CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Vincent E. Ajanwachuku, Jr.

Project Number
J1401

Project Title
Can a Homemade Natural Herbicide Made out of Mistletoe Berries Control Unwanted Daisy Growth?

Abstract

Objectives/Goals
My objective is to see if a homemade natural herbicide, can be used to help control unwanted daisy growth.

Methods/Materials
HERBICIDE MANUFACTURE:I blended mistletoe plants berries,w/1 gal.of soft. water to liquefied mixture(MTH)to meet exper'tal needs. I put 2 Tbsp liq. Soap w/ MTH in spray bottle, for surfactant. HERBICIDE APPLIC#N:. In 4 pots I used seeds to test my herbicide#s pre-emergent treatment. In 4 pots Daisy plants tested my post emergent treatments. In pot 1&2 I put Daisy seed & grass seed. I applied the Mistletoe herbicide to the first pot PE1 & softened water to the second pot PE2. PE2 was the control for PE1.In pots 3 & 4,I put Daisy seed,no grass seed. I applied the Mistletoe herbicide to the 3rd pot PE3 & softened water to 4th pot PE4. PE4 was the control for PE3. In pots 5,6,7,8 I put Daisy plants, ea.w/ 10 flowers. I sprayed herbicide on the flowers & leaves in Pot (C1:contact herbicide tx.). I mixed the herbicide into the soil of Pot 6(SA1: soil applied tx.). In Pot 7 I did whole plant herbicide applica#n SY1:systemic tx.). In Pot 8: Cont., the Daisy got soft.water as my control for 1,SA1,&SY1. For 18 days, results were watched & recorded. Materials:Gloves,Pens&markers,
Plastic Spray Bottle, Camera & Film, Scissors,Blender,Gallon Containers,Soften Water,8 Flower Pots,Mistletoe Berries,Potting Soil,MeasuringCup,Tablespoon,
Large bowl,Labels,Ruler,Daisy Seed,Pencils,Grass Seed,Paper,Liquid Soap, Display Board.

Results
My observations revealed the contact herbicide treatment as most successful against Daisy weeds killing 9 of 10 flowers. The soil applied treatment worked moderately well:killing 4 of 10 flowers &3 leaves.The systemic herbicide tx.was the least effective,killing only 2 of 10flowers, 2 leaves.

Conclusions/Discussion
Mistletoe plants can be an effective natural herbicide on Daisies. Contact, systemic & soil applied treatments were effective, contact herbicide was most effective. I feel this resulted from its direct impact on plant parts cells. A reduced concentration of toxin reached the cellular level in the systemic & soil applied treatments thereby having a reduced ability to inhibit cell growth. I concluded that the mistletoe herbicides# inhibition of pre-emergent Daisy Seeds growth came from the Grass Seeds presence & neutralization of the mistletoe 's lectin/alkaloid toxin on the Daisy seeds, while providing nutrients aiding the growth of Daisy Seeds.

Summary Statement
To see if a homemade natural herbicide, can be used to help control unwanted daisy growth.

Help Received
My mother and father helped me take pictures for my board. My neighbor helped me procure Mistletoe Berries.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Lauren M. Aoki

Project Number
J1402

Project Title
The Effects of the Antioxidant Vitamin C on Organic Granny Smith Apples

Abstract

Objectives/Goals
My objective is to determine whether or not the antioxidant, Vitamin C, is a effective preservative when applied to organic Granny Smith apples.

Methods/Materials
132 organic apples, hand picked, from the same orchard, were randomly divided into two groups after an iodine-starch test was previously conducted to insure the apple's ripeness. The test group, consisting of 66 apples, was sprayed with a solution of Vitamin C (300 mg/5cc) every three days as an organic preservative. Internal fruit pressures were then obtained from three apples in each of the two groups every three days, using a penetrometer. The pressures were recorded and at the end of 66 days the readings were compared to determine the firmness of both the treated and untreated (control) apple groups. The weights of the apples were also recorded during the test period to determine if there was any relationship to the apple's firmness over time.

Results
The data showed the untreated group of apples decreased in internal pressure by 27%, while the treated apples with Vitamin C decreased in pressure by 14% over 66 days. This showed the treated group of apples had a 13% higher pressure and slower decline of firmness at the end of the experiment. The data also showed that all the apples in both groups lost weight over the test period, but this did not correlate with the declination of the apple's internal pressure.

Conclusions/Discussion
Vitamin C is a widely used vitamin supplement and antioxidant. Vitamin C when applied as a preservative to organic apples kept the treated apples 13% firmer than the untreated apples. This supported my objective and suggests Vitamin C can be used as a preservative for apples and other fruits and vegetables. Vitamin C should be considered as a preservative that also has antioxidant properties that can provide other medical benefits such as helping to prevent heart disease and certain cancers in humans.

Summary Statement
My project was to measure the effect of Vitamin C as a preservative and antioxidant on organic apples using the apple's weights and penetrometer readings.

Help Received
Mr. Piercy, Mr. Kinney, and my father reviewed my work and my mother helped type my report.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kaleigh E. Aucoin

Project Number
J1403

Project Title
Determining a Dose of Acyclovir in the Horse

Abstract

Objectives/Goals
A correct dosage of acyclovir for the horse is not known even though it has been used by veterinarians to treat equine herpes virus (EHV-1). The maximum dose in humans is 800 mg because giving more does not increase the concentration in the serum. This study was designed to answer the question is dosing by surface area or by weight a better approach when extrapolating human doses to much larger animals like the horse.

Methods/Materials
Three adult horses were prepared with IV catheters and given 3.2 g of acyclovir (4 x the human dose based on a horse having 4 times its surface area) and on the following day 6.4 grams of acyclovir (8 x the human dose based on a horse weighing 8 times as much as a human). Blood samples were taken at specific times during the study and acyclovir concentration in the serum determined by HPLC at NC State University.

Results
Serum concentrations showed little differences between the two doses which is the same as what is seen in humans. Concentrations of acyclovir changed little over 8 hours indicating that absorption was due to a constant amount being absorbed rather than a percentage. This is what is also seen in human.

Conclusions/Discussion
Doubling the dose of acyclovir in the horse did not double the serum concentrations just as hypothesized because of how it is absorbed.
Serum concentrations of acyclovir were lower in the horse compared to man using either dosing strategy. The current accepted horse dose of 10-12 grams would not be expected to produce any higher serum concentrations than a dose based on surface area differences between a horse and man (3.2 grams) but would cost 4 times as much. Acyclovir is best given at 3.2 grams since doubling the dose does not increase its concentrations in the serum very much.

Summary Statement
Determining a correct dose of acyclovir in the horse by extrapolating the human dose using two different methods.

Help Received
Dr Dave Aucoin (my father), Dr Rick Stevens (my veterinarian). Lorri Aucoin (my mother).

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christopher R. Barry

Project Number
J1404

Project Title
The Prevention of Crown Galls (Plant Cancer) in Plants

Abstract

Objectives/Goals
HYPOTHESIS: I think that if I add antioxidants and nutritional supplements to the soil of germinating plants, then some, if not all of the plants will develop a resistance to crown galls (plant cancer), caused by Agrobacterium tumefaciens.

Methods/Materials
PROCEDURE: I planted my sunflower and bean seeds. Since the sunflower seeds didn#t germinate, my experiment was done only on the bean seeds. I had a total of six pots. They included a pot for each plant watered with beta-carotene, lycopene, vitamin E, vitamin C, all of these nutrients combined, and my control, water only. I watered once every day with a solution of 150mL of water and a pulverized antioxidant. The only time I didn#t water was when the soil remained moist from the previous day. For several weeks I followed this procedure, noting the growth of the plants. When the stalks were tall and strong enough, I exposed the plants in all six pots to the Agrobacterium. I did this by using the hypodermic needle to scrape away a small portion of the outer layer of cells on the stalk. I dipped one of the sterile swabs in the vile of Agrobacterium, and swabbed the open wound with the culture. I then watched for the formation of crown galls.

MATERIALS: I used potting soil, 6 clay pots, sunflower and bean seeds, and an indoor plant light. I used a vial Agrobacterium tumefaciens, the sterile cotton swabs, and a hypodermic needle. I bought vitamin C tablets, the vitamin E capsules, the beta-carotene tablets, and the lycopene tablets. Household items used include a Pyrex measuring cup, a hammer (to pulverize the tablets), a spoon, paper towels, tap water, a fine finishing nail (to pierce the vitamin E capsules), and a camera to record visually the progress of my project.

Results
RESULTS: Crown gall growth was found in some plants. In addition, the type of antioxidant or vitamin supplement affected the rate of growth of the plant.

Conclusions/Discussion
CONCLUSION: My hypothesis was correct since some of the plants developed crown galls. These include the plants watered with lycopene, the plants watered with vitamin E, and the control plants. Galls didn#t develop on the plants watered with beta-carotene, the plants watered with vitamin C, or on the plants watered with all of the nutrients. In addition, the most rapid plant growth was with the lycopene, beta-carotene, and vitamin E.

Summary Statement
My project studies the use of certain antioxidants in the prevention of cancer (caused by Agrobacterium tumefaciens) in germinating and developing bean plants.

Help Received
4. My mother, Coleen Barry, who spent many hours assisting me and driving me to various locations to procure the necessary items needed for my project. She also taught me how to do footnotes on my research paper.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Neil Bhambi

Project Number
J1405

Project Title
What's on Your Plate?

Abstract

Objectives/Goals
The object of my project was to find out how the growth of E. coli on meat was affected by various cooking methods and storage time. I thought that the growth of E. coli in meat would decrease with the increase of cooking temperature, and when meat got stored at room temperature, will result into greater amount of bacterial growth. My hypothesis was based on the fact that increased temperature destroys bacteria and mesophilic bacteria like E. coli thrive at room temperature.

Methods/Materials
I tested my hypothesis by using quantitative dilution method. E. coli bacteria was inoculated onto the ground beef and mixed in thoroughly. I took the raw meat (Control) and blended it in 99ml of sterile water. Then I pipetted out 1ml of aliquot until 10 dilution. Then, I further diluted it by taking 0.1ml aliquot from the mixture to put on the Petri dish and spread it. I carried out the same process with varied meat: Medium Rare (60 C), Medium (71 C), and Well Done (77 C), incubated over a period of 2 days. I observed and recorded the Petri dishes. I conducted this experiment for storage time (8hours and 12 hours) at an ambient temperature. I observed the cultures and observed three different morphologic bacteria. I used isolated pure culture technique to study further different organisms. After obtaining pure culture gram stain study was done under microscope.

Results
Consistently, it was found that as cooking time increased, less bacteria was found present in my samples.

Conclusions/Discussion
My hypothesis proved to be correct. Meat that was cooked showed less amount of bacterial growth than Raw (Control). The meat left after 12 hours had the most amount of bacterial growth.

Summary Statement
The object of my project was to find out how the growth of E. coli on meat was affected by various cooking methods and storage time.

Help Received
I used a local hospital lab for microscopic study of organisms under the supervision of a registered microbiologist.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Alex Brown; Arjan Puniani

Project Number
J1406

Project Title
The Effects of Ethyl Alcohol on Ant Colony Behavior

Abstract

Objectives/Goals
The objective is to determine whether varying amounts of ethyl alcohol will affect the behavior of worker ants as they establish new colonies. We believe that the number of tunnels they dig and the time it takes them to dig tunnels will decrease with higher percentages of ethyl alcohol given in their water supply.

Methods/Materials
Seven identical, giant, commercially purchased ant farms were stocked with seven (7) sets of commercially purchased red harvester ants of the genus species Pogonomyrmex californicus. A chemist at the local state university donated 100ml ethanol at 95%. This was proportionately divided into application bottles in seven varying ratios of 100% distilled water, 100% distilled water, 100% distilled water, 95% distilled and 5% ethyl alcohol, 90% distilled and 10% ethyl alcohol, 85% distilled and 15% ethyl alcohol, and 80% distilled and 20% ethyl alcohol. The three control groups and four variable groups were administered their respective quantities every other day. They also received normal amounts of ant food every seven days. We documented the number of tunnels dug and dead ants daily by visual count and digital photography.

Results
Colony number 4 (85% distilled water and 15% ethyl alcohol) had the highest number of tunnels dug at thirty-one (31). However, colony number 1C, a control group (100% distilled water) had the lowest amount of death at six (6), and the second highest amount of tunnels dug at twenty-six (26). When comparing the number of deaths to the number of tunnels dug, colony number 1C had the highest productivity-survival ratio.

Conclusions/Discussion
It is our conclusion that high levels of alcohol do have an adverse effect on ant colonies. The data indicated that colony number 4 (85% distilled water and 15% ethyl alcohol) dug the most tunnels. This is due to either increased calories from the grain alcohol in addition to the ant food or having started out with a higher number of ant workers, which created a higher productivity number. However, colony number 1C had the higher survival rate and second highest number of tunnels dug. The data leads us to suspect that higher amounts of alcohol leads to higher death rates and at the same time the lack of calories from alcohol leads to less productivity.

Summary Statement
Varying amounts of ethyl alcohol affected the behavior of worker ants as they established new colonies by either increasing their death rate or increasing their productivity through the additional calories.

Help Received
Hazards & source of alcohol: Univ. Chem. Professor. Hazards of handling ants & amounts of alcohol to administer:Entomologist. Advice on figuring calculations-parent. Instruction on operation of digital camera, basic layout rules & board mock-ups - parent. Grammar editing and printing - parent.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ruth Ann Chan; Noreen Lue

Project Number
J1407

Project Title
Vitamin C Supplements: A Flush of Your Money?

Abstract

Objectives/Goals
The purpose of this project is to test the efficacy of vitamin C supplements in 3 forms: Chewable tablets, TimeRelease capsules,and EsterC with bioflavonoids. Megadoses of vitamin C can increase the risk of tolerance building which can require more to maintain health and increase risk of kidney stones. Saving money and explaining benefits and risks to others are the benefits to society that this project may bring.

Methods/Materials
We first dissolved all 3 supplements in water and a low pH solution measuring the how fast supplements released the ascorbic acid. We titrated 2,6 dicholoro-indophenol into the samples taken at different time intervals. Four mL of the solution was pipetted into an Erlenmeyer flask, to which was added 10 mL of metaphosphoric acid. We then titrated as much blue dye until the first faint rose pink endpoint was reached. A series of formulas were then used to determine the amount of ascorbic acid.
Urine samples were taken froim 38 college students at 24 hrs, (control), 2, 4, and 6 hours after ingesting the supplements. In titrating the urine with dye, we were not aware which supplement the subject had taken, nor the subjects knew which supplement they were taking. Therefore, this was a double-blind study.

Results
At 15, 30, and 45 minutes, EsterC dissolved more quickly and had a higher concentration in water and acid than both Chewables and Time-Release. Baseline means of the 3 groups ranged from 31-34 mg a day, and there was no statistical difference among the three groups. Excess vitamin C was apparent in the urine 2 hrs after ingestion, with the mean 0-4th hour exceeding the mean daily excretion. At 2, 4, 6 hours after ingestion, vitamin C excess from Chewables were excreted in the greatest amounts, followed by the TimeRelease tablets, and lastly by the EsterC tablets.

Conclusions/Discussion
EsterC was the most easlily dissolved, and TimeRelease the least. Although Ester C dissolved the quickest, it appears to be the least effective in saturating tissues and excess excreted. The chewable tablet has shown to be the most efficient. However, there were significant differences between the mean percent excreted in chewable and Ester-C subjects in 2, 4, and 6 hours compared to 24 hour values.

Summary Statement
We tested the efficacy of vitamin C in three supplements to benefit society by saving them money and explaining potential benefits and risks.

Help Received
used lab, equipment, chemicals supplied by Cal State University of LA nutritional science lab; supervised by college student and advisor in lab

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Cole M. Conroy

Project Number
J1408

Project Title
Diabetes. Insulin. NPH vs. Lantus

Abstract

Objectives/Goals
To whether a new long-acting human insulin, Lantus, causes less nocturnal hypoglycemia in a juvenile diabetic than the standard long-acting insulin, NPH.

Methods/Materials
A juvenile diabetic volunteer with previously stable glucose control performed frequent blood glucose testing for 30 consecutive nights with a standard commercial testing kit. The subject used NPH insulin the first 15 nights, then Lantus for 15 nights. A commercial snack with cornstarch, previously shown to help prevent hypoglycemia, was eaten at the same time each night. Blood sugar levels were recorded through each night and graphed for comparison.

Results
The number of low blood sugars, defined as 70 milligrams per deciliter (mg/dL) or below, was 10 on the NPH nights and 3 on the Lantus nights. Overall blood sugar levels were much more stable on Lantus. The number of hyperglycemic events, defined as blood sugar over 180 mg/dL, was also much lower with Lantus (5) compared to NPH (32).

Conclusions/Discussion
Insulins are designed to be absorbed from injection sites at different rates to keep blood sugars at normal levels. Lantus insulin was designed to be absorbed evenly for up to 24 hours. This is compared to NPH, which has a peak absorbtion 8-to-12 hours after injection. A diabetic can have dangerously low nighttime blood sugars at the time of NPH's peak effect. Through my experiment I found that Lantus insulin was better at regulating nighttime blood sugars than NPH.

Summary Statement
My project compares two types of insulin on a juvenile diabetic's nightime blood sugars.

Help Received
Mother helped take sugars, type report and prepare poster.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Andrea N. Csaszi

Project Number
J1409

Project Title
Effect of Fluvalinate on Apis mellifera Honeybees Infested by Varroa Mites

Abstract

Objectives/Goals
Worldwide, the Varroa jacobsoni mite levels on Apis mellifera honeybees have increased. Statistics show that more beekeepers are quitting the bee business mainly because of the increase of these parasites called the Varroa jacobsoni mite. These mites can cause total destruction and eradication of entire apiaries. If the varroa mite does not become controlled, the future of the honeybee industry could be at stake. The objective of this project is to determine if the Varroa Mite infestation levels found in honeybee colonies can be effectively treated with a miticide called Fluvalinate. Recently, the Varroa Mites are developing a resistance to this miticide.

Methods/Materials
Using the anti-varroa mite sticky board trap, the varroa mite count was determined and 4 honeybee colonies with high infestation levels were used.
3 colonies were treated using the Fluvalinate miticide strips. 1 colony was left untreated as the control. After the eight week recommended treatment period, the Fluvalinate strips were removed and a new anti-varroa mite sticky board was inserted. The mite fall was counted and the numbers were compared with the pre-treatment mite count.

Results
There was an increase in the number of varroa mites present in the honeybee colonies post Fluvalinate treatment than prior. The three colonies prior to treatment had a mite count between 3,000 to 5,200 mites. The control colony had approximately 1700 mites before treatment. After the Fluvalinate treatment the 3 colonies now had a mite count between 6,200 to 7,400 while the control also increased to approximately 2,500 mites.

Conclusions/Discussion
The results did not support the hypothesis that the varroa mite population would decrease after the Fluvalinate treatment. Based on the results, the experimenter concluded that these honeybee colonies that were infested by varroa mites, had developed a resistance to the miticide, Fluvalinate.
An explanation to this resistance is that mites that have been exposed to
frequent treatments of miticides eventually develop a resistance to the substance.

Summary Statement
This project focuses on the parasite called the Varroa Mite which infests honeybee colonies, and the treatment method Fluvalinate, used to control them.

Help Received
The experimenter visited the University of California at Riverside, Department of Entomology. With the assistance of Dr. Kirk Visscher PhD, the experimenter viewed his bee lab, apiary, and used his macro-lense camera to photograph bees and varroa mites.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

Cassandra (Cassie) C. Fausel

Project Number

J1410

Project Title

Rad Worms: Will Radiation and Different Vitamin Solutions Change Planaria's Regeneration?

Abstract

Objectives/Goals

My previous experiments showed that vitamins by themselves and in combinations helped Planaria regenerate. Now I am testing whether Radiation and different Vitamin solutions will change the regeneration process. I think that the Radiation will stunt the Planaria#s regeneration and the Vitamins will
protect the Planaria from the damage that the radiation might cause.

Methods/Materials

I used X-ray radiation and radiated the Planaria using 2 different doses and placed them in four groups of Vitamin solutions: A & C, A & E, C & E and A,C & E. Within each Vitamin group I had 4 controls which contained Planaria that had not been radiated. I also had a No Vitamins group which contained only radiated Planaria. The Planaria were cut into head and tail pieces. Using a log sheet to measure the head and tail pieces, measurements were performed and logged weekly.

Results

All Planaria in solutions containing Vitamin C died. Planaria in Vitamin solutions A & E survived radiation. Planaria without Vitamins survived radiation. In the No Vitamin solution, Planaria that were exposed to Radiation grew better than the Control without Radiation. Planaria in Vitamin A & E had regeneration that was similar in the radiation and control groups. Planaria in Vitamin A & E solutions, both control and radiation regenerated more that Planaria in the No Vitamin solutions. Vitamin C was toxic to Planaria and all specimens died the conclusion is Radiation did not affect regeneration. Vitamin solution A & E showed better growth regeneration in the Control and Radiation specimens.

Conclusions/Discussion

Although Radiation did not affect the Planaria, one of the
Vitamin combinations, Vitamins A & E showed better growth regeneration in the Control and Radiation than the Control group No Vitamins specimens. This proves that Vitamin A & E can improve Planaria#s regeneration.This concludes that Vitamin A & E can improve Planaria#s regeneration.

Summary Statement

My project is testing to see if Radiation and different vitamin solutions change Planaria#s regeneration.

Help Received

Dr. Monica Khanna and the staff at Peter Lake Radiation Center, my Dad worked with me throughout the project and answered many questions, 2 friends who assisted with weekly measurements and my Mom who helped with my board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Miriam C. Glicksberg

Project Number
J1411

Project Title
Does Sunscreen Prevent UV-Caused Mutations?

Abstract

Objectives/Goals
I wanted to see if I could use the bacterium E. coli instead of animals to test whether sunscreens worked. I hypothesized that the higher the SPF rating, the more protective the sunscreen would be at blocking mutations caused by UV rays.

Methods/Materials
I spread 500-1000 single cells of the bacterium E. coli onto plates, and exposed them to UV light at a tanning salon to cause mutations. Onto the plate lids I applied different SPF suncreens all of the same brand, aluminum foil or no addition. By counting the number of colonies that grew I was able to determine whether the treatments helped to block mutations.

Results
The average number of colonies that grew from UV-treated bacteria was higher if the lid had a treatment to block out the UV. Except for SPF45, sunscreen with a higher SPF rating (SPF30) was more protective than lower SPFs (8 and 15) in blocking UV-induced mutations in bacteria.

Conclusions/Discussion
I conclude that my hypothesis was mostly correct. Except for the SPF45 lotion, the higher SPF rating was more protective at blocking UV-caused mutations. This is important because sunscreen is necessary to prevent skin cancer in light-skinned people. My method allows bacteria to be used instead of humans or other vertebrates to show that sunscreens do what they advertise.

Summary Statement
I demonstrated that bacteria could be used as a model system to show that sunscreens do protect cells from mutations caused by ultraviolet rays.

Help Received
Mother taught me microbiology techniques and helped with typing. Midnight Sun Tanning Salon donated time for UV exposures. Science teacher loaned me homemade incubator.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christine Haas

Project Number
J1412

Project Title
Effects of a Natural Poison on Mosquito Development: Year III

Abstract

Objectives/Goals
My objective was to learn if a "natural poison" derived from buckeye blossoms could be effective in stopping the development of mosquitoes.

Methods/Materials
I collected buckeye blossoms. I created a "natural poison" by blending and soaking the buckeye blossoms in bottled spring water for 14 days. I eliminated the buckeye blossoms and used the "poisonous" water to fill 40 containers. I poured 8 oz. of poison into 10 containers for the 100%, 6oz. of poison and 2 oz. of bottled spring water (B.S.W.)into 10 other containers for the 75%, 4oz. of poison and 4oz. of B.S.W. into 10 other containers for the 50%, and 2oz of poison and 6 oz. of B.S.W. into 10 other containers for the 25%. I poured 8oz. of B.S.W. into 10 containers for the "control." I placed one mosquito egg raft into each of the 50 containers. I conducted this experiment and made observations for six days.

Results
The 75% and 100% solutions both had the same effects. In the ten 75% and 100% containers, I found no life. The egg rafts never split apart and the eggs never hatched. They appeared to sit on top of the poisonous water for six days. I learned that the 50% solution was less effective than the 75% or 100% solutions. Approximately 10% of the eggs hatched and developed into larvae. The mortality rate was 1 day. They never reached the pupae stage. I learned that the 25% solution was the least effective. Approximately 30% of the eggs hatched and developed into larvae. The mortality rate was 2-3 days. They never reached the pupae stage. I observed the control progress through the larvae stage and enter the inactive pupae stage.

Conclusions/Discussion
My conclusion is that any amount of buckeye blossoms in our vernal pools (standing water left from the rainy season) might help eliminate or at least reduce the population of the disease carrying, irritating mosquitoes. This is imortant to me because the area in which I live is "open range," and it is not within the jurisdiction of any vector control or mosquito abatement program. The residents don't like the idea of using chemicals. Buckeye is native to our open range area and the livestock tends to leave it alone.

Summary Statement
This project was done to learn if a natural poison derived from buckeye could be effective in stopping the development of mosquitoes in vernal pools in our open range area not covered by any vector control or mosquito abatement program.

Help Received
My mother helped me by proofreading my research, she helped me by taking some of the pictures, and she helped my assemble my board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Munirah Habib

Project Number
J1413

Project Title
Toxic Impact on Plants

Abstract

Objectives/Goals
The most toxic products should have the greatest impact on growth of plant seeds.

Methods/Materials
3 dilutions of each product were prepared(eg.1%bleach,3.2%bleach,10%bleach,1%,3.2% & 10%ammonia & same for alcohol).30 dishes of each seed type were planted.3 dishes of each seed were kept as controls.3 dishes were prepared for each seed-product-%solution combination to be tested.The dishes were enclosed in a polyethylene bag labelled by seed type,household product & %solution.After 2 weeks height & emergence of seeds were recorded.

Results
The controls presented the greatest no.of seeds emerged in 5 days & the highest average shoot height in 14 days.The data show that the 10%concentration of all 3 products had the greatest impact on %emergence & seedling height for radish,lettuce,spinach seeds.Bleach was the most toxic product that had the greatest impact across all 3 concentrations.Ammonia & alcohol were similar in their toxicity.Spinach was the most sensitive.

Conclusions/Discussion
As the concentration of the contaminant solutions increased the % of emergence & average shoot height decreased.Bleach was found to be the most toxic & Spinach was found to be the most sensitive seed.The hypothesis appears to be correct.

Summary Statement
The effect of diff. concentrations of chemicals on emergence & shoot height of diff.seeds.

Help Received
Mother helped in making up diff.concentrations of ammonia,bleach , alcohol.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jennifer D. Hall

Project Number
J1414

Project Title
Fast Food Crisis

Abstract

Objectives/Goals
I did this project to find out if there was a certain way or amount of time to cook a hamburger to reduce the chance of keeping the harmful bacterias found in ground beef.

Methods/Materials
The materials I used in this project were: cotton swabs, petrie dishes, agar, oven, microwave, oven mitts, beaker, clamps, foil, agar baker, pan, stove, wooden spoon, stop watch, paper plates, napkins, trash can, ground beef (hamburger meat), and a refrigerator.

Conclusions/Discussion
As I come to the end of my project, I concluded that if you bake a hamburger at 350 degrees, for twenty minutes, until it is well done, or if you broil a hamburger for ten minutes, until it is well done, then you will not get any kind of bacteria in your meat. I also concluded that the worst state to eat a hamburger is when it is rare and has been cooked by boiling it. The worst way to cook a hamburger is to fry it. Even when it is well done, it still has a lot of bacteria in it. The second worst way to cook a hamburger would be to boil it. The third worst way to cook a hamburger is to nuke(microwave)it. The second best way to cook a hamburger would be to broil it. The best way to cook a hamburger would be to bake it.
My hypothesis was that I thought that it would be safest to eat hamburger when it was cooked well done, and cooked in high temperatures. Take an oven for instance, if you cook a hamburger in an oven, your chances of receiving bacteria in your meat might be slim-to-none because the heat is so hot, that it kills all the bacteria.
My hypothesis was correct. The best way would be to bake a hamburger until it was well done. There was no bacteria found found in a hamburger that was bake until it was well done. There was also no bacteria found in a hamburger that was broiled until it was well done, but the best way to cook a hamburger would be to bake it because it has less baceria when it is cooked rare and medium than a hamburger that is broiled util it is rare or medium.
The significance of my project and data is that, now, if fast food restaurants bake there hamburgers, then it will reduce the chance of people receiving dangerous bacteria that can get them sick or even kill them. This is helping the world to be a safer place.

Summary Statement
My project is about trying to find a way to cook a hamburger that is safe to eat.

Help Received
Mother helped to buy all supplies; Mr. Susman helped to prepare me for the fair.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Allison M. Kaku

Project Number
J1415

Project Title
The Effect of Walnut Extract on Root Lesion Nematodes

Abstract

Objectives/Goals
My project was to see if chemicals extracted from walnut branches will kill Root Lesion nematodes.I think that the toxic chemicals in the branches will kill Root Lesion nematodes.

Methods/Materials
I made walnut extract by chopping up walnut branches and putting them into a cheesecloth bag. I soaked the bag in a liter of water for 48 hours.I made concentrations of 200 grams of walnut branches/liter of water, 50 grams/liter, 10 grams/liter and an untreated water. I put the nematodes into the extracts, and counted the dead nematodes after 24 hours. I had three reps for each treatment.

Results
The 200 grams/liter had 98% mortality,50 grams/liter had 83% mortality, 10 gram /liter had 65% mortality and the untreated water had 7% mortality.

Conclusions/Discussion
My conclusion is that walnut extracts are toxic to Root Lesion nematodes. It was interesting to me that Root Lesion nematodes can live inside the walnut roots, but they can be killed by the toxic chemicals that are inside the walnut plant cell.

Summary Statement
My project is to see if the toxic chemicals inside the walnut plant cells will kill Root Lesion nematodes.

Help Received
My mother helped me type my report. The Kearney Agricultural center for providing me with nematodes.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kelli M. Kaku

Project Number
J1416

Project Title
Bioassay of Garlic Extracts on Root-knot Nematodes to Determine the LC50

Abstract

Objectives/Goals
My objective was to determine the LC50 of garlic extracts on root-knot nematodes exposed for twenty-four hours. I believe the LC50 of garlic extract will be 10-g/l, because from my previous experiment 20-g/l had 100% mortality.

Methods/Materials
I extracted root-knot nematodes from 1 liter of soil by sieving the soil and putting it into a mist chamber. I made my garlic extract by cutting up 20 grams of garlic and putting it into a liter of water. I exposed the root-knot nematodes to 20-g/l, 10-g/l, 5-g/l, and untreated water. I checked the mortality after 24 and 48 hours.

Results
The 20 and the 10-g/l both had 100% mortality. The 5-g/l had 40.3% mortality and the untreated water had 0% mortality. I used log probability paper to estimate the LC50 to be 6.5-g/l.

Conclusions/Discussion
My conclusion is 6.5-g/l is the approximate LC50 of garlic extract on root-knot nematodes. I need to do more experiments narrowing the concentrations closer to the 6.5 range.

Summary Statement
My project was to determine the LC50 of garlic extracts on root-knot nematodes.

Help Received
Use lab equipment at the Kearny Agricultural Center under the supervision of staff research associate Stephanie Kaku

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Todd K. Kawakita

Project Number
J1417

Project Title
The Redgum Lerp Psyllid: Threat to the Eucalyptus Tree

Abstract

Objectives/Goals
What is the most cost effective and environmentally safe way to eradicate the redgum lerp psyllid? The redgum lerp psyllid is a parasitic insect that causes extensive defoliation and weakens the eucalyptus tree. My objective is to try different solutions and note the effects in eliminating the redgum lerp psyllid. It is hypothesized that antibacterial soap and water will be the most effective and least hazardous. The antibacterial soap and water will wash away the honeydew and lerps on the leaves.

Methods/Materials
Five solutions were formulated: antibacterial soap and water, water, pesticide, oil and water and betadine and water.

Cut down branches of a eucalyptus tree that have infestation on its leaves. Make the following mixtures: 30% oil/70% water, 10% antibacterial soap/90% water, and 50% betadine/50% water. Record black soot lerps, honeydew spots and crystallized lerps. Spray each of the solutions on each branch. After spraying one solution, change the set of leaves and use another spray. Spray for five minutes and use 25 ml of each solution on each branch. Wait for 1 hour and then count and record how many black soot like lerps, honeydew spots, and crystallized lerps are remaining on each leaf. Cut off all remaining lerps to see if the nymph is still alive. Examine the lerp under a microscope and look for movement.

Results
Antibacterial soap was most effective in removing the lerps among all the applications. The antibacterial soap removed 33% of the lerps that were on the leaves tested. The betadine was most effective in removing the honeydew spots among all the applications. The betadine solution removed 52% of the honeydew spots that were on the leaves tested. Pesticides had a minor effect on removing the honeydew spots and no effect on removing the lerps. The oil and water mixture removed some of the honeydew spots and stayed on the leaf for more than 24 hours. The oil and water was detrimental because it suffocated the leaves.

Conclusions/Discussion
My conclusion is that the redgum lerp psyllid is a dangerous predator and parasite. By using these different solutions on eucalyptus trees we can be sure to extirpate this hazardous pest. Antibacterial soap and betadine were consistently the most effective ways to treat the eucalyptus by removing the crystallized lerps and honeydew spots, respectively.

Summary Statement
I plan to demonstrate what is the most cost effective and environmentally safe way to exterminate the redgum lerp psyllid.

Help Received
Mother and father helped paste items on board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christopher K. Khavarian

Project Number
J1418

Project Title
Are Penicillin Resistant Bacteria Resistant to Ultraviolet Light?

Abstract

Objectives/Goals
The experiment that was conducted was #Are Penicillin Resistant Bacteria Also Resistant to Ultraviolet Light?# My hypothesis was that penicillin resistant bacteria will be more resistant to Ultraviolet light then non-penicillin resistant bacteria and when the exposure time is increased then fewer bacteria will survive.

Methods/Materials
The experiment was conducted in two of the four Preuss School Labs, where my long and tedious science fair experiment began. Through this process the main materials that were used are penicillin chads, E-coli bacteria strand k, and an ultraviolet light lamp. The process in which the experiment was conducted was the bacteria was put on agar and then medicated with penicillin, later the bacteria that survived the penicillin where extracted and grew. The last and final steps where the penicillin resistant bacteria was put on agar and exposed to ultraviolet light for zero, one, two, three, four and five minutes and after 2 day they were checked for the results. Basically the same process was followed for the ordinary bacteria but just it was put strait on the plate and not grown and then grown again.

Results
The data varied for instance in the five minute range 49% of penicillin resistant bacteria survived compared to 9.1% survival. The only case where the ordinary bacteria ha more survival was in zero minutes of exposure when the average was 99.6% and for penicillin resistant the rate was 99%.The comparison between the two types of bacteria was very different and less survived on the ordinary bacteria and more survived on the penicillin resistant bacteria.
The few mishaps that might have occurred are where when the sterile loop was overheated and it could have killed the bacteria. The other thing was that one some of the dishes some mold had begun to go, which only covered 1% to 5% of the dish.

Conclusions/Discussion
My hypothesis was supported because the experiment supported that pencil resistant bacteria will be more resistant to Ultraviolet light than ordinary bacteria. From this experiment one can see that penicillin resistant bacteria are more resistant to ultraviolet light than regular bacteria. Therefore if you have an organism that is resistant to penicillin that does not mean that it will be resistant to ultraviolet light. The reason that this could have occurred is due to the genes of the bacteria being able to withstand penicillin but not ultraviolet light.

Summary Statement
The project compares whether penicillin resistant bacteria is more r less resistant to ultraviolet light than ordinary bacteria.

Help Received
Howard Hughes undergraduate Organization for all of the materials, Dr. Adina Sobo for all of the guidance and advice, Ms. Ko for all of the creative criticism and help, Parents for the entire support and assistance layout of board, The Preuss School for the opportunity, all of the Preuss Science Teachers for

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Robert L.P. Knight

Project Number
J1419

Project Title
The Effects of an Electromagnetic Field on Mealworms

Abstract

Objectives/Goals
People are exposed to electromagnetic fields daily. When someone walks through a metal detector, stands under a power line, rings an electric doorbell or uses their computer they are exposed to an electromagnetic field. It is usually not possible for a person to feel if they are in an electromagnetic field. Although no one knows for sure all the effects of electromagnetism on organic material, some studies have suggested an association between exposure and cancer. The purpose of my project was to determine if continuous exposure to an electromagnetic field will effect the lifecycle or development of mealworms.

Methods/Materials
In this experiment one hundred mealworms are continuously exposed to an electromagnetic field using copper wire coiled around a steel pole and attached to a transformer. A control group of one hundred mealworms is exposed to all the same conditions except there is no electric current attached to the copper wire.

Results
The results obtained showed significantly ($p<0.005$) faster development to pupa and beetle stages in the experimental group. There were no differences in the physical characteristics and no difference in mortality up to the first month of life.

Conclusions/Discussion
In conclusion, mealworms continuously exposed to an electromagnetic field have a more rapid development.

Summary Statement
My project is about evaluating if there are any effects of an electromagnetic field on mealworms

Help Received
Dr. Edmund Capparelli , University of California, San Diego, for help with the statistical analysis.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Chris S. Kuber

Project Number
J1420

Project Title
How Does L. buchneri 40788 Affect Silage Quality?

Abstract

Objectives/Goals
The objective is to decrease mold and yeast growth in silage fed to dairy cows. My hypothesis was that Lactobacillus Buchneri 40788 inocculant would control mold and yeast growth better than silage treated only with standard Lactobacillus Acidophilus.

Methods/Materials
One hundred fifty pounds of corn silage was cut, chopped and treated with standard Lactobacillus Acidophilus inocculant. Seventy pounds was also treated with Lactobacillus Buchneri 40788, leaving 80 pounds untreated. Silage was ensiled in PVC tubes, 4# diameter, 4 feet long, and sealed with end caps. Silage was left to ferment 90 days. PVC silos were opened and silage exposed to air. Temperatures were monitored every three to four hours, an increase indicating mold and/or yeast growth. A sample of silage was prepared and sent to a forage-testing lab in Wisconsin (Note: this was not a test that could be done at home, and in-state labs were unable to perform the tests. I chose this lab because of the large volume of tests run and high level of accuracy, and on the recommendation of university scientists I worked with.)

Results
Overall, less yeast grew in silage treated with Lactobacillus Buchneri 40788 and the standard Lactobacillus Acidophilus. Less mold grew in the silage treated only with Lactobacillus Acidophilus.

Conclusions/Discussion
Silage is fermented forage and makes up a large portion of a dairy cow's diet. It is harvested, sealed, going from an aerobic to anaerobic state. When the silo is opened for feeding to cows, the silage is exposed to air again, and mold and yeast grows. This causes actual feed loss and loss of feed quality, which leads to loss of money and sick cows. Lactobacillus Acidophilus has successfully been used for several years as a silage inocculant to speed the fermentation process just after ensiling. Lactobacillus Buchneri 40788 is a new inocculant, recently studied for its ability to inhibit mold and yeast growth at the feedout stage, when the silage is again exposed to air. The data suggests that dairymen should use Lactobacillus Buchneri 40788 combined with Lactobacillus Acidophilus to control mold and yeast growth at all stages of silage fermentation and feedout.

Summary Statement
Helping dairy producers feed better quality silage for healthy cows and thus, more good California cheese!

Help Received
Dr. Bob Charley, Mr. John Zmich, and Mr. Roland Pourier explained silage fermentation and how silage inocculants work over several conversations, California State University, Fresno Dairy Unit provided silage and advice from Dr. Jon Robison, Dad helped with procedure and research, Mom helped type

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Lan-Anh T. Le

Project Number
J1421

Project Title
How Does Caffeine Affect the Health of Children?

Abstract

Objectives/Goals
QUESTION: How Does Caffeine Affect the Health of Children?
HYPOTHESIS: If children take in high amounts of caffeine, then there will be a negative affect on their health.

Methods/Materials
Scale, measuring stick, doctor's write-up, soft-drinks, water, juice and children (four subjects).

Results
As I have shown on the poster-board how I compared the four children, its shows that the children who drink water and milk have a higher growth percentage. Even though Jonathan and Michelle (the two that drink only water and milk) are smaller in age, they are still bigger (in height and weight) than Caroline and Richard. In the tests I have performed, it shows that caffeine really does affect the health of children. In the second part of the experiment, I compared their health, height and weight from the beginning to afterwards (in the several months we stopped them from drinking caffeine). It shows progress and that their health has gone up, not a lot, but some in just several months. In the tests I have done, it shows that caffeine does have an affect on children.

Conclusions/Discussion
In conclusion, caffeine does have a negative affect on children. Based on my data, the health of Richard and Caroline, the subjects who regularly drank caffeinated sodas, were negatively affected. I have shown and described how I determined this conclusion. It is all in the information and graphs of the four children, that prove that caffeine has an affect of children.

Summary Statement
My project is about the negative effects caffeine has on the health of children and in my experiment, it shows the disadvantages caffeine has on children.

Help Received
The help I received in doing this project is my aunt helped me to test Caroline and Richard (the children that helped me in this experiment) in the second part of the test.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Rebecca S. Levin

Project Number
J1422

Project Title
Effects of UVB on p53 Wild Type and Null Cells

Abstract

Objectives/Goals
p53 is a tumor suppresser gene commonly mutated in human cancers. It is responsible for the regulation of cell cycle arrest and/or apoptosis when DNA damage occurs. The purpose of this work was to compare the effect of UVB irradiation on HCT cells that had p53 (p53+/+) versus cells lacking p53(p53-/-).

Methods/Materials
Wild Type and null cells were exposed to different doses of UVB light (312 nm), and cell death was measured using a Coulter counter to determine the correct amount of exposure for the microscopy experiments. Cells were grown in Lab Tec chamber slides. The cells received 0 or 750 mJ/m2 of UVB light. After exposure the cells were incubated for 24 or 48 hours. The cells were then staind with DAPI, a nuclear stain, and photographed.

Results
In the first part of the experiment, cell death in p53+/+ cells ranged from 34% at 250 mJ/m2 to 74% at 1000 mJ/m2. p53-/- cell death ranged from 0% at 250 mJ/m2 exposure to 82% at 1000 mJ/m2. In the microscopy experiment 24 hours after irradiation, very few p53 null cells appeared to be undergoing apoptosis whereas many p53 wild type cells were apoptotic. At 48 hours, all the surviving p53 +/+ cells appeared to be normal, however there were few mitotic cells suggesting that cells were in cell cycle arrest. In contrast, there were many mitotic p53 -/- cells, and many more cells with abnormally large nuclei or several nuclei were observed.

Conclusions/Discussion
The microscopy results at 24 hours indicate that +/+ cells do undergo apoptosis at high doses of UVB exposure. However, apoptosis was not apparent in the -/- cells, presumably because of the lack of p53, a regulator of apoptosis. In the -/- cells at 48 h, more mitotic cells were observed compared to +/+ cells and many more -/- cells with abnormally large nuclei or several nuclei were observed. Work by other groups have shown that p53-/- cells can go through mitosis after DNA damage, or that they arrest at the G2 phase, with multiple times the normal amount of DNA. Thus might explain the occurrence of oversized nuclei in the p53 null cells at 48 h. The results suggest that p53-/- cells respond incorrectly to UVB damage and can escape the cells cycle inhibition that occurs in cells with p53 present.

Summary Statement
This project studed the effect of UVB exposure of cells with and without a tumor suppressor protein, p53.

Help Received
Dr. Madeline Butler, Isis Pharmaceuticals, provided assistance and equipment

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jessica M. Massey

Project Number
J1423

Project Title
Planarian as an Indicator Organism: Will Nitrate in Hinkley Well Water Compromise Our Future?

Abstract

Objectives/Goals
This project investigates the planarian#s behavior in different levels of nitrate and examines current levels of nitrate contamination in area wells. Potential problems for humans are discussed.

Methods/Materials
I used black, brown, and dugesia planarian. Experimentation with nitrate levels was first conducted from 2 # 60 ppm to find an experimentation range. Planarian adjustment to contaminant and spontaneous regeneration were examined. Comparisons were made based on activity in control water. Water samples in the area were tested to check for nitrate involvement in the water table. Two nitrate comparator tests were used for nitrate testing in the water.

Results
Nitrate levels below 10 ppm are tolerable for planarian; however, spontaneous regenerations (appearing as fragmentation into tiny, living particles) did occur. At present, local water well tests indicate that nitrate contamination ranges from 0 # 27 ppm.

Conclusions/Discussion
The California State safe drinking water standard for human consumption is 10 ppm. Some water samples drawn from wells in the local area exceed safe levels. Health concerns abound regarding agricultural industries (dairy and alfalfa ranching) located on or near the Mojave River (dry). This planarian study leaves many questions regarding our own ability to withstand current and future nitrate contamination.

Summary Statement
Using planaria as an indicator organism, tests were conducted using water from area wells contaminated with different levels of nitrate to observe planarian adjustment to nitrate.

Help Received
Teacher advised on project

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Sophie A. Mayer

Project Number
J1424

Project Title
Tipsy Worms

Abstract

Objectives/Goals
I think that alcohol, which is a central nervous system (CNS) depressant in humans, will also have a depressant effect on worms. I wanted to design a simple bioassay to test this.

Methods/Materials
Groups of 10 night crawlers each were dipped for 30 seconds in 0%, 2.5%, 5%, 7.5%, 10%, or 13% ethanol solutions made with vodka.The time it took each member of each group to bury themselves completely in loose potting soil was measured. A lamp was placed over the soil to encourage them to bury themselves.

Results
There was little or no difference between average burrowing time in the in the 0%, 2.5%, and 5% alcohol groups. The burrowing time increased linearly in the 7.5%, 10%, and 13% groups.

Conclusions/Discussion
i conclude that alcohol impairs the CNS in worms just as it does in humans, leading to a decrease in coordination and longer burrowing times. This is a simple and inexpensive bioassay for CNS depressants.

Summary Statement
My project showed that ethanol has a CNS depressant effect on worms.

Help Received
My father helped me measure the burrowing time and showed me how to graph the results in Excel. My mother helped me paste up my display board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Philip S. Melkonian

Project Number
J1425

Project Title
Effects of Varying Soil Temperatures on Pesticide Toxicity

Abstract

Objectives/Goals
My objective is to determine if different soil temperatures have an effect on the effectiveness of pesticide on insects. My goal is to keep an accurate record of my results and be able to compare this information to further help others with this investigation.

Methods/Materials
I am using aquariums,water heaters,thermometers,plastic cups,soil,Lorban pesticide,and crickets. I am using different soil temperatures with a pesticide to see what effect it has on how fast it can kill an insect. I will be keeping a record of how long the pesticide takes to kill the insect in the different soil temperatures.

Results
I discovered that the colder the temperature was the longer the pesticide took to kill the insect. From 85 degrees to 50 degrees there was a 9 hour difference in the time the pesticide took to kill the insect.

Conclusions/Discussion
My hypothesis stated that the warmer the temperature was,the faster the pesticide would kill the insect. My hypothesis was correct. From my science project I've learned that pesticides are more effective in warmer temperatures than colder temperatures. This can be helpful to farmers to know when is the most effective time to use pesticide. In future I may want to use a few other different pesticides for my investigation.

Summary Statement
Comparing if pesticides are more effective in warm or cold temperatures on insects.

Help Received
My science teacher and the district science coordinator gave me encouragement and support.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Rachel E. Miller

Project Number
J1426

Project Title
Don't Give Fluoride the Brush-off: The Effect of Tooth Brushing on the Development of Decay in Baby Teeth

Abstract

Objectives/Goals
To determine if brushing the teeth of babies and children under two with water, or not brushing them at all, is less effective than, or as effective as, brushing with fluoridated toothpaste in preventing dental caries.

Methods/Materials
18 extracted baby teeth from the same mouth were placed in nine different air-tight, screw-lid glass containers each containing human saliva and either milk, apple juice or non-fluoridated water. The teeth were cleansed in different ways: six were brushed daily with fluoridated toothpaste, six were brushed daily with water and six were never brushed. Every two days the teeth were observed.

Results
After 15 days of experimentation, when compared to teeth immersed in the same liquid, the teeth brushed daily with fluoridated toothpaste were in the best condition. The teeth brushed with water significantly deteriorated from their original condition. The teeth never cleansed in any way showed the worst signs of decay and exhibited extreme changes from their original form.

Conclusions/Discussion
Because, among teeth immersed for 15 days in the same liquid, those brushed with fluoridated toothpaste were in the best condition at the end of the experiment, it is essential to brush a young child's teeth with fluoridated toothpaste at least once a day to prevent the development of dental caries. Therefore, the recommendation of the American Dental Association that fluoridated paste not be used on young children's teeth should be changed. Also, because exposure to apple juice resulted in extreme decay even in those teeth brushed with fluoridated paste, parents should limit the drinking of apple juice by their young children.

Summary Statement
This project is about the effect of tooth brushing (with either water or fluoridated toothpaste) on the development of tooth decay in baby teeth exposed to milk, apple juice or non-fluoridated water.

Help Received
Science teacher helped find the mass of teeth using electronic balance; photographer took photos of teeth after experiment was completed using micro lens.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kimberly A. Moore

Project Number
J1427

Project Title
What Is the Survival Rate of Fetal Rat Brain Cells After Treatment with Nicotine, Alcohol, and Tobacco?

Abstract

Objectives/Goals
The objective is to determine which substance, nicotine, alcohol, or tobacco has the greatest impact on the survival of fetal rat brain cells.

Methods/Materials
Fetal rat brain cells were available from a laboratory at USC where I conducted my experiments. I placed brain cells on 30 gridded cover slips coated with 10 micrograms per ml of poly-d-lysine. I randomly selected 5 grids on each cover slip and counted the number of brain cells before treatment. I then prepared 5 solutions, one was a nicotine solution, one was a ground up cigarette and water solution, a ground cigarette and ethanol solution, an ethanol control, and a media control. I treated the cells for 24 hours and then counted the exact same grids and recorded the results

Results
After 24 hours the average survival rate of brain cells treated with nicotine was 89%. The brain cells treated with tobacco and ethanol was 86%. The survival rate treated with tobacco and water was 83%. In all 94% of the brain cells that were trated with ethanol survived. All (100%) of the brain cells that were not treated survived after 24 hours.

Conclusions/Discussion
In conclusion, I found that the tobacco and water extract had the lowest brain cell survival. The tobacco and ethanol extract and nicotine also had low survival. This experiment shows the harmful affect of these substances on brain cells. This provides important information to people about tobacco and alcohol and its harm to our brain cells.

Summary Statement
This project shows the affect of nicotine, alcohol, and tobacco on fetal rat brain cells.

Help Received
My mother helped type project and poster, and drove me to USC. Angela Dietreich, USC research assistant, supervised and helped with calculations and experimental setup in the laboratory. Kathleen O#Neal, USC researcher, taught me methods used in the laboratory and helped photograph the cells. Dr.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Sara R. Nickel

Project Number
J1428

Project Title
Do Fruit and Vegetable Washes Really Work?

Abstract

Objectives/Goals
The objective is to determine if the commercially available fruit and vegetable wash products remove bacteria better than dilute vinegar or water alone.

Methods/Materials
Five fruit and vegetable wash products, dilute vinegar and water were used to clean organically grown(no pesticides) tomatoes. The tomatoes were then cultured on blood agar plates and incubated for 48 hours at 37 degrees celcius.The plates were removed from the incubator and photographed. Bacterial colony counts and area of growth were measured for each plate. The data was recorded in tables and bar graphs.

Results
Washing with water or dilute vinegar solutions resulted in 80-90% reduction in bacterial colony growth. Three of the commercially available fruit and vegetable washes were comparable to water alone. Two of these products actually did worse.

Conclusions/Discussion
Several of these products advertise that they are 300-400% more effective than rinising with water alone. None of these claims were proven true according to this experiment. In fact these products showed little, if any, benefit. Currently, the Federal Government does not have standardized testing methods for fruit and vegetable washes and advises consumers to rinse all produce with water.

Summary Statement
I compared the effectiveness of 5 fruit and vegetable washes to dilute vinegar and water alone.

Help Received
Dr. Michael Richardson, Pathologist, at St. Francis Hospital, in Santa Barbara, provided the petri dishes, incubator and photographic equipment. My parents helped with obtaining the tomatoes and the vegetable washes.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ramina J. Nouri

Project Number
J1429

Project Title
Does Beta-Carotene Prevent Cancer in Plants?

Abstract

Objectives/Goals
The objective is to find out if beta-carotene will prevent the cancer caused by the plant carcinogen agrobacterium tumefaciens in plants, which plant is it more affective in Mammoth Sunflower or Lemon Queen Sunflower. My hypothesis what that beta-carotene would prevent cancer in the plants and be more affective in mammoth than in lemon queen sunflowers.

Methods/Materials
Needed to obtain, 1 packet of mammoth sunflower seeds and lemon queen sunflower seeds, 12 flower pots, tap water, beta-carotene (vitamin A) solution (5 caplets to 1 pint of water), disinfectant, inoculating needle, Agrobacterium tumefaciens (a plant carcinogen)
Purchase sunflowers at Home Depot. Purchase beta-carotene from drug store. Divide seeds into three equal groups A, B, and C. Group C is control. Germinate group b in beta-carotene solution and A, C, in water. Plant the seeds. Wait for Lemon Queen to grow 10cm and Mammoth to turn 18cm then inject group A and B with agrobacterium tumefaciens. Water group B biweekly with beta-carotene solution water groups A and C biweekly with water. Observe for next 2 weeks.

Results
The four sunflowers that have been watered with Beta-carotene and nothing else and have been injected with agrobacterium tumefaciens seem to be health. The plants that were watered with tap water and injected with Agrobacterium tumefaciens have slowly wilted. They have turned brown and are sagging. It turned out that the Mammoth sunflowers grew taller than the Lemon Queen sunflowers. The Lemon Queens did not rot as fast as Mammoth sunflowers. They were smaller but much stronger. My hypothesis proved half correct and half incorrect. The Beta-carotene did cure the cancer in the plants but the Lemon Queen was stronger and did not rot as fast in Agrobacterium tumefaciens.

Conclusions/Discussion
My hypothesis proved partially correct. The Beta-carotene did cure the cancer in the sunflowers. The part that was incorrect was that the beta-carotene would work better in Mammoth sunflowers. It proved to work better in Lemon Queen.

Summary Statement
I wanted to see if beta-carotene would prevent the cancer caused by the plant carcinogen agrobacterium tumefaciens in mammoth and lemon queen sunflowers, I also wanted to see which sunflower it would be more affective in.

Help Received
My mother supervized me while i injected the plants and helped pot them, my teacher Mr.Keith Newell purchased the agrobacterium tumefaciens for me, my father helped pot the sunflowers and look for stores to buy the plant carcinogen from.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Sarah M. Prince

Project Number
J1430

Project Title
The Effect of Salt on How Venus Fly Traps Close

Abstract

Objectives/Goals
The objective of my project is to see if adding salt to Venus fly traps affects whether or not they close, and how quickly.

Methods/Materials
As needed, I watered Venus fly traps with water (control), 0.1 M NaCl, and 0.2 M NaCl. I used six plants for each treatment. On four days over a one-week period, I checked how quickly they would close. To do this, I used a toothpick to brush across the hairs on the leaves, which should cause them to close. I timed how quickly they closed, if at all. How quickly they closed and what percentage of them closed was recorded.

Results
I calculated the average closing time for each day and each salt concentration. It turned out that the Venus fly traps that were given the most salt closed the slowest, although the standard deviations were high. After so many days of getting watered with the correct solution, some of the leaves didn#t even close at all. As time went on the plants watered with 0.2M salt looked sicker and sicker. In fact on two of the days none of the 0.2 M#s closed at all (1/11 and 1/17). The mean closing time for the control plants (0 salt) didn#t change over time in this experiment. Both the 0.1M and the 0.2M treatments caused longer closing time by the end. In addition to the mean and the standard deviation, I calculated the percent of plants that closed, since not all of the leaves were able to close at all after being watered with salt water. Over time, a lower percent of the plants closed, for each of the three treatments. Surprisingly, early on the 0.1M did better than the control. There was always a smaller percentage of 0.2M that closed.

Conclusions/Discussion
In the end, my data supported my hypothesis. The leaves on the plants that got the most salt closed more slowly. Maybe this is because the sodium got in the way of the potassium, which moves through the same holes in the cell membrane. The plants without salt closed the quickest. Also, the plants that got the most salt had the lowest percentage of leaves that closed, too. These plants also didn#t look very healthy, so maybe the leaves closed slowest for that reason. The 0.1 M NaCl plants and the control plants still looked healthy at the end of my experiment.

Summary Statement
To see if salt affects how fast Venus fly traps close.

Help Received
My dad told me about how Venus fly traps close and helped me with a stopwatch and Cricket graph. My mom helped me paste my poster together.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kavita Renduchintala

Project Number
J1431

Project Title
The Effect of UV Light on DNA

Abstract

Objectives/Goals
My problem statement is: How long does it take for UV light to damage DNA (bacteria)? What types of materials protect DNA from UV light?

My objective was to find out how long it takes for Ultraviolet Light to kill DNA(bacteria), and what types of materials protect DNA(bacteria) from Ultraviolet Radiation.

Methods/Materials
1 spectrophotometer, 1 piece of black and white (felt, cloth, and paper), 50 pipettes, 100 petri dishes, 200 ml bacteria (Escherichia Coli), 200 ml bacteria-medium (Luria-Bertani medium), 20 50 ml test tubes, 1 piece of red and blue paper, 1 incubator set at 37 degrees Celsius,1 UV tube light, 1 roll of saran wrap

Procedure 1 (for first part of the problem statement)
A.Take 4 petri dishes and put 1 ml each of the bacteria and bacteria medium. Swish to mix.
B.Expose 1 petri dish for 30 mins., 1 for 15 mins., 1 for 5 mins., and leave the last one with no exposure.
C.Incubate all 4 petri dishes at 37 degrees Celsius for 24 hours.
D.Take samples from each petri dish, and use a spectrophotometer to record results.

Procedure 2 (for second part of the problem statement)
A.Take 7 petri dishes and put 1 ml each of the bacteria and bacteria medium. Swish to mix.
B.Expose all petri dishes for 30 minutes with the protection material on top of the petri dish.
C.Incubate all 4 petri dishes at 37 degrees Celsius for 6 hours.
D.Take samples from each petri dish, and use a spectrophotometer to record results.

Results
The bacteria which was exposed for 30 minutes was the most affected. These are the materials from the best to worst protection; paper, felt, exposed with the petri dish cover on, cloth, saran wrap, and no protection.

Conclusions/Discussion
It took the UV light 30 minutes to actually start affecting the DNA (bacteria). The color of the material does not matter, but the type of material does.

Summary Statement
My project is about the affect of Ultraviolet Radiation on DNA (how long it takes to kill the DNA and what types of materials protect the DNA).

Help Received
Used lab equipment at University of California, Irvine under the supervision of Dr. Sastry Gollapudi, Mother transported me to the University when needed, Dad helped format the document and display board

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Allison B. Richina

Project Number
J1432

Project Title
Effects of Pain Relievers and Cough Syrups on the Development of Frog Eggs

Abstract

Objectives/Goals
The Objective is to determine if adding pain relievers and cough syrups into the frog eggs habitat. Will this increase or decrease the growth rate of the frog eggs?

Methods/Materials
I used 5 different pain relievers, cough syrups, and a control. With each of these,I made 1:10 and 1:100 dilutions. In each of these tests, I had 50 test samples (10 cups with 5 eggs in each). I measured on a daily basis the hatch rate of frog egg to tadpole.

Results
My results have shown that adding medication to their environment will hinder or slow the growth rate from egg to tadpole. The control specimens have shown the most rapid growth rate of all. They began hatching in 24hrs and had completely hatched in 48hrs. By 7 days in the 1:10 dilutions, there was no growth in the Ibuprofen and Tussin samples. The Tylenol, Aspirin, and Triaminic tests have shown near 50% growth. By 7 days in the 1:100 dilutions,
there was no growth in the Ibuproben tests. In the Tylenol,Aspirin,Triaminic, and Tussin tests,there was near 85-90% growth.

Conclusions/Discussion
Pain Relievers and Cough Syrups aid in the overall health of humans. I wanted to see if adding these substances would increase growth rate. I found that adding these substances hindered the growth rate. The medications were not toxic to the eggs since most all eggs changed to tadpoles. Some of the eggs did die but overall the eggs were healthy and durable. This project has shown me that medications may be beneficial in maintaining health but they have no
benefit in enhancing the growth rate of frog eggs.

Summary Statement
To determine if the growth rate of frog eggs to tadpoles is effected by the addition of medications.

Help Received
Mother helped with the board and some of the typing

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Rebecca M. Ruf

Project Number
J1433

Project Title
Olfactory Function and Cigarette Smoke: Does Exposure to Cigarette Smoke Affect Your Sense of Smell?

Abstract

Objectives/Goals
Conduct controlled testing to see if inhaling cigarette smoke as a smoker or second-hand smoker effects the olfactory sense.

Methods/Materials
Four recognizable smells that were easily diluted into different concentrations were chosen. Vinegar, vanilla and strawberry extract, and coffee were selected. The most dilute solution was assigned a value of 100% with concentrations increased by 100% intervals up to 600% for vinegar, vanilla and strawberry extracts. Concentrations from low to high for coffee were between 100% and 1100% for six samples. The test subjects sniffed each sample working from the lowest toward the highest concentrations until they could detect an odor. The number of the cup, which corresponded to the concentration of the particular scent, was recorded. The participants then continued until they could identify the substance. This was recorded as the point of recognition. When the data collection process was complete, I separated all of the survey sheets into four catagories: nonsmoker, past smoker, current smoker and people who do currently or have lived with smokers. These groupings were then sorted into subgroups of men and women.

Results
Current smokers required higher odor concentrations for first detection and recognition levels than other subject catagories. Past smokers and people who live with smokers detected odors at a higher concentration than nonsmokers, but lower than current smokers. Both past smokers and people who live with smokers had similar results. In some cases past smokers could detect odors at lower concentrations. The results were similar for both men and women, with men's sense of smell generally weaker than women's.

Conclusions/Discussion
The data supports the initial hypothesis that cigarette smoke causes a diminished sense of smell both for detection and recognition of odors. The data also supports the second statement in the hypothesis that the sense of smell can improve if a smoker quits. It was found that women and men experienced a decrease in sense of smell where they have been exposed to cigarette smoke in a live-in environment or due to their own past or current smoking habits. Current smokers did the worst on the smell test. Past smokers had a better sense of smell than current smokers at both the first detection and recognition levels. Subjects that live with or are past smokers scored worse than nonsmokers and better than current smokers.

Summary Statement
Measuring the effects of cigarette smoke on olfactory function.

Help Received
Mr. Scates for encouragement; Mother helped develop test samples and supervised testing; Neighbors volunteered for initial trials; Father helped sort data, edit text and check graphs; Sister arranged for table space at SJSU Student Union; Brother and fellow student provided assistance with volunteer subjects.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Edward G. Schloss, Jr.

Project Number
J1434

Project Title
The Effects of Different Food Colorings on Tenebrio molitors (Mealworms)

Abstract

Objectives/Goals
The objective of my project is to determine how five food dyes, commonly used in consumer products, will affect the physiological growth, development, and death rate of Tenebrio Molitors.

Methods/Materials
An experimental design method was used to randomly choose ninety mealworms and divide them into 6 groups. Each individual mealworm was placed in a cup with dye added to its food. Daily observations were done for 26 days (Exoskeletal sheds, pupas, death). Every other day they were measured for length and weight (O#Haus digital balance scale). Apples were added for moisture every 3rd day and food/food coloring was changed every 5th day.

Results
The control group which was fed no food coloring had the best results with a death rate of only 6%. The one death was on the 26th and final day of testing. The red dye group, which had infamous chemicals such as Red 40 and Red 3, was found to be the most detrimental to the mealworms with a death rate of 47%. The second highest was the mixed dye group with 33% death rate. Green and yellow tied for the 2nd lowest death rate, followed by the blue dye.

Conclusions/Discussion
My conclusion is that food colorings used in consumer food products can be detrimental to the growth, development and death rate of mealworms. Standard deviations, Standard errors and Confidence Intervals were calculated to test data reliability.

Summary Statement
My project is testing whether different food colorings added to mealworms' diets are detrimental to their growth, development and death rate.

Help Received
Mother helped prepare food for the mealworms; Math teacher helped explain reliability tests; brother helped cut out board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Gadielle Stein-Bodenheimer

Project Number
J1435

Project Title
The Effect of Carbon Dioxide on the Reflex Bleeding Rate of Hippodamia convergens

Abstract

Objectives/Goals
My project is an investigation of how the reflex bleeding rate of Hippodamia convergensis is effected by the increase of carbon dioxide in the ladybeetles' atmosphere.

Methods/Materials
The carbon dioxide used in this experiment was the captured product of the reaction between baking soda and vinegar. The CO2 was gradually increased in six containers of ladybeetles. Two additional containers were kept as controls and did not contain heightened levels of carbon dioxide. I conducted two trials to ensure accuracy.

Results
My results showed that low percentages of carbon dioxide in the environment of the ladybeetles did not cause them to change the amount of blood that they excreted. However, high percentages of carbon dioxide caused the ladybeetles to secrete less than normal amounts of blood.

Conclusions/Discussion
The addition of abnormal amounts of carbon dioxide in the atmosphere negatively effects the ladybeetles' ability to protect themselves from predators. I believe that the ladybeetles' were able to adapt to low amounts of carbon dioxide, because the gas is already in existence in our atmosphere. But when they were exposed to high amounts, they were unable to adapt, and therefore their means of protecting themselves were compromised.

Summary Statement
The effect of carbon dioxide on the reflex bleeding rate of Hippodamia convergens.

Help Received
NONE

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ashley S. Wasser

Project Number
J1436

Project Title
Nutrient Modification of the Convergent Lady Beetle, Hippodamia convergens Coloration

Abstract

Objectives/Goals
To determine the effect of rearing Hippodamia convergens larva in a carotenoid enchanced environment on adult lady beetle spot and dorsal coloration

Methods/Materials
Experiment#1: 60 Hippodamia convergen larvae were divided into 6 experimental vials containing nutrient mixed with a test agent. The test vials included a control group,a 0.5 milligram and a 1 milligram dose Vitamin A group, a 0.5 milligram and 1 milligram dose Beta Carotene group and a 1 milligram Vitamin C group.In Experiment#2:60 larvae were similarly divided,however the nutrient medium was treated with one tenth of the dose utilized in Experiment #1,either 0.5 or 1 microgram of test reagent

Results
Vitamin A and Vitamin C groups exhibited no change in pigmentation. Microgram doses of Beta-Carotene resulted in a modestly increased dorsal pigmentation.

Conclusions/Discussion
Dorsal coloration of the Convergent Lady Beetle,Hippodamia convergens, appears to be carotenoid or nutrient dependent.

Summary Statement
This project is designed to demonstrate that pigmentation in lady beetles exhibits a linear relationship with dietary carotenoids.

Help Received
Mother heped with typing and board display,Equipment at Briarwood Medical group, Supervision of project with teacher Mr.Louis Garcia, mentors Douglas Taren of the University of Arizona and Dr. H.L. Wasser, endocrinologist

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Carmen Whitley

Project Number
J1437

Project Title
Do You Believe in Magic? Testing the Rationality of Traditional Beliefs

Abstract

Objectives/Goals
Most people dismiss traditional Native American beliefs as superstitions and black magic, but was there truly a rational reason for certain beliefs? My project investigates whether certain traditional Indian beliefs were actually rational. I have looked at the tobacco ceremonies used by South American natives, focusing on the Blessing of the Crops with tobacco smoke. These Indians believe that tobacco is a purifying or cleansing agent and that it will protect their crops. My hypothesis is that this traditional belief has a scientific basis.

Methods/Materials
I tested this hypothesis by an experiment that looks at the effect of tobacco on plants exposed to bugs. My hypothesis is that this religious belief helped kill insects and increase crop yield, therefore there was a rational reason to do this. I tested this hypothesis by growing bean plants, infesting them with Pacific Spider Mites, and seeing if tobacco prevented or inhibited the infestation rate.

Results
In my results, the Control Group had a very mild infestation: 1.3% total leaf infestation, 32% partial infestation and 66.7% no infestation. Variable Group A, which did not receive tobacco, had 68% of the leaves in the aquarium totally infested, 27% moderately infested and 4.7% of the leaves not infested at all. Variable Group B, which had tobacco, had 32.8% of the leaves totally infested, 36.1% partially infested and 31.1% not infested at all. .

Conclusions/Discussion
Through this experiment, I showed that my independent variable, tobacco applied to some of the plants, effected the dependent variable, the Pacific Spider Mite infestation rate. I believe that tobacco had this effect due to the toxic effect of its active chemical agent, nicotine. These results show that my hypothesis is correct

Summary Statement
I tested whether traditional Soputh American Indian beliefs had a rational scientific basis.

Help Received
Mr. Ed McFadden, professional farmer, helped obtain insects and design hothouse; Dr. Rick Chacon, El Camino College, provided photos; parents helped with board lay-out. ick Chacon

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Michael A. Zuniga

Project Number
J1439

Project Title
Determining the Effects of Various Alcohol Levels on the Heart Rate of Daphnia

Abstract

Objectives/Goals
My objective was to find if alcohol is really a depressant.
I'll determine this by using a daphnia's heartrate after being exposed to various alcohol rates (by volume).

Methods/Materials
I scooped up the daphnia with a spoon and placed on a single microscope slide then added 2-3 drops of 1 of my test liquids.
I then counted the heartbeats for 10 seconds, and multiplied the result by 6 to get the heartrate for 1 minute.
I tested alcohol levels of 1.2%, 5%, 10%, and 12% alcohol by volume.

Results
The alcohol increased the heart rate. The 12% alcohol level increased the heartrate the most.

Conclusions/Discussion
My hypothesis was wrong. The heartrate increased when exposed to the higher alcohol contents. This disproves the theory that alcohol is a cardiac depressant.

Summary Statement
Determining if alcohol affects the heartrate of daphnia.

Help Received
Teacher helped with experiment

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jenny L. Frutchey

Project Number
J1499

Project Title
The Effect of Ethyl Alcohol on Seed Germination

Abstract

Objectives/Goals
The objective of my project was to determine the effect of ethyl alcohol on seed germination. I wanted to see if ethyl alcohol would have a similar effect on seed germination as it does on human fetuses.

Methods/Materials
Five groups of Red Hard Winter Wheat seeds were tested upon, using vodka instead of straight ethyl alcohol. One group received 100% water while another received 100% vodka. Other mixtures were used to test a range of concentrations of water and vodka. Each day any stem growth was measured and at the end of the ten days my experiment lasted for, the roots of each individual seed were measured.

Results
The more vodka the wheat seeds recieved, the more retarded the growth of the roots appeared to be (no groups that recieved any vodka at all grew any stems). Throughout the ten days, all of the groups excepting the group receiving all vodka had visable root development.

Conclusions/Discussion
I can conclude that yes, ethyl alcohol does have a similar effect on seed germination as it does on human fetuses. The growth of the roots was slowed by the ethyl alcohol in vodka; no seeds receiving ethyl alcohol grew any stems at all during the ten days. I still would like to continue seeing the effect of ethyl alcohol on plants, in general, in case it would still be similar, in certain circumstances, to ethyl alcohol's effect on humans.

Summary Statement
The impact of various concentrations of ethyl alcohol and water on seed germination.

Help Received
Used an alcoholic substance, vodka, under supervision of my mother.