different medicines with similar effects on the blood pressure were staggered (staggered intake method). The same measurement and observation procedure was followed now for the staggered method. The mean systolic and diastolic pressures were calculated and observed patient#s condition summarized for each method and the results were compared between the two methods.

Results
In the staggered case, systolic pressure stabilized around 110 mmHg and diastolic 80 mmHg, increasing the patient#s alertness and activity throughout the day; mean variation of systolic pressure was only 22 mmHg and diastolic 11 mmHg. In the coinciding case, mean variation of systolic pressure was 47 mmHg and diastolic 31 mmHg ranging from 109 to 156 mmHg and 71 to 102 mmHg respectively resulting in increased inactive episodes during the day.

Conclusions/Discussion
In the staggered case, the peak effects of two blood pressure medicines did not overlap each other resulting in more equalized effect on the blood pressure consequently improving patient#s condition throughout the day. Data fully supported the hypothesis. Findings agree with the information found in the literature

Summary Statement
By staggering intake times of two different medicines with similar effects on the blood pressure, it was shown that the blood pressure could be effectively stabilized, hence improving the patient#s condition throughout daytime.

Help Received
Consulting, transportation to obtain necessary materials and literature.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Robert R. Calvo

Project Number
J1405

Project Title
Which Bandage Inhibits Bacterial Growth Most Effectively?

Abstract

Objectives/Goals
My project title was "Which type of bandage will most effectively inhibit bacteria growth"? I tested five types of bandages, Curad Silver bandages, BandAid Antibiotic bandages, BandAid Heavy Duty bandages, BandAid Sports Strips, and Nexcare Comfort bandages. I thought antibiotic bandages would inhibit bacteria growth most effectively because they have been shown to do so in various studies.

Methods/Materials
In a laboratory setting, I removed the adhesive from each bandage. I firmly wiped the pads against measured lengths of skin and placed the pads in labeled trypticase soy agar plates. The plates were incubated for 48 hours. After 48 hours, I examined the pads for bacterial growth. I measured the colonies on each pad using a metric ruler and approximated the amount of surface area covered. In my second trial, I tested Curad Waterproof Silver Gel, Curad Silver, BandAid Antibiotic, and Nexcare Comfort bandages. Unfortunately, within a few minutes the Silver Gel pads curled away from the agar, and the Silver Gel bandages had to be eliminated from the test.

Results
The BandAid Heavy Duty, BandAid Sports and Nexcare Comfort bandages did not claim to keep off bacteria, and they did not. The Antibiotic bandages kept off nearly 100% of the bacteria. Silver bandages did not seem to inhibit bacteria growth well. The label on the package of the Silver bandages said that they would. So I decided to investigate at a sixty power (60x). At this power I saw that the bacteria covered nearly every space on the pad between the silver mesh. The bacteria grew everywhere except directly on the silver threads! This meant that the bandage pad was covered with bacteria!

Conclusions/Discussion
Ordinary bandages such as BandAid Heavy Duty, BandAid Sports and Nexcare Comfort offered no protection from bacterial growth. The Antibiotic bandages did what they were supposed to do and destroyed the bacteria. The results for Curad Silver bandages were striking. The makers of the Curad Silver bandages stated that these bandages would have antibacterial properties. While it was true that the bacteria did not grow directly on the silver threads, there was absolutely no zone of inhibition. The bacteria grew right against the edges of the threads. Possibly since the metal was a solid, it did not transfer any antibacterial properties to the surrounding area. If you are trying to prevent infection, my advice is to use Antibiotic bandages.

Summary Statement
My project tested and compared five types of bandages, including Curad Silver bandages, and BandAid Antibiotic bandages to try to discover which bandage would inhibit bacterial growth most effectively.

Help Received
I would like to give a special thanks to my teacher for all of her time and knowledge, to Dr. Soo Hoo for the use of his lab and expertise, and also to my parents for all their help and support. I could not have done it without them. Thank you to Paula Tashjian, R.N. and wound care nurse specialist.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Chelsea E. Cameron

Project Number
J1406

Project Title
Can You Lower the Risk of Nighttime Seizures by Changing the Fat/Protein vs. Carbohydrate Ratio?

Abstract

Objectives/Goals
Test results intend to show that the Type-1 diabetic can improve the stability of his or her own blood sugar levels during the night by eating high protein dinners that produce more predictable blood sugar levels and lower the risk of developing hypoglycemia during the night.

Methods/Materials
The method consisted of two separate tests so I could compare the effects of eating a high carbohydrate dinner with a high protein dinner. The first test had Paul eat five, typically eaten high carbohydrate meals (like a typical breakfast), each eaten at 6 p.m., each consisting of 60 grams of carbohydrate and 2 ounces of protein. The other test had Paul eat five high protein dinners, each eaten at 6 p.m., each consisting of 6 ounces of protein and 37 grams of carbohydrate. For both of the five day long tests I gathered data by doing blood sugar testing on Paul using a glucometer during the evening and night and gathered data whenever Paul programmed his insulin pump for extra insulin (called "corrections") if blood sugar levels were above 120 on the glucometer. The glucometer showed the amount of milligrams of glucose per deciliter of blood that were currently in Paul#s body at testing times of 6 p.m., 8 p.m., 10 p.m., 12 a.m., and the next morning. Exercise was kept to a minimum.
The materials were as follows: human subject, Paul Cameron, age 13, a Type-1 diabetic who wears a 722 Medtronic MiniMed insulin pump. #Novolog# insulin, Medtronic MiniMed BD glucometer and testing strips, batteries, insulin pump site change infusion sets and pump reservoirs, lancet and lancet injector for blood finger pricks, foods listed on Meal Plan #1 and Meal Plan #2, kitchen utensils, appliances, alarm clock, food scale, and carbohydrate gram counting books.

Results
There was a 24% (by measure of Standard Deviation) improvement of the blood sugar stability through the night when comparing a high protein/fat evening dinner (Standard Deviation of 45) versus a high carbohydrate dinner (Standard Deviation of 69). Furthermore, more stable blood sugar levels through the night will reduce the risk of having dangerously low blood sugars that can cause a seizure or unconsciousness, a fear of many diabetics, including Paul.

Conclusions/Discussion
My conclusion is that high protein dinners cause Paul to have more stable blood sugar readings from a glucometer, through the evening and night, than the high carbohydrate dinners.

Summary Statement
This study was done to understand the effects that evening meals (5-days of mostly protein/ fat, plus 5-days mostly of carbohydrates) have on the stability of blood sugar levels throughout the night for a person with Type-1 diabetes.

Help Received
My mom helped me prepare some of the meals and type some of the report. My dad helped me devoloped the computer graphs, and taught me how to use raitos, percentages, and understand the use of Standard Deviation for measuring stability of my data.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Erin Campbell; Nicole Lang

Project Number
J1407

Project Title
Amazing Discovery: The Toxic Effects of Yellow Dye #5 on Mice

Abstract

Objectives/Goals
We sought to find out if a common food additive deemed safe by the food industry & the U.S. Food and Drug Administration, yet banned in other countries is harmful to the health & mental functioning of mice and if so, to raise the question if people consuming it may be at risk from it as well. If yellow #5 dye or coal-derived tartrazine has significant effects on mice, we must consider what the effects are on children & pregnant women around the world who consume tartrazine every day.

Methods/Materials
METHODS
A first control maze run was done with both groups receiving regular food and water. Group B received 5% tartrazine in their water for the 2nd and third runs while Goup A did not. Times were recorded and factored after each run. We concluded the maze runs after the third run because of many unexpected adverse health affects with those that received the tartrazine.

MATERIALS
20 Mice, a timer, a maze, two cages, exercise wheels, & water bottles, yellow dye #5 or tartrazine, mouse food, and science fair journals

Results
The male mice that received yellow dye were 3.5 times slower in their times through a maze they had previously been through than the non-receivers and we found that the tartrazine affected the mice in many more significant ways than we expected. The majority of the dye mice developed hair loss, long-term or chronic diarrhea, inflamed, swollen, or bleeding rectums, reduced growth and development, and possible reproductive impairments. Two of the youngest dye-receiving male mice died from this regulated and assumed safe food dye.

Conclusions/Discussion
While the maze runs showed some interesting potential effects of dye on memory & cognitive function, the most unexpected and frightening results were about how the dye so severely affected the health of the receiver mice. If these health risks exist in mice exposed for only three weeks to this presumed safe dye, how might it be affecting expectant mothers as well as children who consume it daily throughout their childhoods? We plan to send this study to the largest food corporations using tartrazine in products marketed to children, the FDA, and two groups pursuing a U.S. legislative ban of the use of tartrazine in foods.

Summary Statement
Demonstrating the toxic effects of the food additive yellow dye #5 on the health and mental functioning of mice.

Help Received
Nicole's father, Michael helped with making the mazes & running the mice, and Erin's parents helped with the graphs and mathematics.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Anastazia F. Capparelli

Project Number
J1408

Project Title
Save The Babies

Abstract

Objectives/Goals
Aluminum toxicity may cause weak bones and other problems in people. This is a greater problem in babies because they do not have the ability to get rid of aluminum or other compounds like adults because their kidney function is not mature. Recently, the FDA and ASPEN defined toxic levels of aluminum. The FDA also forced manufacturers to label their products (additives) with maximum aluminum content. I determined whether the FDA levels are being met.

Methods/Materials
In my project, I obtained TPN information from 26 patients. Then I found the maximum amount from each manufacturer for each additive. I calculated the aluminum amount per additive, per TPN, per day and per weight (kg). I also compared the aluminum per weight between babies and older children to determine if babies receive more aluminum.

Results
After testing I found that 100% of the infant patients exceeded the FDA#s limits of 4 to 5 mcg/kg/day. However, only one child patient received safe levels of aluminum.

Conclusions/Discussion
Therefore either the manufacturers# maximum aluminum levels are too high or there is too much aluminum in the TPN additives. These calculations are from manufacturers reported maximum aluminum levels so the actual content may be much less. The next step would be measuring the actual aluminum levels in TPNs to solve this problem.

Summary Statement
My project is about the toxicity of aluminum in intravenous feedings for infants.

Help Received
Gale Romanowski (Pharmacist) helped me obtain TPN order forms and showed me how I should calculate my data.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Ryan M. Chapman

Project Number
J1409

Project Title
Beta Carotene: Natural Cancer Fighter or Homeopathic Hoax?

Abstract

Objectives/Goals
My experiment tried to determine whether beta carotene helps prevent the growth of cancer in plants.

Methods/Materials
I germinated fifteen sunflower seeds: ten sunflower seeds in tap water, and five seeds in a solution of ½ liter water and two 25,000 IU tablets of beta carotene. All seeds germinated in five days. I planted them in 10 cm diameter pots of potting soil. All plants were watered three times each week. The beta carotene pots were watered with 10 ml. of the beta carotene solution. The other pots were watered with tap water. After three weeks all plants exceeded 15 cm. in height. Every plant, except 5 of the plain watered plants, were injected with 2 units of Agrobacterium tumefaciens, using a standard syringe. The plants were then watered twice a week, using the solutions described above. All plants were examined for changes and effects every two weeks.

Results
The measurements showed that the plants infected with the crown gall disease grew less than the control plants. No significant difference in the growth of crown gall (plant cancer) was observed between the infected plants watered with plain water and the plants watered with beta carotene.

Conclusions/Discussion
This experiment was expected to show that beta carotene helps reduce the spread of cancer. However, this was not the case. The presence of the Agrobacterium tumefaciens was seen in all plants infected, but there was no significant difference between the plants given beta carotene and those given plain water. In addition, the beta carotene also had serious effects on the plants. The beta carotene plants had slower growth and withered appearance compared to the plain water group prior to infection, and showed only a little better growth rate than the infected group after the cancer was introduced. While beta carotene may have positive effects in people, it does not seem to be a positive additive for plants.

Summary Statement
I tested whether adding beta carotene to plants helps prevent or slow the growth of plant cancer.

Help Received
My father obtained the plant cancer (Agrobacterium tumefaciens), helped inject the plants, and helped type my report.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Tiffany R. Chu

Project Number
J1410

Project Title
Ultraviolet Ray Exposure vs. Surface and Time of Day

Abstract

Objectives/Goals
Many people get sunburned or tanned, which is a result of exposure to ultraviolet rays. The objective of this project is to determine whether certain surfaces should be avoided at certain times of day to minimize the exposure to UVA rays. I used UVA detecting, color changing beads and shirts (sensitive to approximately 365 nm wavelength) to assess UVA radiation over three different surfaces: concrete, asphalt, and grass. I tested under various conditions of time of day, weather, temperature, and humidity; in sun and in shade. Based upon my research regarding UVB radiation, I beleived UVA radiation would be highest over concrete and lowest over asphalt. I did not beleive that the temperature and humidity would affect the amount of UVA rays present, but I thought that cloud cover, sun and shade, would affect UVA ray intensity. I also believed the UVA rays would be strongest at 1:00 pm.

Methods/Materials
To carry out this experiment, I separated UVA sensitive beads by color and placed them in open, clear, plastic cases. I also exposed a UVA sensitive, color changing shirt at the same time as the beads over each of three surfaces: concrete, asphalt, and grass. I recorded the amount of time that it took the beads and shirts to change to their full color, or how much the color had changed after 15 minutes. I also recorded temperature, humidity, and weather conditions. These procedures were performed on multiple dates at 7:00 am, 1:00 pm, and 4:00 pm.

Results
My results showed that the beads changed color fastest over asphalt, which meant the beads received more UVA rays over this surface. Surprisingly, the beads changed color slowest over concrete. At 7:00 am and 4:00 pm, in many cases, the beads did not receive enough UVA rays to change to their full, bright colors. At 1:00 pm in the sun, the UVA sensitive beads were always exposed to enough UVA rays to change to their full colors.

Conclusions/Discussion
I had thought that UVA rays would be more concentrated over concrete than asphalt. Concrete is a reflective surface. According to my results, the UVA rays were in much greater concentration over the dark surface of the asphalt. This result was very consistent throughout the experiment. The UVA rays were also in far greater concentration at 1:00 pm than at 7:00 am or 4:00 pm.

Summary Statement
This project attempts to determine whether time of day (7:00 am, 1:00 pm, or 4:00 pm) or type of surface (concrete, asphalt, or grass) affect the degree of UVA ray exposure.

Help Received
I'd like to thank my science teacher for providing guidance, and Jeff Leichty and Brittany Cushing of Del Sol Company for their advice.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Alexandra de la Torre

Project Number
J1411

Project Title
How Fertilizers Affect Eisenia fetida's Mortality Rate and Cocoon Production

Abstract

Objectives/Goals
Fertilizers, intended to improve the quality and fertility of the soil, might be harming earthworms. The objective of these tests was to determine the possible effect of two common inorganic fertilizers, and one organic fertilizer on the mortality rate and cocoon production of Eisenia fetida.

Methods/Materials
100 worms were placed in each of 4 containers. The worms were covered with a layer of soil. The control group received additional soil, food scraps, and yard debris. The second, third, and forth containers each received that same mixture plus either 77.93 grams of Earthgro Steer Manure Fertilizer, 1.15 grams of Scotts Starter Fertilizer (a slow release fertilizer), or 1.73 grams of Vigoro All Purpose Fertilizer, respectively. The amount of fertilizers applied was based on the recommended amount for that surface area. The soil had a controlled moisture and pH level. After 11 days the contents of the containers were sorted and counted. This ended Test#1. The same procedure was repeated for Test #2, and Test #3. All containers had the same number of mature worms (with clitellum). The other worms were juveniles of various sizes.

Results
The control group had 282 worms out of 300, 55 cocoons, and 18 deceased worms. The group with manure had 282 worms, 51 cocoons, and 18 deceased worms. The group with Scotts Fertilizer had 281 worms, 42 cocoons, and 19 deceased worms. The group with Vigoro Fertilizer had 233 worms, 9 cocoons, and 67 deceased worms.

Conclusions/Discussion
The sampled inorganic fertilizers reduced Eisenia fetida's cocoon production. The Vigoro Fertilizer caused a 22.33% mortality rate (The mortality for the other fertilizers, and the control group, ranged from 6% to 6.33%.), and reduced cocoon production by 84%. The Scotts Fertilizer caused a 24% reduction in the cocoon production, and a negligible change in the mortality rate. The manure had little or no effect. The immediate release feature of the Vigoro Fertilizer's chemicals were toxic to Eisenia fetida. The Scotts Fertilizer's slow-release feature reduced the amount of fertilizer chemicals released into the soil. A longer series of tests, including regular watering, may be required to better determine the effects that may be caused by the further release of Scotts Fertilizer's chemicals. Further studies are needed to determine how the fertilizer's toxicity may have affected the cocoons' fertility, and the viability of the newly born worms.

Summary Statement
This experiment showed that inorganic fertilizers can be toxic to Eisenia fetida.

Help Received
My father provided advice, and support.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Andrew R. Dunn-Rankin

Project Number
J1412

Project Title
Cooling the Heat of a Jalapeno

Abstract

Objectives/Goals
My objective was to find out which edible substance cools the heat of an ingested jalapeno pepper the fastest.

Methods/Materials
A jalapeno pepper was cut into four equal slices and then eaten by the four participants. A stopwatch was started, and we ate or drank the test substance. I tested water, whole milk, nonfat milk, bread, a lemon/sugar paste, and no substance. Once the participant felt no more heat in his/her mouth, the time was recorded. This was repeated for each substance 3 times.

Results
Whole milk cooled the heat of the pepper the fastest, whereas water cooled it the slowest - slower than no substance at all.

Conclusions/Discussion
My conclusion is that whole milk cools the heat of a jalapeno the fastest. This is because dairy products contain casein, which breaks down capsaicin (the chemical that makes peppers hot). Also, capsaicin mixes well with fat, so whole milk worked the best.

Summary Statement
My project is about finding out which edible substance cools the heat of a jalapeno pepper the fastest.

Help Received
Mother, father, sister were test subjects; Mother helped with board.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Kenneth D. Flatman

Project Number
J1413

Project Title
Does Higher Sunscreen SPF Matter?

Abstract

Objectives/Goals
The objective of this project was to learn whether there is a significant difference in the protection given against UV rays by sunscreens at SPF 30 and up. My hypothesis is that there won't be a significant amount of difference in the protection given by sunscreens with higher SPF levels.

Methods/Materials
This experiment uses a paper called Sunprint paper (created by Lawrence Hall of Science) that turns blue when exposed to UV rays. Ten sunscreens were smeared over a clear acrylic sheet that came with the Sunprint kit and were exposed to 5 minutes, 4 minutes, and 2 minutes of sunlight. After stopping the Sunprint paper's chemical process with water, I scanned the dried Sunprint paper into the computer and used the GIMP graphics program to take samples of the Sunprint paper blue pixel value to get an average darkness for each sunscreen and time interval.

Results
The sunscreens gave roughly the same amount of protection against UV rays, with the SPF 60 sunscreen giving a little more protection. Regardless of SPF, the sunscreens with physical blockers Zinc Oxide and Titanium Dioxide gave the most protection, whereas the sunscreens with the active ingredient Avobenzone did the poorest.

The sunscreens with Avobenzone were less dense than the other sunscreens, so I conducted a follow-on experiment to determine whether density played a key role in my results. The experiment used columns with no sunscreen, white Lubriderm lotion (no SPF), the experiment's least dense (clear) sunscreen (SPF 30 that did the worst), and the experiment's most dense sunscreen (SPF 60 that did the best). The denser lotion provided a little more protection than no sunscreen but did not perform nearly as well as the clear (less dense) sunscreen.

Conclusions/Discussion
There wasn't a visible difference in the protection given against UVB rays by sunscreens at SPF 30 and up. However, sunscreen SPF doesn't accurately define the amount of protection given from UV rays, because SPF only measures UVB protection. Because sunscreens with Avobenzone didn't perform well, the best sunscreens to buy should have an SPF of 30 or above and Zinc Oxide to protect against UVA1 rays. Future experiments could test the stability of sunscreens with Avobenzone to see why these sunscreens did poorly.

Summary Statement
This experiment tests whether the FDA proposal to label higher SPF level sunscreens as "30+" adequately defines the amount of protection from the sun's UV rays.

Help Received
My mother typed in raw data, took pictures, and helped with the charts.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Colin M. Gavin

Project Number
J1414

Project Title
Antibiotic Resistance in Selected Cell Lines

Abstract

Objectives/Goals
The Objective of this experiment was to determine the resistance of two strains of Chinese Hamster Ovary cells to the antibiotic Geneticin. My hypothesis was that the strain called CHO-M1 would be more resistant to geneticin because this strain had been treated to make it resistant to Geneticin.

Methods/Materials
Three plates of each strain of CHO cells were grown in each of eight dilutions of Geneticin. These plates were fixed with methanol and stained with Crystal Violet. Next the number of colonies with more than 50 cells were counted and from these counts a cloning efficiency was derived.

Results
The results of this experiment were that CHO-K1 cells could not survive in concentrations of Geneticin above 500 mcg/ml. However CHO-K1 cells could survive at concentrations of Geneticin up to 2000 mcg/ml, but at much lower cloning efficiencies.

Conclusions/Discussion
My hypothesis was supported, CHO-M1 cells did have a higher cloning efficiency than that of CHO-K1 cells after exposure to Geneticin. In fact the Geneticin was virtually useless against the CHO-M1 cells. Therefor my conclusion is that microbes that are resistant to antibiotics are a important health hazard because they are difficult to treat.

Summary Statement
In this project we cultured Chinese Hamster Ovary cells, exposed them to an antibiotic and measured the effect.

Help Received
Used lab facilities at Molecular Devices Corp. under the supervision of Carole Crittenden.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Claire M. Haines

Project Number
J1415

Project Title
Commercial vs. Natural Supplements: Is There a New Way to Improve a Horse's Health?

Abstract

Objectives/Goals
The objective of my project was to see if you could buy a cheaper, more natural horse supplement to improve your horse's health as opposed to expensive, commercially made supplements that propose to improfve the same physical conditions. I wanted to see how these worked on the older horse in particular.

Methods/Materials
Using a 25 year old Arabian gelding, showing severe signs of aging problems such as weight loss, dull coat and toxin retention, as my subject, I did the following over a 33 day period.
1. Measure a 1/2 cup of apple cider vinegar and pout on top of the grain.
2. Take the notebook and pen (or pencil) and write down observations.
*Look for any bald spots or places where losing hair.
*Pull the skin on the shoulder to see if horse is dehydrated (if the skin does not shoot back, the horse is dehydrated).
*Eyes are not reddish in the back.
*Dandruff/dust deep in the horse's fur.
3. Take samples of hair and measure fetlock for water and toxin retention.
4. Give horse the bucket of grain with the apple cider vinegar.

Results
I witnessed some major changes in the horse's appearence and behavior. The natural supplement, apple cider vinegar, worked faster than Platinum. The swelling in the horse's fetlock went down almost three inches and the horse started to fill out around the rib cage. In addition the horse's coat texture was softer and the muscles developed nicely. The horse began to pick up his feet and act like a much younger horse.

Conclusions/Discussion
I learned that a gallon of apple cider vinegar for three dollars had the same results as the more expensive commercial supplement, Platinum. The results of my experiment are what I expected.

Summary Statement
My project is to see if you could buy a cheaper, more natural horse supplement to improve your horse's health as opposed to expensive, commercial made supplements that propose to improve the same physical conditions.

Help Received
Mother and father helped with the horse by driving me to the ranch, even in the rain.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Alexis R. Husak, Jr.

Project Number
J1416

Project Title
Will Eucalyptus Oil Be More Effective in Killing Mosquito Larvae than Insecticide?

Abstract

Objectives/Goals
My Goal was to find a way to kill mosquito larvae with a more nautral substance.

Methods/Materials
40 drops of Eucalyptus oil; 40 granules of Bayer Advanced Garden Mosquito Preventer; 1,200 Mosquito Larvae; 60 Petri dishes; rubber gloves; mask; goggles; eyedropper; piece of screen; 1 gallon of Distilled water; measuring cup.

Results
The result of my investigation on the toxity level of eucalyptus oil vs. mosquito preventer insecticide indicates that the eucalyptus oil is more effective.

Eucalyptus Oil 1 Drop: In 9 out of 10 Petri dishes 100% of all the larvae died. In 1 of the dishes 19 out of 20 larvae died. Eucalyptus Oil 3 Drops: In 10 out of 10 dishes 100% of all the larvae died. Control for eucalyptus oil: Out of all 10 dishes 11 mosquito larvae died.

Insecticide 1 Granule: In 3 out of 10 dishes there was 100% dead. Then only 8 larvae survived out of the remaining 7 dishes. Insecticide 3 Granules: In 9 out of 10 dishes 100% of the larvae died. In 1 of the dishes 9 out of 10 larvae survived. Control for insecticide: Out of all 10 dishes 10 larvae died.

Conclusions/Discussion
After completing my investigation on determining if eucalyptus oil will work better at killing mosquito larvae than insecticide; I found that my hypothesis was correct. My hypothesis stated that the eucalyptus oil will work better than the mosquito preventer insecticide.

My results stated that the eucalyptus in the 3 drop dishes worked 100%. The lowest result was the 1 granule of mosquito preventer insecticide with 96%. One observation I made was that after just 10 minuets the 3 drop eucalyptus oil had killed more than half of the larvae.

I learned a lot from my research about mosquitoes for example they hatch from egg rafts and they have 4 different stages to their life cycle. First of all they start out as an egg, move to a larvae, change into a pupae, and finally develop into an adult. I learned that eucalyptus oil is one of koala bears favorite snacks. Also that eucalyptus oil is used in many tooth pastes. I also learned that the insecticide is a crystal and is suppose to dissolve in the insects stomach and destroy their stomach and kill them.

In conclusion the eucalyptus oil would be a lot better thing to spray where larvae is. I was very surprised about the insecticide not working as well as it says in my research. First of all it is safer, and secondly it works better.

Summary Statement
My project is about find a more natural substance to kill mosquito larva.

Help Received
Selma Mosquito Abiment District supplied the mosquito larvae; Mrs.Wright helped go over paper work;Mom helped put board together.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Alexander I. Ivany

Project Number
J1417

Project Title
Dangerously Enhanced: The Effects of Various Sports Supplements on the Heart Rate of Daphnia magna

Abstract

Objectives/Goals
The purpose of my project was to find out if sports supplements affect heart rate of atlhletes. I measured the heart rate of small invertebrates called Daphnia Magna after I had given them a diluted solution of 5 diffent sports supplements. . Daphnia magna are clear, therefore allowing me to see their heart beating underneath a microscope.

Methods/Materials
Materials:
Thirty Daphnia Magna; 50 milliliters of distilled water mixed with ten drops of Craetine; 50 milliliters of distilled water mixed with ten drops of Thermo Burst; 50 milliliters of distilled water mixed with ten drops of Tribulus; 50 milliliters of distilled water mixed with ten drops of Nitric Oxide; 50 milliliters of distilled water mixed with ten drops of Green Tea Extract; A microscope; Six fifty milliliter test tubes; Observation Gel to keep Daphnia Magna in place; Timer.

Methods:
1. Grind with a mortar and pestle, one tablet of each of the five sports supplements; 2. Mix each one into water; 3. Once the supplements are completely disolved add 10 drops of each one into a 50 milliliters of distilled water. Do not add to control jar; 4. With a pipet add a group of about five Daphnia Magna to each jar; 5. Shape the observation gel so that there is a small shelter for the Daphnia Magna to sit; 6. Using the pipet place the Daphnia inside the shelter; 7. Place a lens over the shelter and put it under a microscope; 8. Count how many heartbeats the Daphnia have in ten seconds and then record it; 9. Repeat for a total of 3 times per supplement.

Results
In conclusion, I found that the sports supplements did affect the Daphnia Magna#s heart rate, and the Creatine increased the Daphnia#s heart rate the most.
The regular heart rate of a Daphnia Magna is 54.33 beats per 10 seconds. Each of the sports supplements were more than this control. The Creatine averaged 71.33 heart beats per 10 seconds, nine more heart beats per ten seconds than the Tribulus as well as the Thermo Burst, which both averaged 62.33. The Daphnia Magna in the Nitric Oxide had an average heart rate of 59.33 beats per second. In the Green Tea Extract, the average heart rate of the Daphnia was 57 beats per 10 seconds.

Conclusions/Discussion
I think that this information is relevant to modern day athletes.

Summary Statement
After testing 5 sports supplements, I found that sports supplements do affect the heart rate in various amounts.

Help Received
Ms. Whitfield and Ms. Moore, my school's science teachers, helped me with the microscope.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Sarah A. Kletzer

Project Number
J1418

Project Title
The Tell-Tale Heart: The Effect of Common Drugs on the Heart Rate of Daphnia magna

Abstract

Objectives/Goals
The objective of this experiment is to investigate the effect of readily available drugs (caffeine, cough and cold medicine, allergy medicine, and a sleep aid) on the heart rates of daphnia magna.

Methods/Materials
Suspensions of four commonly available over-the-counter medications were prepared (distilled water (separately) with caffeine (from No-Doz#), Non-drowsy Claritin# (pseudoephedrine and loratadine), Simply Sleep# (diphenhydramine) and NyQuil# (acetaminophen, dextromethorphan, doxylamine, alcohol). Using one daphia magna, a control (non-drugged) heart rate was established, using repeated counts. The treatment involved applying one droplet of the drug suspension, followed by repeated counts of the heart rate. Each of the four drug treatments involved repeated trials. Due to the rapid beating of the daphia magna heart, 10-second heart rate counts were used to calculate an estimated 60-second heart rate.

Results
All four medications produced a change in the heart rate. No-Doz has caffeine as its active ingredient, and applying it to the daphnia increased the heart rate by an average of 39 percent. Simply Sleep has diphenhydramine as its active ingredient, and it slowed down the heart rate of the daphnia. The average change in the heart rate was -15 percent. Non-Drowsy Claritin contains psuedoephedrine and loratadine as active ingredients, and it increased the heart rate of the daphnia, by an average of 23 percent. NyQuil contains acetaminophen, dextromethorphan, and doxylamine as active ingredients, with alcohol as one of the inactive ingredients. The NyQuil produced a very slight increase in the heart rate, an increase of 5 percent on average.

Conclusions/Discussion
The increase in the heart rate observed with the treatments of caffeine and pseudoephedrine are consistent with their labeling as stimulants. Depressant effects, seen as a lowering of the heart rate, were observed with the treatments using diphenhydramine, an antihistamine, and dextromethorphan and doxylamine, also antihistamines. The widespread use of stimulants and depressants suggests a need for more public awareness of the effect of these types of medication on heart rate.

Summary Statement
My project is an investigation of the effect of over-the counter (OTC) medications, categorized as either stimulants or depressants, on the heart rate of daphnia magna.

Help Received
Mother helped with heart rate count.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Daniel M. Kwon

Project Number
J1419

Project Title
Green Tea: Do More Expensive Green Teas Have a Better Medical Effect?

Abstract

Objectives/Goals
My objective was to determine whether more expensive green tea types were more effective in reducing heartbeat rates in Daphnia than cheaper varieties of green tea.

Methods/Materials
I tallied the heartbeat rates of Daphnia samples thirty times each in water and in green teas (five different kinds ranging from $0.15 per 2 grams to $2.00 per 2 grams). A Daphnia was placed on a microscope with a drop of water and the number of the Daphnia#s heartbeats was counted in five seconds. The result was multiplied by twelve to determine the Daphnia#s heartbeat rates in one minute in water. Then, the number of Daphnia#s heartbeats was counted in the green tea concentrate. This process was repeated 30 times each per green tea (5 different kinds) to collect enough sample data (total of 300 samples). The quality and the cost (unit price per 2 grams of green tea) of the green teas are: Tea #1 (grounded in a tea bag, $0.15), Tea #2 (bulk and large mature leaves, $0.20), Tea #3 (better quality mature leaves, $0.30), Tea #4 (small early leaves in a luxury package, $1.00), and Tea #5 (very small baby leaves in a luxury package, $2.00).

Results
In my testing, the average reduction in heartbeats of Daphnia exposed to each green tea sample were: Tea #1 (32.8 beats per minute), Tea #2 (34.0 bpm), Tea #3 (34.0 bpm), Tea #4 (28.0 bpm), and Tea #5 (32.8 bpm). It showed that the larger and more mature green tea leaves (#2 and #3) are more effective in lowering heartbeat rates than the younger and smaller leaves (#4 and #5). It means that the cheaper green teas are more effective in lowering heartbeat rates than the more expensive ones.

Conclusions/Discussion
My hypothesis was not supported because the cheaper green teas showed better heartbeat rate reduction results than the more expensive ones. The Daphnia#s heartbeat rate was slower with Green Teas Samples #2 and #3 than with Green Teas Sample #4 and #5. It seems to me that the larger and mature leaves have more chemical ingredients than younger and smaller leaves. However, the taste of the expensive green teas is much better than the cheaper varieties# taste, giving a better, more luxurious, and longer-lasting taste.

Summary Statement
This project is to determine whether more expensive green teas have better medical effectiveness than cheaper varieties in reducing heartbeat rates on Daphnia (and perhaps even humans).

Help Received
Many thanks to my mom and dad for transportation, funds, and making green teas; Mr. Hodges and Ms. Herrington (science teachers) for their advice and mentoring; and my sister Eunice for her help on editing my work and giving me advice.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Amy H. Lee

Project Number
J1420

Project Title
How Clean Is Your Hospital?

Abstract

Objectives/Goals
The object of this project is to determine which chemical cleaning-agent, commonly used in hospitals, kills the most bacteria.

Methods/Materials
Using a disk-diffusion method, I first prepared three agar plates with three bacteria: Pseudomonas aeruginosa, Escherichia coli, and Staphylococcus aureus. Then I soaked the sterile disks with cleaning-agents such as Epi-Clenz Instant Antiseptic Hand Cleanser, Aseti-Chlor, Germicidal Disposable Cloth Sani-Cloth Plus, and Stat III TB Germicidal Detergent. Next, I placed a disk on one of the four quadrants of a plate and repeated on all four quadrants, using disks with different chemical agents. Then I covered the agar plates and placed them in an incubator. I compared the results from 8, 16, 24, and 32 hours. Finally, I repeated the entire experiment two more times for accuracy.

Results
The test results show that Germicidal Disposable Cloth Sani-Cloth Plus was the only chemical cleaning-agent that killed all three bacteria. Stat III TB Germicidal Detergent killed both Escherichia coli and Staphylococcus aureus. However, Epi-Clenz Instant Antiseptic Hand Cleanser and Aseti-Chlor agents did not kill any bacteria at all. The length of time the bacteria grew (8, 16, 24, and 32 hours) in the incubator did not make a difference in determining which chemical cleaning-agent killed the most bacteria. Surprisingly, the cleaning-agents became less effective after 32 hours.

Conclusions/Discussion
I conclude that my hypothesis was correct. Germicidal Disposable Cloth Sani-cloth Plus made the greatest difference by killing all three different bacteria. The length of time (8 to 32 hours) the bacteria grew in the incubator was not a factor. However, the bacteria grew over the cleaning-agents after the 32 hours of incubation time. It verified that the cleaning-agents became less effective after 32 hours. Active ingredients of the Germicidal Disposable Cloth Sani-cloth Plus produce quaternary ammonium disinfectants, which are powerful bactericidal against gram-positive bacteria and less effective against gram-negative bacteria. But my experiment results showed that Germicidal Disposable Cloth Sani-cloth Plus killed all three bacteria: one gram-positive and two gram-negatives.
For further research I would like to expand this project to find out which antibiotics would kill certain types of bacteria. I would like to use the same three bacteria to see which antibiotic works best.

Summary Statement
My project explored which chemical cleaning-agent, commonly used in hospitals, kills the most bacteria over time.

Help Received
I received help on sterilizing all the necessary materials from the Sterile Processing Department in Ridgecrest Regional Hospital. Also, the Laboratory Department allowed me to use their incubator and microscope. Mrs. Chalise and Mrs. Sherri, microbiologists at the hospital, provided bacteria.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Nichele R. Lee

Project Number
J1421

Project Title
Osteoporosis, Oh My! Calcium and Bones: Decalcification and Recalcification

Abstract

Objectives/Goals
The objective of my project is to study the process of calcium loss in bone. I wanted to determine whether calcium supplements help prevent osteoporosis by reducing decalcification and what type of calcium supplements work best to prevent decalcification and improve re-absorption of calcium.

Methods/Materials
Two types of experiments were conducted: decalcification and recalcification. For decalcification, vinegar was used to decalcify chicken bones. Five different calcium supplements were tested: Caltrate and TUMS containing Calcium Carbonate; Citrical and Kirkland containing Calcium Citrate; and Target-Mins containing Calcium Hydroxyapatite. Vinegar was used as the control. I soaked the bones in jars with vinegar mixed with 1,200 mg of calcium from each supplement. I checked the bones for change in flexibility and mass every day for five days.

For recalcification of decalcified bones, I first decalcified the chicken bones in pure vinegar. To test the re-absorption of calcium, I used distilled water as the control. I tested the same five calcium supplements. Each decalcified bone was soaked in a mixture of water and 1,200 mg of the calcium supplements. I checked the bones for change in flexibility and mass every two days for 14 days.

Results
In my initial sets of trials, Calcium Carbonate lowered decalcification of the chicken bones best and Calcium Hydroxyapatite recalcified bones best. But, I made a mistake by misreading the dosage on two of the calcium supplements and applied uneven quantities of calcium in the original experiment. To get accurate results I did two extra sets of trials. In both of these trials I found that Calcium Carbonate not only lowered decalcification of the chicken bones best, but this time it also recalcified bones best.

Conclusions/Discussion
Through my experiments I had a firsthand glance at what could happen to bones due to osteoporosis. The loss of calcium in the bones made them become brittle and weak. I could not even begin to imagine what it would be like to have bones like that. I also learned that calcium supplements do indeed help reduce decalcification and improve re-absorption of calcium on bones. If someone were to go buy a calcium supplement, I would suggest they buy supplement containing Calcium Carbonate. Nevertheless, I learned that the important thing to prevent osteoporosis is to have a daily intake of calcium.

Summary Statement
My project examines what type of calcium supplements help prevent decalcification and improve recalcification of bones best, in order to prevent osteoporosis.

Help Received
My mother showed me how to graph my data and proofread my report. My father helped cut the chicken bones. My science teacher lent me a scale to use for measurements.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Melissa K. Marinez

Project Number
J1422

Project Title
Blood Sugar vs. Exercise and Diet

Abstract

Objectives/Goals
The Objective is to determine if a controlled diet and exercise will lower blood glucose levels and reduce the amount of insulin requirements of a type 1 diabetic.

Methods/Materials
My mother was used as a test subject, in the first 30 days she ate her normal diet and went about her usual routine. Blood sugars were checked 3 times per day 7 days a week. During the second 30 days, diet was controlled 7 grams of protien for every 15 grams of carbohydrates consumed. One hour of exercise daily and blood sugar levels were checked 3 times per day. Insulin was adjusted 2 units at a time as needed. Material used: Insulin, Humolog & Humulin N, MediScene Optium blood glucose monitoring system, Ultilet lancets, one time use, MediScene Optium blood glucose test strips, BD ultra-fine 31 gauge needle,1/2 cc syringes.

Results
Exercise and a controlled diet lowers blood glucose levels and reduces the insulin requirements of a type 1 diabetic.

Conclusions/Discussion
My results support my hyporthesis. The information from my project will help my mother and others to gain better control of type 1 diabetis.

Summary Statement
Will a controlled diet and daily exercise lower blood glucose levels and reduce insulin requiements in a type 1 diabetic.

Help Received
Mother was my test subject.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Jorie A. Moore

Project Number
J1423

Project Title
Investigating the Effectiveness of Various Pepper Extracts as Natural Pesticides in Killing Aphids

Abstract

Objectives/Goals
The purpose of my project is to test the effectiveness of different kinds of pepper extracts as a natural pesticide in controlling and killing aphids. If a natural pesticide works the same or better than a chemical pesticide the natural pesticide could be an effectve alternative in destroying this pesty insect. Natural pesticide would be less harmful to the environment.

Methods/Materials
To conduct my experiment I collected four types of peppers commonly found in stores. I used a blender to help in extracting the solution from the peppers. I gathered over 100 cottonwood leaf galls which contains live aphid colonies at various stages of development. A opened gall (with aphids) was placed in plastic cup container. I sprayed equal amount of pepper extracts onto the live aphids in the cup and observe reaction of aphids to the spray. 20 test trials was done for each test variable. My control was aphids sprayed with only water.

Results
After completing my project I found that the highest percent of aphids killed on day 1 (immediate killed) was with the serrano and habanero peppers with 47% of aphids killed. The control had 0% on day 1. On day 4 the serrano was most effective with 92.5% killed and lowest percent was bell pepper with 72.5% killed. Control had 32.5% aphid dead on day 4.

Conclusions/Discussion
In conclusion, the pepper extracts proves to be an effective chemical in killing aphids. Most peppers contains capsacin at various amounts and this seem to be the main ingredient in killing the insect. Natural chemicals is always better than man-made chemicals for our environment.

Summary Statement
Determining if pepper extracts are effective in killing aphids.

Help Received
Carl Gong, Sanger Unified Science Coordinator helped with project suggestion. Mrs. Cloud guided me.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Taylor S. Parkinson

Project Number
J1424

Project Title
The Battle of the Energy Drinks

Abstract

Objectives/Goals
The objective of my project is to determine if higher caffeine content in an energy drink increases heart rate the most. I believe the higher the caffeine content in an energy drink, the more it will increase a person's heart rate.

Methods/Materials
Four different energy drinks were used for this experiment: Red Bull, Amp, Monster, and Rockstar. Six subjects were tested. Two of the subjects were caffeine tolerant(the subjects drink coffee and energy drinks on a regular basis). Two of the subjects do not drink caffeine on a regular basis. The final two subjects were children(11 year olds). The heart rate of each subject was measured before drinking the energy drinks. Each subject was asked to drink one of the four energy drinks. When the energy drink was consumed, the subject's heart rate was measured every 15 minutes for an hour. This process was repeated for each subject on seperate days until all four energy drinks were consumed. Only one energy drink was consumed per day for all subjects.

Results
Rockstar, with a caffeine content of 150 mg, increased the heart rate the most peaking at 30 minutes for all six subjects. All six subjects rated Rockstar as the strongest energy drink and indicated that the effects of this energy drink lasted the longest.

Conclusions/Discussion
My conclusion is that caffeine content has an important role in judging hwo much an energy drink will affect the heart rate. Energy drinks with higher caffeine content will increase heart rate more.

Summary Statement
Finding how caffeine content in energy drinks affects heart rate.

Help Received
Mom helped paste work on board.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Julia Pinto

Project Number
J1425

Project Title
Is It A.D.D. or the Effects of MSG?

Abstract

Objectives/Goals
To see if the consumption of fast foods containing high concentrations of monosodium glutamate (MSG), such as Doritos Cooler Ranch chips at 500mg/1oz serving, cause the symptoms of Attention Deficit Disorder (ADD) in children, and is a possible cause of misdiagnosis of ADD.

Methods/Materials
100 subjects, grades 4-6 were given pre and post attention tests before and after (3 hrs.) consumption of 1oz packets of Doritos Cool ranch chips with 500mg of MSG.

Results
90% of subjects exhibited signs of deterioration in "levels of attention". 9% of subjects exhibited little or no deterioration in levels of attention. 1% showed improved levels of attention.

Conclusions/Discussion
The results indicate that consumption of MSG may lead to a misdiagnosis of ADD with subjects exhibiting the main diagnostic symptom of ADD, deterioration in levels of attention.

Summary Statement
This project was examining whether the consumption of monosodium glutamate (MSG) causes deterioration of levels of attention in children, leading to the misdiagnosis of Attention Deficit Disorder (ADD).

Help Received
Pediatrician Ashley Barboza, M.D. assisted with test approvals and interpretations for the levels of attention.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Madison J. Russell

Project Number
J1426

Project Title
The Effect of Fertilizer on the Hatching Rate of African Dwarf Frogs

Abstract

Objectives/Goals
The purpose of my project is to determine if run off water from fertilizer will effect the eggs of amphibians. The African Dwarf Frog Egg is representing amphibians. Amphibians are very vulnerabel to changes in the environment. Fertilizer run-off is a problem with the growing population of people moving close to natural streams and rivers. How much fertilizer does it take for the water to become dangerous to the eggs.

Methods/Materials
First I simulated run off water. I mixed 1/2 cup of fertilizer with 1 gallon of water. (recommended amount). Next I took a sample of lawn from our backyarc. Placed the lawn over a bowl and filter. I hen sprayed the lawn with fertilizer solution and let it filter through the lawn into acup that was already 1/2 full. This simulated runoff water into a stream or lake.
Next I placed the cup into a tank with waster that was 80 degrees. I allowed the runoff water to reach the same temperature. Once it reached 80 degrees I placed 5 frog eggs into the cup. I then checked for the hatching rate of the eggs.
Variables - 5 cups for each variable for a total of 50 eggs
1/2 cup fertilizer to 1 gallon of water - 1/4 cup solution - 1 cup solution - control (no fertilizer)
200 total eggs

Results
control - 48 of 50 eggs hatched within the first three days. 2 eggs never hatched
1/2 cup fertilizer solution - 7 eggs hatched within first 7 days none survived after that
1/4 cup fertilizer solution - 9 eggs hatched within first 4 days none survived after that
1 cup fertilizer solution - 0 eggs survived

Conclusions/Discussion
Fertilizer had a very harmful effect on the hatching rate of amphibians. Even the less that recommended amount was extremely harmful to the eggs. I was very surprised at how harmful this was. The nitrates in the fertilizer affected their ecosystem enough to do a lot of damage.
With the human population continuing to grow closer to natural streams and lakes we must be very careful in not allowing our runoff waster from lawns, gardens, or farms, to reach these areas. It is very damaging to these animals and can eventually destro their ecosystems.

Summary Statement
Determining if fertilizer from runoff water will have a harmful effect on amphibian eggs.

Help Received
Dad helped get eggs, and helpd with getting supplies for experiment. Dad helped with board.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Amy L. Schultz

Project Number
J1427

Project Title
Killer Karts

Abstract

Objectives/Goals
My objective is to see whether wiping down grocery cart handles reduces bacterial growth and which of 3 different disinfectant wipes prevents the most bacterial growth.

Methods/Materials
For each of 3 different disinfectant wipes, 3 wipes were used to wipe down 9 randomly selected grocery cart handles. The cart handles were swabbed with a sterile swab after drying for 30 seconds and cultured on sterile agar plates. An additional 3 cart handles were swabbed without being wiped by any disinfectant wipe and cultured on agar plates. Three agar plates were also cultured with a sterile swab and used as controls. The plates were then incubated for a total of 96 hours with the number and appearance of bacterial colonies recorded for each plate. The experiment was repeated 2 more times for a total of 3 trials. The growth of bacteria was compared by totaling up the number of colonies found for each type of wipe, nondisinfected and control plates.

Results
The control plates had 0 bacterial colonies at 96 hours. The non disinfectant plates had a total of 377 colonies at 96 hours. The SaniCart Wipes plates had a total of 6 colonies at 96 hours. The Wet Ones Antibacterial Towelettes plates had a total of 6 colonies at 96 hours. The Clorox Disinfectant Wipes plates had a total of 3 colonies at 96 hours.

Conclusions/Discussion
My conclusion is that the disinfectant wipes significantly reduced the number of bacterial colonies growing. I also conclude that the Clorox Disinfectant Wipes were slightly more effective at reducing the growth of bacteria than either the SaniCart Wipes or the Wet Ones Antibacterial Towelettes.

Summary Statement
Which of three wipes disinfects grocery cart handles best?

Help Received
My mom helped me type my report and assisted me in my experiments. My dad helped me graph my data, take pictures of the plates and helped with my display

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Hanna L. Seltz

Project Number
J1428

Project Title
Snails: The Pest of the Ages

Abstract

Objectives/Goals
The purpose of my experment was to find a natural non-toxic material that can repel snails without killing them, and to see if the materials that prove effective will still work after 24 hours, and every day after that up to a week.

Methods/Materials
I put snails in different tubs with a plant and the test material separating them, and tested ten times for each material. If at least five of the ten snails crossed the material to the plant, I concluded it was ineffective against snails, and vice versa. The materials that did prove to be effective I tested the next day, until they became ineffective. I tested with 7 materials: the mineral lime, ash, cinnamon, bay leaves (sliced and fresh), eucalyptus leaves (whole and from the ground), sand, and human hair.

Results
Cinnamon, bay leaves, ashes, and lime all proved to be effective against snails after being freshly laid out. Sand, hair, and eucalyptus leaves proved to be of little effect against snails even when freshly laid out. After being out for 24 hours, only lime and the ashes worked well, so I tested them every day up to for a week, and they proved to repel most of the snails every time.

Conclusions/Discussion
Lime and ash would both be ideal for gardeners to use against snails.
However, I did not find any materials that are completely foolproof that commercial farmers could use, as I had hoped. The lime would be ideal to protect some commercial produce, but it depends on the pH of the soil. Lime increases the pH of the soil. Therefore, if the soil has a low pH, the lime would actually enrich the soil, but the lime would degrade the soil if it had a high pH.

I can now answer my question. Yes, there are natural non-toxic materials that can repel snails without killing them: lime, ash, chopped-up bay leaves, and cinnamon. However, ash and lime are the only materials which still proved effective after 24 hours, and every day after that up to a week.

Summary Statement
The purpose of my experment was to find a natural non-toxic material that can repel snails without killing them, and to see if the materials that prove effective will still work after 24 hours, and every day after that up to a week.

Help Received
My mother and teacher helped edit my report. Interviewed Doug O' Brian, a pest control consultant for organic farmers.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Isabelle R.P. Sico

Project Number
J1429

Project Title
Tough on Germs?

Abstract

Objectives/Goals
The objective of my project was to test whether or not anti-bacterial soap really kills more bacteria than regular soap, and which is the best soap on the market for both categories. My hypothesis is that Dial Complete Gold will produce the least bacteria and be the best tested soap, since it#s the most advertised soap on the market.

Methods/Materials
This project tested two categories of soap, anti-bacterial and regular, with 4 soaps in each category. These soaps also acted as the variables of this experiment. The anti-bacterial soap category consisted of Dial Complete Gold, Clean and Smooth liquid soap, Bath and Body Works Cotton Blossom, and Safeguard White. Regular soaps included Softsoap Aloe Vera, Dove moisturizing hand soap, Yardley London Natural Oatmeal & Almond, and Pure & Natural. Potting soil was used to dirty my hands, as I washed them under warm water with one tsp. of testing soil for 2 minutes. My left index finger was then swabbed for existing bacteria and rubbed on Petri dishes of Tryptic Soy Agar with 5% sheep blood. These dishes were left to sit in a warm area for 2 days or 48 hours as I recorded data and other important information.

Results
The results in this experiment proved that Safeguard White was the best overall soap, and in its category of anti-bacterial soap. However, Softsoap Aloe Vera proved to be the best soap in its regular soap category. These two soaps consistently produced low amounts of bacteria through both experiment A and B.

Conclusions/Discussion
Through this experiment, I have concluded that regular soap and anti- bacterial soap are the same. In experiment B, results proved that both groups of soap produce the same amount of bacteria. Although regular soap can produce safer bacteria, the bacteria not destroyed by anti-bacterial soap or the #super bugs# are dangerous and cannot be destroyed by the common antibiotic. These results did not match my hypothesis and was proven in experiment B, when Dial Complete Gold grew the most bacteria. This experiment has proved that regular soap and antibacterial soap produce the same amount of bacteria and therefore one is not better than the other. I believe that this experiment will inform others of the types of soaps they should purchase and of false marketing ads.

Summary Statement
This project tests antibacterial soap and regular soap, and how it affects its bacterial growth.

Help Received
Mother swabbed finger, sister took pictures

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
San Singh

Project Number
J1430

Project Title
Curcumin vs. Cancer: The Effects of Curcumin on MCF7 Breast Cancer Cells and A549 Lung Cancer Cells

Abstract

Objectives/Goals
The purpose of this experiment was to observe the effects of curcumin on cancer. Cancer is a disease of genes which causes cells to mutate and then spreads throughout the body. It can often be a fatal disease, if not treated early. Curcumin is a substance found in a commonly used household spice as turmeric that has anti-proliferative and anti - inflammatory properties. My hypothesis stated that curcumin would have a devastating effect on the MCF7 and A549 cancer cells. Due to the fact that cancer is believed to be caused by forms of inflammation, I believe that the curcumin will have an adverse effect on the cancer cells.

Methods/Materials
MCF7 breast cancer cells, A549 lung cancer cells, 240 micromolars of curcumin, 1 stocked cell culturing lab, 4 twelve well plates, 1 incubator, 1 pipetter, 50 pipets (1mL, 5mL, 10mL), 1 Coulter Counter, 1 Microscope, 1 safety gear, and 1 Computer.

1. Obtain all needed materials
2. Using the Coulter Counter, place 150,000 MCF7 cells in each well of two twelve well plates. Repeat the process with the A549 cells in the remaining plates. Label them. One set should be for 24 hours, the other should be for 48 hours. Within these, there should be a row of wells labeled Control(0 micromolars), as well as Low Dose(10 micromolars) and High Dose(50micromolars).
3. Take pictures of the cells as they are now with the microscope before treatment.
4. After 24 and 48 hours, take pictures of the plates, trypsinize the cells, and count the number of cells left with a Coulter Counter.

Results
I observed that the curcumin treated cells' population was reduced to a mere 2% of what it was originally. I also observed that the cells to which no treatment was done almost doubled in population, due to the accelerated proliferation of cancer cells, which is one of the reasons they are so deadly.

Conclusions/Discussion
I discovered that my hypothesis was correct and that curcumin had a severe effect on the cancer cells. My findings can be used by researchers trying to create drugs that can reduce the symptoms of cancer. It can also be incorporated in the diets of cancer patients in order to alleviate or even cure the disease.

Summary Statement
The goal of my experiment was to determine the effects of curcumin on MCF7 breast cancer cells and A549 lung cancer cells using multiple doses of curcumin after time intervals of 24 and 48 hours.

Help Received
Used lab equipment at University of Pacific under the supervision of Dr. Jesika S. Faridi and graduate student Mr. Ashish Sawhney. I would also like to thank Ms. Solaegui, our school's science fair coordinator for her support and guidance.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Nicole N. Soukaseum

Project Number
J1431

Project Title
Determining the Toxicity Level of Perfumes and Colognes

Abstract

Objectives/Goals
My goal for this science competition is to just havve a great time. If I don't win I will still be proud of myself knowing that I did my best.

Methods/Materials
Materials: 1. perfumes (Calvin Klein, Fantasy, Curious); 2. colognes (Axe, Tag, Polo Sport); 3. 105 live crickets; 4. 35 cups; 5. 35 cottonballs; 6. stopwatch; 7. siran wrap; 8.35 rubber bands.

Procedure: 1. spray cottonball with either perfume or cologne; 2. place sprayed cottonball into cup; 3. place 3 live crickets into cup with cottonball; 4. put plastic wrap over cup; 5. put rubber band around siran wrap to keep in place; 6. time how long it takes for the crickets to die; 7. repeat each step and additional 4 times totaling 5 trials.

Results
In my investigation of finding the toxicity level of perfumes and cologne, perfumes were the most toxic. The total average of all perfumes is 94.6 seconds. The most toxic perfume was Calvin Klein with an average death rate of 84.2 seconds. The least toxic was Fantasy with an average death rate of 106 seconds. The perfume that was neither most or least toxic was Curious with an average death rate of 93.8 seconds

As for colognes, it did not result of being the most toxic overall. The total death rate of all perfumes was 105 seconds. The most toxic cologne was Axe with an average death rate of 74.4 seconds. The least toxic was Tag with an average death rate of 123.4 seconds. The cologne that was neither most or least toxic was Polo Sport with an average death rate of 117.4 seconds.

Conclusions/Discussion
After completing my project on finding the toxicity level of perfumes and colognes, I learned that they are toxic. Since perfumes and colgnes are used on a daily basis, I would suggest to people to watch what and where they are spraying their fragrances. The should be aware of that because it may be sprayed near children and/or babies and also near people who have allergies. Doctors have also stated that people can die because of this.

Summary Statement
The purpose of my project is to find the toxicity level of perfumes and colognes and how they can affect your health.

Help Received
Dad helped with purchasing materials and science board; Sister helped with transportation to CSSF; Science teacher helped with writing; Computer teacher helped with making graphs.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Robin T. Trumble

Project Number
J1432

Project Title
Capsaicin Antagonists

Abstract

Objectives/Goals
To find the best way to counter the effects of capsaicin in four hot sauces including pure habanero (very hot), Susie's Calypso(hot), Marie Sharp's (medium) and Melinda's (mild.)

Methods/Materials
I went to Cannery Row and set up a table. Subjects volunteered to take part in the experiment. I gave them their choice of any of the four hot sauces listed above. I did not let them choose the antagonist. The antagonists were: water; orange juice (a mild acid); a sugar solution (lemonade); Milk of Magnesia (a common household base) and milk. I used a stop watch to time how fast it took for the effects of the capsaicin to wear off. I assigned each subject a unique identifier and recorded data including the hot sauce I gave them, the antagonist I gave them, how long it took for the effects of the hot sauce to wear off and the subjects' ages. Over two weekends, I tested 100 subjects.

Results
While there are no known antidotes to the crystalline alkaloid capsaicin -- the substance that makes chili peppers "hot" -- some dietary antagonists appear to work better than others for fiery food first aid. My sampling of test subjects showed that sugar was the most effective, with milk and acid (orange juice) coming in second.

Conclusions/Discussion
There is something in sugar -- and secondarily, milk and acid -- that counteracts the effects of capsaicin. Also, younger people recover more quickly from the effects of capsaicin. This means that capsaicin doesn't work on tastebuds but on some other sense receptor (since younger people actually have more tastebuds than older people, so if it worked on tastebuds younger people would recover more slowly.)

My sample size was only one hundred. Before the State Science Fair, I'm going to test more subjects to see if the results change.

Summary Statement
While there are no known antidotes to the crystalline alkaloid capsaicin -- the substance that makes chili peppers "hot" -- some dietary antagonists appear to work better than others for fiery food first aid.

Help Received
My parents own a hot sauce store. They helped me by providing the hot sauce & pointing me to good news stories and reference materials.

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Maly Vang

Project Number
J1433

Project Title
The Effects of Air Pollution on Mosquito Larvae

Abstract

Objectives/Goals
My objectives is to see if air pollution affects mosquito larvae.

Methods/Materials
The steps of my project is simple. First get 15 larvae into the beaker, then put beaker into the fish tank. Start a pollution (car exhaust, paint fumes,wood smoke). Test the polluiton for 2 min. After you tested put the beaker into a container with a screen and rubber band. Leave the container under the light for 5 days so it'll go through its life cycle.

Results
The most harmful pollution was wood smoke, then paint fumes. The least harmful was car exhaust.My objective is to see if air pollution affects mosquito and from what my results shows wood smoke was the most harmful.

Summary Statement
The purpose of my project is to determine air pollution affects on mosquito larvae.

Help Received
Father help get mosquito larvae; Teacher provides materials like beakers, eye droper, etc..

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Gurleen K. Virk

Project Number
J1434

Project Title
Determining the Longevity of Insecticide in Different Soil Types

Abstract

Objectives/Goals
The purpose of my project is to determine the longevity of insecticide in different soil types. I am using crickets in my investigation. I will be putting insecticide on different soil types and see how long the insecticide takes to kill the crickets each day. I would like to figure this out, because many farmers and gardeners use variuos types of insecticide and it will be easier for them to know when to reapply the insecticide. Though the bottles tell when to reapply some may be wrong.

Methods/Materials
I will be using sand, loam, and clay soil for my investigation. I will also be using crickets. For my control group I will use 1 container for each soil and fill it up with 1 cup of soil. Then I will place 2 crickets into the container and put a lid on top which has holes in it so the crickets can breath.

For the actual tests I will use 5 containers filled with 1 cup of soil. Then I will put 2 teaspoons of insecticide and let it set for 1 hour. Next, I will place 2 crickets into the container and record how long it takes for the crickets to die. I will keep doing these steps until the death rate reaches about 6 hours. Then I will dispose the soil and wash the containers throughly. Finally, I will do all these steps again so I will have a total of 10 trials.

Results
For the results, the sand soil took the least amount of time to kill the crickets and the clay soil took the most amount of time to kill the crickets. The sand soil took an average of 4,894 min to kill the crickets in the control and it took 106.12 min for the crickets to die in 5 days in the actual test. For the loam soil, in the control it took 5,826 min. and in the actual test it took 175.72 min. to kill the crickets in 5 days. For the clay soil, in the control it took 5,043 min. to kill the crickets and in the actual test it took 230.95 min. to kill the crickets in 5 days.

Conclusions/Discussion
In conclusion, the sand soil took the least amount and the clay soil took the most amount to kill the crickets. for farmers that use sand soil they should reapply withtin 5 days and for loam soil they should reapply within 3-4 days. Finally, for the clay soil they should reapply within 2 days. This is only if you are using pure sand, loam, or clay soil.

Summary Statement
The purpose of my project is to see how long it takes for insecticide to kill crickets in different soil types every day.

Help Received
Susan Wright helped edit my papers; Dad helped put things on board

CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Haley F. Washburn

Project Number
J1435

Project Title
Which Vinegar Works the Best as a Disinfectant?

Abstract

Objectives/Goals
My goal for this project was to determine if vinegar worked to effectively prevent the growth of bacteria. I felt that if it was a successful antibacterial agent; it would be a much better alternative to store bought cleaners that have harsh chemicals in them. I also felt that this would be better for the environment because vinegar is safe to consume as a food product.

Methods/Materials
I had 5 different test substances for this project, they were white wine vinegar, red wine vinegar, garlic wine vinegar, apple cider vinegar, and a control group of distilled water. For each test I would streak a sterile petri dish that was filled with nutrient agar with a cotton swab that was contaminated with the Bacillus subtilus bacteria. Then I would lightly dip an absorbent dot in the test substance and place it on the contaminated agar. These steps were repeated for a total of twenty tests per test substance. After all twenty test dots were in place and properly labeled I set the dishes in a warm dark drawer. After 72 hours I removed all of the dishes and measured the area of inhibition surrounding each test dot. These measurements were then logged in my log book. I measured the area of inhibition again at the 96 hour point.

Results
The results of my testing showed that all of the test vinegars were successful to some degree. Apple cider vinegar and distilled white vinegar were both extremely successful in preventing the growth of the Bacillus subtilus bacteria. After 72 hours both test substances had an average area of inhibition in the 27mm range. However, after 96 hours the apple cider vinegar had the largerst average area of inhibition at 25.6mm. My control group of distilled water was unsuccessful in the prevention of bacteria growth.

Conclusions/Discussion
After completing my science project I found that my hypothesis was wrong. My hypothesis stated that distilled white vinegar would work the best as a disinfectant. Through my testing I discovered that all of the test vinegars worked to prevent the bacteria growth, but it was the apple cider vinegar that worked the best. I learned alot about vinegar and its different uses during the research phase of this project and after completing the testing phase of my project I am more convinced than ever that vinegar would work well as a disinfectant. I believe that it would be a safer alternative to the harsh chemicals that are in most store bought cleaners.

Summary Statement
I wanted to determine which type of vinegar would effectively work as a disinfectant.

Help Received
Mr. Carl Gong supplied the petri dishes and Bacillus subtilus bacteria. He also helped with my experimental flow chart. Mrs. Hillary Cloud reviewed all written work. My mom helped to type the written work and photograph the experiment process.