CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Sean I. Atamdede

Project Number
J1501

Project Title
Animal Magnetism: How Does Magnetism Affect the Rate of Regeneration in Planaria?

Abstract

Objectives/Goals
The use of magnets is believed to increase the rate at which tissue damage heals. Planaria are known for their documented ability to regenerate when cut into pieces. My goal is to determine if increasing magnetic strength will increase the rate of regeneration in planaria.

Methods/Materials
Twenty four planaria were divided into 6 groups of 4 each and each group placed in a sectioned Petri dish with spring water. Sixteen planaria (groups 1 through 4) were bisected horizontally, halfway between head and tail. Group 1 was exposed to no magnets, and groups 2 through 4 exposed to increasing magnetic strengths. Groups 5 and 6 were left whole, with group 5 exposed to no magnets and group 6 exposed to the maximum strength of neodymium magnets used in this experiment. They were observed and measured over three weeks and results compared. The spring water was changed every three days and the dishes kept in a darkened cabinet to provide a clean and natural environment for the planaria.

Results
The bisected planaria all regenerated new heads and tails but at rates that decreased with the increasing magnetic strengths. The halves with an itact head regenerated a new tail faster than the halves with an intact tail regenerated a new head. The whole planaria exposed to the strongest magnetic strength grew much more slowly than those exposed to no magnets.

Conclusions/Discussion
It appears that magnetism actually decreased the rate of regeneration in the bisected planaira as well as the rate of growh in the intact planaria.

Summary Statement
I used increasing strengths of magnets on bisected and whole planaria to test the popular belief that magnetism can increase the rate of tissue regeneration and wound healing.

Help Received
My mom took pictures of me dissecting a planaria specimen and with my completed set-up of my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Abigail Z.E. Bairrington

Project Number
J1502

Project Title
Fighting for Phytoplankton

Abstract

Objectives/Goals
My project was to simulate the effects of Global Warming with increased temperature and carbon dioxide enriched environmental variables, and to document the survival of the marine phytoplankton Nannochloropsis in those treatments compared to a control.

Methods/Materials
Three species of marine phytoplankton were obtained from the HSU Marine Lab. Three treatments were set up: increased temperature only, carbon dioxide enriched only, increased temperature and carbon dioxide enriched, and a set of controls in two greenhouses. Using a microscope, the number of surviving cells in the three treatments and controls were counted in three replicates daily.

Results
In the increased temperature environment, or treatment, the phytoplanton grew slower and began to die off quicker than the control. In the carbon dioxide enriched treatment, the phytoplankton grew quicker and died off slower than the control. In the carbon dioxide enriched and increased temperature treatment, the phytoplankton grew slower and died off slower than the control.

Conclusions/Discussion
Phytoplankton are affected by Global Warming. The increased temperature decreases the survival rate of Nannochloropsis and was more of a factor than the enriched carbon dioxide treatment. Since phytoplankton are at the bottom of the food chain and are a major producer of the world's oxygen, their survival can influence the ecosystem of our oceans and the planet. To reduce this threat we must keep the balance of nature and clean up the environment.

Summary Statement
My project is about the effects of Global Warming on the survival of the phytoplankton Nannochloropsis.

Help Received
Original phytoplankton cultures were supplied by HSU Marine Lab, and Dad helped type the report.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
James P. Beattie

Project Number
J1503

Project Title
Butterflies over Pollution

Abstract

Objectives/Goals
The objective of my project is to determine the influence of chemical and particulate pollution on the Painted Lady (Vanessa cardui) butterflies undergoing metamorphosis.

Methods/Materials
I tested five groups, each containing six larvae, with ash, tap water, 2.5% acetic acid and 2.5% sodium hypoclorite, along with a control group, to see how these substances influenced their metamorphosis from the larval to the imago stage. Specifically I measured the time spent to form a chrysalis and the time spent within it before emerging.

Results
The tap water group took a longer time than the control to form their chrysalides, but both took the same amount of time to emerge. The acetic acid group formed their chrysalides in the same amount of time as the controls, but took three days longer to emerge. The ash group took a longer time to both form and emerge from their chrysalides. The sodium hypochlorite group did not survive long enough to participate in the entire experiment as five out of six died.

Conclusions/Discussion
Chemical pollution of both bases and acids, along with particulate matter such as ash, influences the time needed for a Painted Lady (Vanessa cardui) butterfly to both form a chrysalis and to develop within it before emerging. These insects have developed adaptive mechanisms that allow them to withstand and overcome minor onslaughts during metamorphosis.

Summary Statement
Chemical and particulate pollution does have an influence on the metamorphosis of Painted Lady (Vanessa cardui) butterflies.

Help Received
Mother helped transcribe information from letterboard and type report. Mother helped in mechanical construction of display.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Page B. Benoit

Project Number
J1504

Project Title
Ten Little Teeth and How They Dissolved!

Abstract

Objectives/Goals
The purpose of my experiment was to examine the affect of certain liquids on teeth. I wanted to find out if the teeth would dissolve more (get lighter) the higher the acidity of the liquid. My hypothesis was that the teeth in the most acidic liquid would dissolve the most (lose the most weight).

Methods/Materials
I got ten teeth from an oral surgeon. At a dental office, I put on protective clothiing and cleaned the teeth with an ultrasonic cleaner and steam sterilized them in an autoclave. Once cleaned, I put each tooth in a numbered jar, labeled 1-10.I filled two jars with: distilled water, soymilk, Coke, vinegar and lemon juice. I used two teeth in each liquid in an effort to replicate my results. I let them sit in the liquids for one week. Then I cleaned the teeth and jars, weighed the teeth and put them back in their jars with fresh liquid. I repeated this procedure for three weeks.I also measured the acidity of each liquid.

Results
Vinegar and lemon juice were the most acidic liquids with a pH of 2.0. The teeth in these liquids lost the most weight. They also changed the most in appearance. I had two unexpected results. The first was that soymilk dissolved the teeth more then Coke. Coke was acidic at a pH of 2.5 while soymilk was basic at a pH of 8.4 but both the teeth in the soymilk lost more weight. The second interesting result was that distilled water had a pH of 4.7. That is slightly acidic and more acidic then the soymilk. That was unexpected because I thought distilled water was my neutral liquid. I went on the internet and found that distilled water is very reactive to carbon dioxide and when they combine they make acids.

Conclusions/Discussion
My results supported my hypothesis. The teeth in the most acidic liquids lost the most weight. I learned in my research that the acids react chemically with the calcium and minerals in the enamel and dissolve them. I think my experiment showed this happened. This is important because now people know what's happening in their mouths when they drink these liquids and don't brush their teeth. They are at risk for more cavities. Many people might have speculated that Coke was the worst drink for your teeth but my results suggest lemon juice or vinegar, often found in drinks and salad dressings, might be of more concern. The bottom line is to brush after every meal!

Summary Statement
I put ten human teeth in five different liquids, varying in acidity levels, for three weeks and found that the teeth in the most acidic liquids lost the most weight and changed the most in appearance.

Help Received
Father helped purchase teeth, at the dental office,and on the internet to purchase items and do reasearch, Mother helped type and proof read.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Gregory J.C. Brostek

Project Number
J1505

Project Title
Plant Cancer: Can It Be Treated?

Abstract

Objectives/Goals
My objective was to see if I could effectively treat the Agrobacterium tumefaciens bacteria caused tumors on tomato plants with natural and pharmaceutical agents, and which would work best. My hypothesis was that Amoxicillin would be most effective.

Methods/Materials
Innoculate 5 healthy tomato plants with the Agrobacterium tumefaciens bacteria. Document and observe for 9 days the growth of tumors on the plants stems. Measure the diameter of each tumor on day 10, puncture the tumor to allow penetration, and treat each plant's tumor topically with a different agent every other day. Agents used were garlic, tea tree oil, Vitamin C, Amoxicillin and distilled water as a control. Every 4 days tumors were measured and results noted and documented.

Results
Control tumor increased in size 300%, Garlic treated tumor increased in size 233%, Amoxicillin treated tumor increased in size 167%, Vitamin C treated tumor increased in size 100%. Tea Tree Oil killed the tomato plant so there were no comparative results. Vitamin C was the most effective in limiting the size of the tumor.

Conclusions/Discussion
My hypothosis was wrong. Vitamin C was the most effective treatment. Amoxicillin did have a favorable response but it is not practical since the antibiotic would enter the fruit and be ingested by people which is not healthy, nor cost effective. Garlic was slightly effective and may have worked better in a stronger concentration, but the garlic taste would transfer to the tomato which is an undesirable side effect. The terpents in the tea tree oil applied topically were too strong of an agent for the tender tomato plant. Agrobacterium tumefaciens bacteria is unique because it transfers part of it's DNA to the plant and integrates into the plant's genome. I believe the Vitamin C worked best because after doing research I found that it is an antioxidant. Antioxidants neutralize the free radical and nitrate cells and minimize the oxidative damage to the DNA. Knowing my results I would like to do this experiment again but I would only use Vitamin C, at different concentrations and I would administer it systemically through the soil. The challenge would be to reduce the size of the tumor without causing the tomato to take on a strong acidic taste from the Vitamin C. The findings in my experiment lend creedence to the practice of using natural antibiotics with possible benefits of supressing the formation of tumors in people.

Summary Statement
My project is about the effectiveness of various natural and pharmeceutical antibiotics in treating the Agrobacterium tumefaciens bacteria .

Help Received
Mom helped with applying for the USDA live pest permit and took photos.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Brenna A. Callero

Project Number
J1506

Project Title
Mosquito Larvae Beware! An Eco-friendly Approach to the Elimination of Mosquito Larvae

Abstract

Objectives/Goals
My objective was to study the current larvacides and their effects on the mosquito and then make my own plant extracts from plants found in Ventura County to determine whether these plant extracts could have a lethal effect on mosquito larvae. I studied and tested 28 plants found in, and around Thousand Oaks and determined that certain plant extracts were very effective in killing the mosquito at the larval stage. I extended my research to include the copepod, which is a small crustacean with a great appetite for mosquito larvae. I decided to mix these creatures with my most lethal extracts to determine whether I could kill the larvae even faster without harming the other organisms and found I could do so.

Methods/Materials
I will use the simple tea method using ground plant material which I will place inside of coffee filters, tie with a string and add to a jar filled with boiling water. I will then steep the plant bags in order to make a strong plant extract. To set up the mosquito larvae use a beaker, and take 450 ml. of the water from the main source bucket and add to the mosquito breeder jar. Repeat this procedure three times, transferring pond water into each of three breeder jars. Using a Mosquito pipette, add 25 larvae to each of three mosquito breeders. Next, add 2 grams of growth inhibitor (Bti) to each of the three sample mosquito breeder jars. Watch over the jars for 15 days and record number of surviving larvae, if any.

Results
In my results, I found that copepods did a much better job of attacking and killing the mosquito larvae in the water samples and killed them much quicker than the Bti control. When added to the more lethal of the extracts the lethal results were amazing. An insect larvae killer made from plants should be harmless to non-target organisms, harmless to humans and highly effective. Use of plant extracts instead of synthetic insecticide would be cheaper, more effective and environmentally friendly.

Conclusions/Discussion
In conclusion, this experiment proved my hypothesis by demonstrating that there are several plants growing in Ventura County having larvacidal capability. The copepod-plant extract combination effectively and dramatically killed all of the mosquito larvae in an amazingly short period of time, which was also consistent with my hypothesis that copepods combined with plant extracts would be more lethal than just the copepods.

Summary Statement
Eco-friendly elimination of mosquito larvae utilizing natural plant extracts and copepods.

Help Received
Mother drove to Vector control for Mosquito Larvae

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Christine Chen; Marian Slocum

Project Number
J1507

Project Title
Alcoholic... Insects?

Abstract

Objectives/Goals
The objective is to determine how the amount of alcohol affects the lifespans of D. melanogaster fruit flies and R. rohweri fruit flies. It was hypothesized that a 50-50 or 25-75 water-alcohol combination would allow the flies to live the longest. This is because the flies have an alcohol-based diet and water has no nutritional value for the flies.

Methods/Materials
A brief procedure of the experiment is as follows. First, food was made with different combinations of Budweiser, water, and flour. 15 of D. melanogaster were placed in each jar along with the food and a leaf in jars A1- E5, while 10 of R. rohweri, the food, and a leaf in were in jars AA1-EE5. For each type of fly there were five different combinations of water and alcohol, and there was a total of five trials for each variation. The jars were placed in a well-lighted area of a ventilated room that was kept between 75-80 degrees F. Every morning and afternoon for ten days, the number of flies alive was recorded. The data was taken and recorded the same way for every trial.

Results
The results gathered from the experiment proved our hypothesis correct. Both types of flies did live longer in the 50-50 and 25-75 water-alcohol combination jars, but an equal amount of liquids was still the better of the two. The R. rohweri generally also lived longer than D. melanogaster.

Conclusions/Discussion
This experiment demonstrates that a moderation of alcohol, as well as water, is best for fruit flies, and that too much of a supposedly good thing, alcohol, can be bad. This experiment also gathers that home-remedy pesticides including equal amounts of alcohol and water may not work, but will actually lengthen the lives.

Summary Statement
This experiment demonstrates the alcohol tolerance, eating habits, and the effects of diverse potencies of alcohol on the lifespans of fruit flies on two different types of fruit flies.

Help Received
Our parents helped us acquired the materials necessary for the project. Marian#s parents also graciously allowed us to use their home for the experiment.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Logan L. Davis-Wallace

Project Number
J1508

Project Title
Can Soda Cause Abdominal Discomfort?

Abstract

Objectives/Goals
My objective was to find out how many people who drank the amount of fructose contained in 32 ounces of soda would malabsorb the fructose and have abdominal discomfort. My hypothesis was that a minority of the subjects tested would malabsorb fructose and show symptoms of abdominal discomfort.

Methods/Materials
Informed consent was obtained from ten randomly selected people, ages 10 to 52 years old, 5 males and 5 females. After fasting for 10 hours, the subjects were given 8 ounces of water (control group) or 8 ounces of a 20% solution of fructose in water (test group). Hydrogen in the subject#s exhaled air was measured by gas chromatography at 0, 30, 60, 90, 120, and 160 minutes after the fluid was consumed.

Results
In this study more than half the people malabsorbed fructose. In fact, 70% of the people tested malabsorbed the fructose solution and 71% of the subjects who malabsorbed the fructose showed symptoms of abdominal pain, gas, bloating, nausea and/or diarrhea.

Conclusions/Discussion
The results of my study did not match my hypothesis. The majority of the subjects malabsorbed the fructose in 32 ounces of soda and had abdominal complaints. The reason I did this study was because fructose is used to sweeten more and more drinks such as juices, energy drinks, sports drinks, as well as soda. People are drinking more of these beverages in larger quantities than ever before. Little do they know that this could make them feel badly and cause unnecessary doctor visits and tests to see what#s wrong with them. People need to know that drinking lots of soda can have these short terms effects, as well as, having the well known long term effect of obesity.

Summary Statement
My study showed that drinking the fructose contained in 32 ounces of soda resulted in fructose malabsorbtion and abdominal discomfort in a majority of my subjects.

Help Received
My Mom and Dad helped with the board display and study design. The gas chromatograph and supplies used for the fructose hydrogen breath tests were provided by the California Digestive Disease Center. Mr. Karsevar helped with the study design and board display. My friends and family served as study subjects.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Saira Delgado

Project Number
J1509

Project Title
A Nutritional Analysis of Japanese and American School Lunches

Abstract

Objectives/Goals
My project is to analyze the nutritional values of Japanese and American school lunches.

Methods/Materials
Contacted Kojiya Elementary School in Tokyo, Japan and requested lunch menu. Contacted Sanger Unified School Services and requested lunch menu. A nutritional breakdown of meals served over a 22-day period in Fresno County and Kojiya Elementary School was analyzed and graphed by categories. Calories, fiber, protein, fat, calcium, carbohydrates, vitamin C, sodium, and iron were charted.

Results
Iron content was lower than recommended daily value at 2.3mg; was higher in the United States, at 6.37mg and 277% of Japan#s iron content. Vitamin C was lower than recommended daily value at 24mg, and was higher in the United States, at 55.69mg and 232% of Japan#s vitamin C content. Fiber content was lower than recommended daily value at 4.9g, and was higher in the United States, at 10.62g and 217% of Japan#s fiber content. Calorie content was under the recommended amount at 625kcal, and higher in the United States at 729kcal and 167% of Japan#s calorie content. However, seeing that less calories are healthier, the Japanese menu was healthier. Sodium does not have a recommended daily value in either Japan or the United States. Japan was lower in sodium at 1210mg, and higher in the United States at 2265mg, which was 187% of Japan#s sodium content. Calcium content was higher than recommended at 350mg, and was higher in the United States at 525.35mg, and 150% of Japan#s calcium content. Protein content was lower than recommended at 24.8g, and higher in the United States at 29.02g, which was 117% of Japanese protein. Carbohydrates do not have recommended amounts in Japan or in the United States. Japan's carb content was 101.69g, and the United States was higher at 85.5g. Fat content was higher than recommended at 19.5g, and was higher in the United States at 24.05g, and 123% of Japan's fat content.

Conclusions/Discussion
I discerned that the American lunches were healthier than the Japanese lunches on the menu, but that is if the students take everything from the salad bar. Unfortunately, they do not, which would make the Japanese menu healthier. The explanation for this is Japanese lunches have their vegetables in their menu; there is no salad bar. There is no option for the Japanese students: you have to eat your vegetables. They do eat it, because they eat it at home and at school. It really lowers the obesity count.

Summary Statement
My project is about Japanese and American school lunches and their nutritional values; I analyzed them to find which was healthier.

Help Received
Sanger Unified School District Food Services provided nutritional breakdown; Kojiya Elementary School provided Japanese nutrition spreadsheet

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Eli W. Erlick

Project Number
J1510

Project Title
Red Bull Energy Drink: "Special Ingredients" or a Caffeine and Sugar Effect?

Abstract

Objectives/Goals
Red Bull has been marketed for twenty years yet there is still no definitive proof Red Bull increases energy beyond the effect of caffeine and sugar. My objective is to determine if Red Bull Energy Drink has ingredients other than caffeine and sugar that will increase the heart rate in Daphnia Magna. My hypothesis is that Red Bull will have no effect on heart rate of Daphnia beyond a solution which is equivalent for caffeine and sugar.

Methods/Materials
A solution that has the equivalent concentrations of sugar and caffeine to a Red Bull solution was made. A Daphnia magna was placed on a slide and its heart rate was measured for 15 seconds. Then a drop of Red Bull solution was placed on the slide and the heart rate was again measured. Using a different Daphnia this was repeated 10 times each for a Red Bull solution and the caffeine and sugar solution in three different trials.

Results
The Red Bull solution increased the heart rate of Daphnia by 5.97%, while the caffeine and sugar solution only increased it by 3.11%. The difference persisted throughout all three trials. This resulted in a percentage increase in heart rate of Red Bull compared to sugar and caffeine of 2.86%.

Conclusions/Discussion
My hypothesis was incorrect, the Red Bull did increase the heart rate more than the solution with caffeine and sugar. It is possible that the increase in heart rate in Daphnia may be an indicator of a cardiac stimulant effect in humans that is in addition to the effects of caffeine and sugar in the Red Bull Energy Drink.

Summary Statement
A solution of Red Bull Energy Drink is compared to an equivalent caffeine and sugar solution on its effects on the heart rate of Daphnia magna to evaluate the claim that Red Bull has a stimulant effect.

Help Received
My mother helped me with pouring the solutions into petri dishes, to blind the expiriment.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Geena N. Garabedian

Project Number
J1511

Project Title
Aquatic Herbicides: Wanted vs. Unwanted Effects

Abstract

Objectives/Goals
Copper sulfate is a widely used aquatic hericide. It is used to kill 'weeds' in ponds, lakes and streams. Since it is added directly to water, where other desirable organisms live, I wanted to know if the use of copper sulfate could cause unwanted biological harm to non-target organisms. I investigated if copper sulfate,in similar used amounts, affects cell respiration in general because most cells respirate with oxygen, and if could get into food chains.

Methods/Materials
I first prepared the copper solutions. For cell respiration I soaked pea seeds in 2,4 and 6ppm copper sulfate. I placed the germinating seeds in self-made respirometers made of a test tube,glass tube, and cotton soaked with KOH to absorb the carbon dioxide exchanged for oxygen. Pea seeds soaked in plain water were used for controls. For the food chain investigation I first cultured Daphnia, a fresh water crustacean. Using a spectrophotometer I measured how much copper sulfate was in the water before and after 30 hours with Daphnia and for controls of water with the same starting amount of copper sulfate but no Daphnia.

Results
I did multiple trials on all tests. Cell respiration rates were an ave of .55cm/min for controls but only .35,.24 and .1cm/min for 2,4,and 6ppm exposures respectively. For Daphnia copper uptake, controls changed only an ave. -.026mg/l Cu, while ,after I was careful to rinse water off Daphnia back into test solutions, the ave change of copper in solution was greater at -.75mg/l Cu.

Conclusions/Discussion
I found cell respiration which is essential for many non-target and desirable organisms was slowed by this popular aquatic herbicide. Copper lowering in solutions with Daphnia also suggested it could get into food chains by uptake where fish ,birds and maybe people could be exposed.My hypothesis was supported that copper sulfate could do more harm than just killing aquatic 'weeds'

Summary Statement
Does copper sulfate, an aquatic herbicide, do more biological harm than just kill 'weeds'?

Help Received
Brother helped with graphs, mother with typing, teacher with loan of and instruction on equipment.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Colin M. Gavin

Project Number
J1512

Project Title
The Effects of Nanoscale Particles on Mammalian Cell Viability

Abstract

Objectives/Goals
There is not much is know about the interaction between Carbon Nanoparticles and living organisms. These types of particles have many uses such as drug delivery, catalysts, and cosmetics. The purpose of this project was to test how molecules made of sixty and seventy carbon atoms effect Chinese Hamster Ovary Cells.

Methods/Materials
Plates of cells were treated with eight different dilutions of each type of nanoparticle. Measurements of the percentage of live and dead cells were taken using a fluorescence microplate reader. Measurements were also taken of a control plate that used digitonin to kill some cells.

Results
It was found that the nanoparticles had no significant effect on the cells. Other the range of dilutions the percent of dead cells only varied by 5 percent. These results seem to be valid based on the control assay that we preformed.

Conclusions/Discussion
There are some considerations however. The types of particles we used were limited. The particles could have caused damage to the cells that this test did not measure. Finally, it would have been best to use a lung cell type because the most common vector for exposure to these particles would be inhalation. We can infer that in the scope of this work carbon nanoparticles do not cause significant cell death in Chinese Hamster Cells.

Summary Statement
We used a fluorescence microplate reader to determine the effects of very small carbon particles on Chinese Hamster cells.

Help Received
I used the Cell Culture lab at Molecular Devices Corp. under the supervision of Ms. Carole Crittenden

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Claire M. Haines

Project Number
J1513

Project Title
Pure Glucosamine Sulfate vs. Glucosamine Chondroitin: Which Is the Most Effective Treatment for the Arthritic Horse?

Abstract

Objectives/Goals
My objective was to test the effectiveness of pure glucosamine, which is an amino derivative of sugar, versus a glucosamine which has the additive chondroitin, which is made from shark cartilage. Which would help improve the flexibility and balance of the test subjects, four arthritic horses?

Methods/Materials
Four horses were selected for use in this three week study, based on observable evidence of arthritis in each horse. Each day, two horses were given one cup of grain with 2 ounces of pure glucosamine and two horses were given one cup of grain with 2 ounces of glucosamine with chondroitin. Flexions tests begin by holding up each of the horses legs and bending it as much as possible, holding the position for at least one minute. Observe and record the degree which the horse is able to bend his or her leg. The horse is trotted out immediately after the hoof is put down. The off steps (slight limping and/or stumbling, for example) are counted and recorded. Repeat process for all legs and all horses. Repeat the test 1-2 times weekly and observe and record changes in the horse's condition.

Results
All horses in this study showed positive results. I noticed changes in appearance and behavior. The horses were more supple and moved much better during flat work. By the end of the study, all the horses had fewer observable off steps. In particular, Breeze showed considerable improvement in his back left leg and Count improved drastically in his back right leg. These two horses were given the glucosamine with chondroitin so I would have to say the supplement with the additive had a slight edge.

Conclusions/Discussion
Glucosamine is worth the money. An arthritic horse can not be ridden to the best of his or her ability because that kind of pain leads to limping and poor balance. Most horses, like most humans, will suffer some degree of arthritic pain in their lifetime. As in humans, it is important to treat this condition so your horse can have a happy and long life. My study proves that this is possible. I hope I can find a way to test this supplement on humans, as there is much discussion and controvery over glucosamine's effectiveness on humans. I know that the physiology of the horse is very different from a human's but if we can learn what works with the horse, maybe some of what we test and learn will help with human sufferers of arthritis.

Summary Statement
This experiment showed that glucosamine supplements, both pure and with chondroitin, improves the health and condition of the arthritic horse.

Help Received
Many thanks to Rich and Lauren Allen for letting me use Sweet Dreams, Count and Breeze in this study. Thanks to my own sweet horse, Poco, for being such a good sport. Thanks to my mom and dad who helped with the transportation, funding for the supplements and trot out on very rainy days.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Codi L. Hirsch

Project Number
J1514

Project Title
The Teeter-Totter of Tea

Abstract

Objectives/Goals
My goals were to find out what the effects of Black Tea and Chamomile Tea would have on an adult's heart rate.

Methods/Materials
The materials I used for my procedure were two boxes of Tazo Black Tea, two boxes of Tazo Chamomile Tea, a tea kettle, tea cups, adult participants, a calculator, a stopwatch, and an eight ounce measuring cup.

Results
The results showed that Caffeinated or Black Tea raised an adult's heart rate at an average of 14.2 beats per minute. Chamomile Tea lowered an adult's heart rate at an average of 4.7 beats per minute.

Conclusions/Discussion
In conclusion, I found that by looking at my results, my hypothesis was partly correct. I had thought that caffeine would raise an adult's heart rate at an average of 3 beats per minute and Camomile Tea would lower an adult's heart rate at an average of 2 beats per minute, having a lesser effect on the heart rate than caffeine. The reason why my hypothesis was only partly correct was that my results showed that Black Tea and Chamomile Tea both had a greater effect on an adult's heart rate than I thought. Yet, caffeine did have a greater effect on an adult's heart rate than Chamomile Tea.

Summary Statement
My project is about the effects of caffeine and Chamomile Tea on an adult's heart rate.

Help Received
None

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alexis R. Husak

Project Number
J1515

Project Title
Determining the Effects of Natural Oils in the Death Rate of Mosquito Larvae

Abstract

Objectives/Goals
My goals are to do great at the state science fair and have a fun time doing it.

Methods/Materials
The materials that i used were:20 drops of Cinnamon oil
20 drops of Orange oil
20 drops of Eucalyptus oil
400 Mosquito larvae
40 glass jars
3,000 ml. of distilled water
1 eyedropper

Results
My results were that all of the oils killed each jar effectively just killed them in differnt periods of time.

Conclusions/Discussion
My conclusion is that I would recommend using the cinnamon oil because i was noticing results in about 10 minutes where everything else took a couple of hours.

Summary Statement
Finding an effeicint and natural oil that kills mosquito larvae.

Help Received
Mr4. Turmon helped figure out graphs.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Casey A. LaMar

Project Number
J1516

Project Title
Caffeine: Is It Just Not for Breakfast Any More?

Abstract

Objectives/Goals
Caffeine is a common drug used to improve mental alertness and stamina but can worsen concentration and reasoning. The researcher hopes to clarify how caffeine influences teenager performance during a complex test. It is hypothesized that caffeine will worsen performance by at least 7%. This prediction is based prior reasearch in adult subjects.

Methods/Materials
Test 70 students on two seperate days using a word puzzle of equal difficulty level. Sujects drink 12 oz of soda with blinded caffeine content 20 minutes prior to the test. All tests are timed using a stopwatch and data recorded in a log. Inclusion criteria for final analysis depend on questionaire responses and ability to finish both tests. Needed Materials: Questionaires, word puzzles, timer, soda, cups, and pencils.

Results
Result analysis included 39 students meeting criteria. The average completion time without caffeine was 16.64 minutes vs. 20.76 minutes with caffeine (a 20% difference). A high range in test taking time was seen in both groups. Using each subject as their own control for data analysis showed that 25% did better with caffeine and 75% performed worse with cafffeine (p-value of 0.05).

Conclusions/Discussion
As hypothesized, the results show that caffeine is detrimental for teenagers performing complex tasks. The effect was a 20% slowing of test completion time with caffeine. This was higher than the 7% predicted change in test performance. Teenagers are likely to benefit from avoiding caffeine intake before test taking in school. The results may have been affected by test anxiety and a learning effect. Future studies should include ways to reduce these potentially confounding variables. Using a larger sample size would also help strengthen any conclusion being made from measured results.

Summary Statement
The project showed a significant detrimental effect of caffeine on teenagers when taking a complex test.

Help Received
Mom helped with some typing. Dad helped supervise the test taking. Mrs. Gilllum help provide test time

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alexa E. Lopez

Project Number
J1517

Project Title
What Is the Effect of Radiation and Heat on the Germination of Seeds?

Abstract

Objectives/Goals
My project was to determine how electromagnetic radiation and heat adversely or positively affect the germination of tough coated seeds and weak coated seeds.

Methods/Materials
Materials List: Soft coat seeds, hard coat seeds, oven, cookie sheet, microwave, napkins, permanent marker, zip-lock baggies, water and a dropper, 23 clothes pins, 5 clothes hangers, and a sunny window.

Results
The results of the experiment is out of 36 radish seeds and 36 sunflower seeds, only 3 of the microwaved sunflower seeds germinated compared to 13 of the microwaved radish seeds that germinated.

Dissimilar results happened for the control group of microwaved seeds. Only 1 radish sprouted compared to 5 sunflower seeds that sprouted.

The radish seeds that were baked, did not sprout. The only sunflower seeds that sprouted were the ones that were baked for 1 minute.

Conclusions/Discussion
In conclusion, my hypothesis was not correct. I thought that most of the seeds with the tough coats, which are the sunflower seeds, would grow whether or not they were exposed to the electromagnetic radiation and the heat. And I thought that the radish seeds would not grow because the heat and electromagnetic waves would be too harsh. This showed that heat was worse for the seeds than electromagnetic radiation (microwave oven).

After my experiment, I found that the seeds that germinated were:

a) the control group of radish seeds
b) the radish seeds that were microwaved for 30 and 60 seconds
c) the control group of sunflower seeds
d) the sunflower seeds that were baked for 1 minute.

Summary Statement
Electromagnetic Radiation and Heat Affects the Germination of Hard Coated and Soft Coated Seeds

Help Received
My mother helped me type the report and format the data tables.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Christian A. Louey

Project Number
J1518

Project Title
Magnets and Plants: What Is the Attraction?

Abstract

Objectives/Goals
The objective of the experiment is to determine if magnetism affects the growth of plants.

Methods/Materials
The following materials were used: twenty 2000 gauss magnets, wood blocks to hold magnets, fifty Cherry Belle radish seeds, spray bottle with tap water, and five clear plastic containers filled with approximately nine centimeters of Miracle Gro gardening soil. Five groups were created with each comprising ten seeds. All seeds were planted about one centimeter deep and placed against the sides of the containers. Two groups contained seeds that were pre-magnetized for a period of three days; one with seeds exposed to the northern polarity and the other with the southern polarity. These groups were not further exposed to magnetism after planting. Two groups contained seeds that were constantly exposed to magnets only after planting; one with the northern and the other with the southern polarity. The fifth group of seeds was the control group. Over a period of a month, each group was watered twice a day with six squirts from a spray bottle. The height of the plants was recorded daily.

Results
After a month, the average growth of each group are as follows: seeds pre-magnetized north grew 4.00 cm, seeds pre-magnetized south grew 4.40 cm, seeds constantly magnetized north grew 4.11 cm, seeds constantly magnetized south grew 6.20 cm, and seeds in the control group grew 4.50 cm.

Conclusions/Discussion
The southern magnetic pole enhances the growth of radishes, while the northern pole slightly inhibits the growth. In addition, magnetizing during the growth had a greater impact than simply pre-magnetizing the seeds. Lastly, magnetized seedlings sprouted faster than the control group.

Summary Statement
My project involves how magnetism affects the growth of plant life.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Rebecca J. Mace

Project Number
J1519

Project Title
Fat Fury

Abstract

Objectives/Goals
The objective of my project is to find out which type of fat is the unhealthiest for your body at 98.6ºF.

Methods/Materials
The fats I used were lard, bacon fat, olive oil and butter. I heated-up each of the fats to 98.6 degrees and then I visually observed and measured which fat left the most residue on the plastic wall of the tube. In addition, I used 4 flexible PVC tubes, a thermometer, a measuring cup, measuring spoons and a funnel.

Results
The results showed that the lard left the most residue on the wall of the plastic tube. Olive oil left the least residue in the plastic tube. This was very obvious when visually inspecting the plastic tubes after the experiment was completed.

Conclusions/Discussion
The lard had the most residue left inside the tube therefore it was the most unhealthy for your body. Butter was the second most unhealthy for your body. This surprised me because I thought bacon fat would be the second most unhealthy fat. Olive oil was clearly the healthiest fat in my project.

Summary Statement
I tried to figure out which of the most commonly used fats in our diet are the most unhealthy for the body.

Help Received
Dad helped create the bar graph in the Excel program and type the bibliography.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alden J. Moir

Project Number
J1520

Project Title
The Effect of Different CO_2 Concentrations and High Nutrient Levels on Cyanobacteria Growth

Abstract

Objectives/Goals
The objective of my project is to see if different concentrations of CO2 will help or kill the bacteria. This is important when seeing if the cyanobacteria will help absorb C02 from our atmosphere so that we live in a healthy environment.

Methods/Materials
I used 9 containers hold the cyanobacteria. I put an alga grow growth medium for productive growth in each container. 3 containers held room air with no added co2 while I entered 30% and 60% of the capacity of the containers into the containers using a canister of C02 to refil the containers every other day.

Results
The results i got after three weeks of testing was that the 30% containers grew the best with the room air in second and the 60 % last. To find this I used a sensitive eletronic scale that measures to the thousandth of a gram.

Conclusions/Discussion
After seeing the results I came up with a few conclusions to why they grew a certian way. The 60% grew bad for the fact that the amount of CO2 made it to acidic there fore killing some of itself also it grew not as well because the amount of CO2 I entered pushed out an important nutrient in nitrogen. The room air did not have enough CO2 to carry out photosyenthsis so it grew porely as well. Where the 30% was a balence between the two. My hypothesis was partially correct because i had said the 30% would grow the best but i mixed up my therory when I said the 60% would grow better than the room air like previous experiments.

Summary Statement
My project is about how we can use cyanobacteria to help get rid of greenhouse gasses like C02. I tested different CO2 levels on cyanobacteria to see how much it can absorb

Help Received
Mother helped glue paper; Father supplied equipment and helped with experimental setup

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Rachel M. Nettles

Project Number
J1521

Project Title
The Effect of EMFs on Plant Growth

Abstract

Objectives/Goals
This experiment attempted to determine the effect of electromagnetic fields on plant growth.

Methods/Materials
The initial subjects of this experiment were twenty spearmint plants. Ten of the plants were placed in two wire wrapped cardboard tubes with an EMF (electromagnetic field) inside of it. The other ten plants were placed in the other two cardboard tubes with no EMF inside of it. At the beginning and the end of this experiment, all of the plants were weighed and each stem was measured.

Results
The plants inside of the field had a positive 7% difference in the growth in the amount of four weeks.

Conclusions/Discussion
The fact that the plants inside of the field had a positive 7% difference in the growth in the amount of four weeks shows that the electromagnetic field had an effect on the plant growth.

Summary Statement
This experiment attempted to determine the effect of electromagnetic fields on plants.

Help Received
Mother borrowed equipment, Mr. Huyett helped with designing of the project

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Courtney E. Nickell

Project Number
J1522

Project Title
Scientific Sugars

Abstract

Objectives/Goals
The objective of this project is to find out which sports drink, Gatorade, water, or CytoMax, will affect the human blood sugar level the most when drinking the designated sports drink throughout a seven mile run.

Methods/Materials
Informed consent was obtained from ten volunteer runners. The materials needed were: Glucometer, sterile lancets, alcohol prep pads, test strips, water, Gatorade, CytoMax, and ten healthy, non-diabetic, experienced adult runners. Runners met at the Bike Path in Bakersfield, CA. They were tested for blood sugar levels with a glucometer by a designated tester immediately before the run. Runners then ran seven miles simultaneously on the bike path, all drinking the same amount of the assigned sports drink. Runners were then tested for blood sugar levels again with a glucometer immediately after the run.

Results
The average results of differences in blood sugar levels before and after runs for Gatorade were 30 mg/dl. The average results of differences before and after runs for water were 15 mg/dl. The average results of differences before and after runs for CytoMax were 5 mg/dl.

Conclusions/Discussion
I thought it was very interesting that the blood sugar levels went up after drinking water throughout the 7 mile run. The results confirmed my hypothesis concerning how the three drinks would affect blood sugar levels. The fact that water registered higher blood sugar levels than CytoMax is indicative of the compensation that a person#s body makes when it is not supplied the proper fuel in the short term. Two years ago, I did a science fair project involving the same three sports drinks: Gatorade, water and CytoMax, but testing electrolyte levels. It is interesting to see that CytoMax was superior in keeping both the electrolytes balanced and the blood sugar level consistent.

Summary Statement
The objective of this project is to find out which sports drink, Gatorade, water, or CytoMax, will affect the human blood sugar level the most when drinking the designated sports drink throughout a seven mile run.

Help Received
Mother helped with blood sugar testing. Runners volunteered for blood sugar testing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Regan M. O'Hara

Project Number
J1523

Project Title
Effect of Glucose Levels in Onions: Does the Amount of Sugar in an Onion Affect How Much You Cry when Chopping Onions?

Abstract

Objectives/Goals
Sometimes when I chop onions, my eyes get really irritated. I would like to know why onions irritate your eyes and why some onions cause more irritation than others.

Methods/Materials
Materials: 2 Sweet Maui Onions; 2 Yellow Onions; 2 Red Onions; 2 White Onions; 6 Shallots; 1 Clean, Sharp Knife (9# MAC Mighty brand used by professional cooks) at Room Temperature; 1 Plastic Cutting Board; Glucose Test Strips
Methods: 1. Peel test onions and place in zip lock baggies; 2. Brush a glucose test strip against each of the onions (use a separate, clean test strip for each onion.); 3. Record the glucose level of the onion; 4. Call test subject into room; 5. Explain irritation rating scale to test subject; 6. Have test subject commence with the experiment on each onion using the following procedure: Remove onion from bag #1; Cut a chunk of onion from the larger onion piece; Replace larger onion piece into bag; Commence dicing of test chunk using a clean sharp knife and clean cutting board; Dice onion for a period of 60 seconds (a stop watch was used for timing); Report level of irritation based on irritation scale of; Record results on record sheet and compare the results; Repeat above steps for each kind of onion. (Note: After all five onions were evaluated by each test subject, they were allowed to make adjustments to their irritation level ratings based on irritation experienced relative to the other onions.)

Results
The Yellow Onion (Onion #3) had the least amount of sugar with a level of 100/5 and the lightest green test strip color. The average irritation level for this onion was 3.2, the highest of all of the onions. The Red Onion (Onion #1) was in the 100/5 range of glucose. The average level of irritation for this onion was 2.8. The Shallot (Onion #4) was in the 100/5 range of glucose. The average level of irritation for this onion was 1.8. The White Onion (Onion #2) was in the 250/15 range of glucose and the average irritation level was 1.6. The Sweet Maui Onion (Onion #5) had the highest amount of sugar indicated by the test strip with a level of 500(++)/30 and a color change to brown. The average irritation level for this onion was 1.0, the least of all of the onions.

Conclusions/Discussion
My hypothesis was proved to be correct. The Yellow Onion had the highest level of irritation and the Sweet Maui Onion made the test subjects cry the least.

Summary Statement
An analysis of why onions make you cry when you chop them.

Help Received
Science teacher helped turn question into a science experiment. Mother helped to supervise the subject testing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Elexis S. Padron

Project Number
J1524

Project Title
The Effects of Magnets on Radish Plant Growth

Abstract

Objectives/Goals
To investigate the affects of magnets and magnetic fields on the growth rates of radish plants.

Methods/Materials
MATERIALS : sparkler radish seeds, donut magnets, self-watering miniature pots, plant trays, spray bottle, labels or labelmaker, pen or pencil, ruler, and artificial lighting
METHODS:
1.Filled eight self-watering miniature pots to the top with potting soil.
2.In four of the eight pots, placed two donut magnets about an inch apart. The magnets were attracting each other.
3. Poked two holes in the soil in each pot with the end of a pen.
4. Placed one seed in each hole.
5. Covered each hole with soil.
6. Placed the two different groups in two separate plant trays,forming a small square.
7. Placed each plant tray under artificial light.
8. Sprayed the soil of each plant with a spray bottle four times.
9. Added one cup
10.Labeled one group of four plants as control plants:
11.Labeled the other group of four plants as magnet/plants:
12.Counted each day to the plant#s germination. (The estimated time is 4-6 days).
13.Once the plants germinated, measured their height in centimeters every twenty-four hours.

Results
The results of my investigation indicate that magnets do have an effect on plant growth.
Control group results: On average, the control group grew taller.The leaves were more numerous and taller.The base of the plants were thicker and redder.
Magnet/Plant group results:On average, this group was shorter than the control group.There were fewer and smaller leaves.The base of the plant was flimsy and mainly white.

Conclusions/Discussion
My hypothesis was correct; #the control group will grow taller and faster than the magnet/plant group.# I discovered that the magnets did have an effect on the radish plants. The control group only grew a centimeter or two taller. However, I observed that the main effect was on the leaves and base of the plants.

Summary Statement
My project is about investigating the affects magnets have on plant growth.

Help Received
Father helped type (not write) the introduction as displayed on my display board; Mother helped cut and glue the paper staight.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Anisha Patel

Project Number
J1525

Project Title
Acid Rain

Abstract

Objectives/Goals
How does acid rain affect plant growth?

Methods/Materials
I used a solution of 1% and 2% sulfuric acid as a substitute for acid rain. The rain outside is naturally acidic because the water molecules in the air combine with the carbon dioxide in the atmosphere to form carbonic acid. Acid rain occurs when sulfur dioxide (from smelters and coal burning power plants) and nitrogen dioxide (from automobile exhaust and other combustion processes) react with oxygen in the atmosphere to form sulfuric and nitric acid. To be considered acid rain, the rain must have a pH of 5.0 or lower.

Results
The plant that was given the 1% solution of sulfuric acid actually did a little better than the plant that was given water. It grew a bit taller and had a better physical appearance. The plant that was given water did not die but, just didn#t grow as tall. Although the watered plant did not grow tall it produced lots of blossoms after adapting to the environment. The plant that was given the 2% solution died completely three-fourth of the way through the experiment. All that was left was old, burnt, and dry leaves.

Conclusions/Discussion
My hypothesis was partly right and partly wrong. I was correct in the sense that the plant that was to be give 2% solution acid would die. I was wrong because I had hypothesized that the plant that was given the 1% solution would not grow as well as the plant that was given water, but that was not the result. Instead the plant that was given the 1% solution was actually growing better than the plant that was getting water. My results determined that in a real life situation, if anyone were to buy Skippy Yellow plants and plant them in a pot, it is better to put a 1% solution of sulfuric acid than only water. Basically, the plant I selected for this project was acid loving.

Summary Statement
How does acid rain affect plant growth?

Help Received
Science teacher helped wtih general guidiance and meterials and my dad helped with the board and pictures.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Matthew E. Pirtle

Project Number
J1526

Project Title
Will Radiation from a Dental X-Ray Affect the Growth of Plants?

Abstract

Objectives/Goals
Determine if radiation from a dental x-ray will effect the growth of pants.

Methods/Materials
Materials: 12 each pot, saucers, beans, stakes. Potting soil, water. Method:
1. Obtain all materials. 2. Get 12 pots and divide them in the groups of 4.
3. Label four pots Group A; four for Group B, four for Group C. For each Group, label the four pots 1 through 4. 4. Radiate four beans. These beans will be planted in the Group A pots. 5. Put 350 grams of soil for each pot.Put one bean in each pot (9 cm deep). 6. Put .05 liters of water in each pot. 7. Put plants near the window. 8. Water plants every other day. Rotate the plants so they get an equal amount of sunlight. 9. Monitor and record growth for each plant. 10. When the Group B plants start growing, radiate them at the same radiation levels as the beans in Group A. 11. Increase watering to .1 liters of water every other day when the plants get taller. Stake taller plants if needed

Results
On the 38th day (from planting to last measurement taken on January 28, 2007), the results were as follows:
Ratings: Rating of 1 for POOR appearance (smaller of the plants, small or fewer leaves). Rating of a 2 for AVERAGE (medium height, several, medium sized leaves). Rating of 3 for GREAT (tallest of the plants, many large, healthy leaves).
The average height of the plants in GROUP A was 30.875 centimeters. The average number of leaves was 7.75. Overall appearance was rated a 2. The average height of the plants in GROUP B was 33.625 centimeters. The average number of leaves was 11.5. The overall appearance was rated a 2.5. The average height of the plants in GROUP C was 44 centimeters. The average number of leaves was 13.25. The overall appearance was rated a 2.5.

Conclusions/Discussion
Based on the results of my experiment, it appears that the radiation received from the dental x-ray did have a small effect on the growth of the plants. We are exposed to radiation every day. A dental x-ray exposes you to about 2 or 3 millirems (mrems). You are exposed to about 350 mrem a year from everyday things. A smoke detector exposes you to about 1 mrem per year.Even though radiation is all around us and can benefit us, we should limit our exposure. With safeguards, the amount of radiation you get from a dental x-ray is very small. It is important to note that the risks of health problems from untreated dental conditions are greater than from a dental x-ray.

Summary Statement
Determining if a dental x-ray will effect the growth of plants.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ildiko Ruzics

Project Number
J1527

Project Title
Will Different Materials Affect the Growth of Sea Life?

Abstract

Objectives/Goals
My goal is to determine the growth of sea life on different materials.

Methods/Materials
20 # 3 in. x 3 in. Light weight sheets of copper
20 # 3 in. x 3 in. Plastic sheets
20 # 3 in. x 3 in. Aluminum sheets
180 - Feet of heavy fishing line

Results
The results show that sea life grows differently on different materials and that copper appears to stop the growth of sea life. This difference between copper and the other materials seems to be very significant.

Conclusions/Discussion
This experiment proves that sea life grows differently on different materials. The difference between growth of sea life on copper versus other materials was statistically significant.

Summary Statement
Copper prevents the growth of sea life.

Help Received
Dr. D. Gjertsen performed a statistical analysis.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Anita Sarkar

Project Number
J1528

Project Title
The Effect of Beta-Carotene on Plant Cancer

Abstract

Objectives/Goals
My objective was to learn if beta-carotene had any substantial effect on plant cancer.

Methods/Materials
I used sunflower and pea seeds, synthetic beta-carotene, water, grow-lights, potting soil, flower pots, inoculating needle, syringe, Agrobacterium tumefaciens, ruler, and a camera. I divided the seeds into 3 groups and made the beta-carotene solution. I germinated and planted the seeds. When the plants were sturdy enough I inoculated them with the Agrobacterium tumefaciens. After inoculation, I recorded their appearance and rate of detoriation.

Results
My overall results showed that synthetic beta-carotene had a negative effect on plant cancer.

Conclusions/Discussion
My results disproved my hypothesis. This may have been because the beta-carotene was synthetic and was not water-soluable. My project proves that synthetic beta-carotene has a negative effect on plant cancer in dicotyledons.

Summary Statement
My project is about the effect of beta-carotene on plant cancer in dicotyledons.

Help Received
Science fair coach obtained and diluted Agrobacterium tumefaciens; inoculated plants at USDA lab under the supervision of science fair coach; father provided transportation and monetary needs

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ravital Solomon

Project Number
J1529

Project Title
Wishy Washy Water

Abstract

Objectives/Goals
This project was performed to observe the varying effects of hard and soft water on hair.

Methods/Materials
The same type of hair was placed in water with different levels of hardness everyday for an hour for a period of three weeks. The hair was dried daily after finishing the water treatment, and the hard/soft water solution was made once a week.

Results
There is a direct relationship between the hardness of water and damage done to hair. As the hardness of water increases, the split ends also increase in ratio, the hair tends to break much more easily and the red color of the hair decreases. In the soft water, the red color of the hair is still noticeable and vibrant. While, in the hardest water (400 mg/L Calcium Carbonate) the hair appears to be a very dark red, almost a black color.

Once the hair is put under a microscope (0.2 A Nikon), the rough edges on a single strand increase as the hardness does. In 40 mg/L Calcium Carbonate-soft water; there are only 2, 1 and 2 rough edges found in 3 different observations (measured per the microscope area). While in 100 mg/L Calcium Carbonate-hard water, there are 8, 3 and 4 rough edges found. In 400 mg/L Calcium Carbonate-extremely hard water, a big change is seen. Total of 28, 58 and 34 rough edges were found.

Conclusions/Discussion
After the procedure was over, and the observations were recorded, it was concluded that hair washed with hard water faces many negative effects: split ends, loss of color, hair breaks more easily, and increase of rough edges found along a strand. The hair in softer water did not experience as many problems, which supported the hypothesis written Some questions that arose from this project include: If the hair is dyed, does it affect the damage done to hair [by hard water]?, Does the type of hair (curly, straight, wavy) reduce or increase damage done to hair [by hard water]?, Is there a possible formula or substance that can minimize the damage done to hair by hard water?

Summary Statement
This project is aimed towards understanding how hard water and soft water may negatively affect and damage hair.

Help Received
Family member arranged help providing microscope, chemicals, and lab space [to prepare water solutions].

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Wesley I. Soo Hoo

Project Number
J1530

Project Title
A Bioassay Detecting Pesticide Toxicity using Artemia salina

Abstract

Objectives/Goals
The effects of three different pesticides pyrethrin, bifenthrin, and carbaryl were tested in a biological system. The goal of my project was to discover how varying concentrations of pesticides might affect the viability of Artemia salina, or brine shrimp. I also exposed the pesticides to weather to monitor degradation due to light or temperature. A. salina was used because brine shrimp are both highly susceptible to changes in the environment and important to the ecosystem.

Methods/Materials
A. salina was cultured in artificial sea water and used in the assay on day four of development. The brine shrimp were first incubated with increasing concentrations of insecticide in a 96-well plate with eight replicate wells. I then developed my own method of assessment, using an overhead projector and at least 10 Artemia in each of 16 petri dishes. In this way I could view all results simultaneously by projecting the Artemia images on a wall continuously. The Artemia were observed at various time intervals until at least half from each group were dead. The times of death were recorded.

Results
Data generated from the bioassay indicated the method was reliable, as the standard deviation was small (<15%). The assay was able to detect differences between the degraded pesticide toxicity, as well as the increased susceptibility of older Artemia to pesticides. Based on the results, when all three insecticides were compared, pyrethrins seemed to have the greatest adverse effect on A. salina viability. The bifenthrin compounds also seemed to resist biodegradation most.

Conclusions/Discussion
The results of this study support the hypothesis that pesticide toxicity and potency can be quantified using an Artemia salina bioassay. Artemia mortality depended greatly on the pesticide tested, which indicated that some pesticides were more toxic than others. The differences found between pesticides after exposure to the environment indicated this assay could be useful in distinguishing between environmentally "friendly" and more persistent toxins.

Summary Statement
This bioassay examined the toxicity of varying concentrations of three pesticides and the rate at which the pesticides biodegraded as quantified through a unique methodology using Artemia salina.

Help Received
Father helped with science equipment; science teacher helped proofread report; friends helped provide moral support

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Catherine Soto

Project Number
J1531

Project Title
How Does Living with a Smoker Affect Lung Functions in Children (Age 12-14) throughout the Four Seasons of the Year?

Abstract

Objectives/Goals
My objective was to determine how living with a smoker affects lung function in children throughout the four seasons of the year, in comparison to those who do not live with a smoker. I hypothesized that children exposed to ETS (Environmental Tobacco Smoke) in their homes would exhibit evidence of greater compromise in their lung functions (FVC and FEV1) when compared to students who do not live with a smoker.

Methods/Materials
The experiment was conducted from June 2006 to March 2007, and I tested my participants during each of the four seasons. My study required 108 randomly selected middle school students, a medically certified spirometer, a digital scale, 2 yard sticks, and my log book. I created a survey that contained questions about exposure to environmental tobacco smoke, as well as other factors that might influence respiratory function, including: asthma, height, weight, gender and age. I entered the height, weight, age and gender of each student into the spirometer. This would allow the spirometer to calculate each student#s expected lung function values. Then each participant would perform a series of exhalations into the spirometer until reproducibility was achieved, and I would print out and analyze their results.

Results
According to my results, students who live with a smoker in their home experienced lung diagnoses of Mild Restriction to Very Severe Restriction from Summer through Spring. These students showed no sign of Normal Spirometry. Participants who do not live with a smoker experienced lung diagnoses that ranged from Normal Spirometry to Moderate Restriction, but diagnoses were predominantly Normal. Also, students exposed to ETS in their own homes exhibited experimental lung function values that were rarely close to their predicted values for either FVC (Forced Vital Capacity) or FEV1 (Forced Expiratory Volume in the 1ST Second). On the other hand, students who are not exposed to ETS in their homes displayed experimental lung function values that were very close to if not equal to their predicted values for both FVC and FEV1.

Conclusions/Discussion
My results show that there was significant compromise in the lung functions of students who are exposed to ETS in their homes, and this compromise intensified during seasons with colder weather. Perhaps windows are closed during these seasons, and people stay indoors. These results support my hypothesis.

Summary Statement
The effects of enviromental tobacco smoke (in the home) on the lung fuctions of 12-14 year old children.

Help Received
Mr. Simonsen helped me edit my work and get me the supplies I needed.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Valerie Vang

Project Number
J1532

Project Title
Determining Which Natural Substances Would Work As a Pesticide on Mosquito Larvae

Abstract

Objectives/Goals
My objective was to find out if natural substances could be used as a pesticide. Something that would not harm the environment or people, but still be used to control the spread of mosquitos and West Nile Virus.

Methods/Materials
I used different fruit peels that contained citric acid to use as a pesticide. I used Grapefruit, oranges, and lemons as my variables. I created a soultion using the peels of the fruit. I shredded the peels on a food shredder. Measured out 1/4 of a cup for each different variable. I then filled 4 containers with 1 and1/2 cups of water. I placed 25 mosquito larvae into each container. After 30 minutes, I checked larvae to make sure they were alive. I then added the 1/4 cup of shredded peels.Solution was 1/4 cup of peels to 1 and 1/2 cups of water.
3 different containers with the variables and 1 container that was the control. The control contained no peels. Only water.
I checked and recorded the death rate of the larvae.

Results
In the control container all mosquito larvae lived.
Containers with natural substances- All larave died within 2 hrs.
The Grapefruit had the quickest affect in killing the mosquito larve.
The lemon had the slowest affect. (If you consider within 2 hours slow)

Conclusions/Discussion
I learned that we can use a natural pesticide to kill the mosquito larvae. Citric acid has a very harmful affect. This could be a safe alternative to pesticide. If you had small children, pets, or even adults, playing in the area. Or drinking the water, the peels would not be harful. Pesticide can be very harmful. The taste might not be good, but that beats the alternative of getting really sick.
I feel this could be used in people's backyard, small ponds, etc.. This would help contain mosquito population and control spread of disease like West Nile Virus. This is a safe way of using a substance as an alternative to pesticide.

Summary Statement
I useda safe natural substance as an alternative to pesticide, to help control mosquito population.

Help Received
Teahcer helped with scientific process, obtaining larvae. Mom helped put board together and supervised.