CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Shannon M. Gonzalez

Project Number
J0401

Project Title
Fruit: When You Are Ripe, You Are Right

Abstract

Objectives/Goals
The objective of this project was to accuratly test pears to see if placing them in different conditions would effect their ripening process.

Methods/Materials
15 unripe pears, paper, tape, permanent marker, scissor, scalpel, parafilm, eppendorf tubes, ohaus balance, distilled water, Sorvall Mc 12v, Finnpipette (5-40 micro liters), pipette tips, refractometer, 95% ethanol solution, Kenmore wipes, journal/log.

Results
The #E# pears, which were left in the windowsill, ripened faster than the others and were in perfect conditions to be eaten. The #D# pears, which were placed in a dark area, ripened the second fastest, while they were at a rotting point. The #C# pears, which were placed in regular room temperature, ripened less quickly than the others and came in third place. If left slightly longer in their assigned condition, they would soon have been ready to eat. The #B# pears ripened less fast than the others because of the fact that they were placed in the refrigerator.

Conclusions/Discussion
The hypothesis was correct because all of the pears ripened at a different speed due to the fact that they were placed in different environments. The refractive index apparently droped when a fruit was placed in the refrigerator because the readings were recorded to be lower after a week in the refrigerator than at the starting point. This was because when a fruit was placed in a refrigerator it preserved the fruit, stopping the production of ethylene, which is a hydrocarbon gas that makes fruits ripen. The fruits that were not placed in the refrigerator began to ripen because hydrolases, found in enzymes produced by ethylene, began to do their part of breaking down the chemicals found inside the pears. The fruit#s sour taste changed as the chemicals and acids were being broken down. #Degradation of starch by amylase# produced sugar, which increased the juiciness of the fruit. Enzymes also transformed large organic molecules into smaller ones that evaporated in the air, giving the fruit a scent. The break down of chlorophyll also contributed to the fruit developing new color/colors.

Summary Statement
This project accuratly tests if placing pears in different conditons effects their ripening process.

Help Received
Used lab equipment at San Diego State University under the supervision of Janice Shackleford.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jan M. Humphrey

Project Number
J0402

Project Title
A Link to the Future

Abstract

Objectives/Goals
Given three linked loci, yellow body (y), a rough eye known as echinus (ec), and cut wings (ct), what is their frequency of recombination and thus the distance between them, and what is their sequence along the chromosome?

Methods/Materials
Drosophila melanogaster were used as experimental subjects. Test crosses were performed and the results were evaluated.

Results
The distances expressed in terms of percent of recombination have been determined as y - ec = 5.4, y - ct = 24.9, and ec - ct = 20.3. This shows that the sequence along the chromosome is y, ec, ct.

Conclusions/Discussion
The genes are arranged in a linear fashion along the chromosome and the frequency of recombination between them reflects their relative positions. The frequency of recombination can also be used as a measure of distance between the pairs of genes, and their linear distribution along the length of a chromosome can form the basis of a genetic map.

Summary Statement
My project is about the frequency of recombination between specific gene loci in Drosophila melanogaster.

Help Received
I received help from local high schools and college in specific problem areas.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ken L.M. Lozano

Project Number
J0403

Project Title
DNA Extraction from White Onions using Laboratory Reagents vs. Household Materials

Abstract

Objectives/Goals
The objective was to determine if there is a difference between the characteristics of DNA extracted from white onions using laboratory reagents versus household materials.

Methods/Materials
Onion DNA was extracted in four trials from the white variety (control variable) using two types of extraction materials (experimental variable). The first involved the use of laboratory reagents (DNA NOW Cell Lysis Reagent and Precipitation Reagent) using the Biogentex Science Project Series SP 101 Kit "DNA Isolation Lab". The second involved the use of common household materials (detergent, meat tenderizer and isopropyl alcohol) following the procedure taken from the General Science Learning Center Website "How to Extract DNA from Anything Living". The general extraction method used is as follows: Collect onion cells through chopping and blending; Split openonion cells using DNA NOW Cell Lysis Reagent or detergent; Destroy enzymes using DNase Inhibitors; Separate DNA by heating between 55 to 65 C or meat tenderizer; and finally Precipitate DNA by DNA NOW Precipitation Reagent or 70% isopropyl rubbing alcohol. The onion DNA extracted was evaluated for general appearance. color, texture and amount obtained.

Results
The results of the four trials showed that the DNA extracted from white onions exhibited some differences in general appearance, texture and amount obtained. DNA extracted using laboratory reagents was in bubble-like stringy clumps at the middle and top of test tube. It was white with smooth, gelatinous texture. The one extracted from household materials was a thin, rough, clumped mucous-like white film between the alcohol and onion filtrate layers which eventually became clumpy. There was more onion DNA obtained using laboratory reagents as compared to household materials.

Conclusions/Discussion
In conclusion, there was a difference between the onion DNA extracted using laboratory reagents versus household materials in terms of general appearance, texture and amount obtained. From this experiment, future study involving electrophoresis for DNA profiling of other onion varieties can be done.

Summary Statement
This project deals with the comparison of DNA extracted from white onions using laboratory reagents versus common household materials.

Help Received
Dr. Reynaldo Villareal helped me select onions for this project; my dad helped me put together the wood base of the display board; and my mom/home school instructor guided me through all the steps of making a science project.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kristen E. Seabury

Project Number
J0404

Project Title
The Effect of Antioxidants in Preventing Further Oxidation in TBA Analysis

Abstract

Objectives/Goals
My project mainly focused in testing the effects of antioxidants in slowing the rate of oxidation in a TBA analysis using pure pork, beef, and vegetable oil. In the tests I used each of the oils, hexane, and a TBA solution put in three test tubes. By boiling the solution in a water bath for a designated amount of time (30 or 40 minutes) with or without BHA, BHT, or tocopherol at a concentration of 1%, I then measured the aqueous layer at the bottom in a spectrophotometer and recorded the absorbance number. By comparing and analyzing the absorbance numbers of several tests that used the same chemicals and were heated for the same time, I concluded from my results that using antioxidants did slow the oxidation down in one of the three oils using all three antioxidants.

Methods/Materials
To perform the TBA analysis, three pure oils (free from antioxidants) pork, beef, and vegetable were used. Six grams of each were weighed into one of three test tubes and were dissolved in six milliliters of hexane and eight grams of TBA solution. They were then heated in a hot water bath for either 30 or 40 minutes depending on the run. After heating an watery layer on the bottom of the test tubes was collected with a pipet and read in a spectrophotometer at 510 nm. This method was used for the control. The runs with the variables, this process was repeated except either .2g og BHA, BHT, or tocopherol (antioxidants) was added. The absorbance numbers were recorded and compared to analyize the effects of the antioxidants in slowing the oxidation rate down.

Results
The end results aren't what they were expected to be. All three antioxidants only took affect in the beef oil for 30 and 40 minutes and for the pork and vegetable oil they didn't seem to have any effect whatsoever for 30 and 40 minutes. In fact when graphing the results, the samples with the variables had a higher absorption number than samples with the control indicating more oxidation.

Conclusions/Discussion
In conclusion, the explanation for the results would be there wasn't enough malonaldehydes (which is the compounds that come off the oil as a result of oxidation and what the TBA analysis is measuring) in the pork and vegetable oil was low in the control and high in the variable samples. To contine research, the heating time will be decreased and all runs will be repeated so the results will be more accurate.

Summary Statement
My project is about studying the effects of antioxidants in slowing the rate of oxidation in oils in a TBA analysis.

Help Received
Teacher taught me procedures, mentor sent me protocols, answered questions, teacher helped revise report, friend helped me with measurements

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Francisco J. Tejeda, Jr.

Project Number
J0405

Project Title
What Conditions Affect the Lactate Dehydrogenase Enzyme?

Abstract

Objectives/Goals
The purpose of this study is to determine some conditions that affect the reaction rate of the lactate dehydrogenase (LDH) enzyme. How does changing the amount of enzyme present affect the reaction rate of LDH? How does changing the degree of acidity, measured as pH, affect the reaction rate of LDH? How does changing the amount of reactant present, pyruvate, affect the reaction rate of LDH? Does cibacron blue (CB) inhibit the reaction rate of LDH? If so, what type of inhibition is observed?

Methods/Materials
First, a set of conditions were used to monitor LDH reaction rate. In order to answer each question of the objectives, all conditions remained identical except for the condition being tested.

Results
As more enzyme is added to the reaction the LDH reaction rate increases. LDH performs its reaction the fastest at pH 7. As more substrate is added to the reaction, LDH reaction rate increases. Cibacron blue was observed to inhibit LDH competitively.

Conclusions/Discussion
Predictions made about LDH reaction rate under different conditions were identical to the results obtained. But an incorrect prediction about increasing pyruvate was made.

Summary Statement
The purpose of this project is to determine what conditions affect the reaction rate of lactate dehydrogenase enzyme.

Help Received
Kathy McNamara Schroeder at San Diego State University donated the materials, equipment and procedures for this project. I performed all of the experimental work myself. My brother Genaro Hernandez showed me some math and graphing techniques used in this project. My brother also guided

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Katherine S. Wu

Project Number
J0406

Project Title
Enzymatic Activity

Abstract

Objectives/Goals
The objective is to determine if temperature fluctuations in the environment will affect the rate of oxygen produced by the enzymatic activity of the enzyme catalase.

Methods/Materials
My My main materials were porcine liver, test tubes, hydrogen peroxide, detergent, and oil. The temperature of the environment of liver in a testtube(which contains the enzyme catalase) was changed. One control had no liver in it.After one drop of oil, detergent, and then hydrogen peroxide were dropped into the test tube, the resulting foam was measured with a ruler.

Results
The enzymatic activity peaked consistently at 40 degrees Celcius throughout the three trials conducted.

Conclusions/Discussion
My conclusion is that temperature does have an effect on enzymatic activity, and that enzymatic activity peaks at forty degrees Celcius.

Summary Statement
My project is focused on how temperature affects the rate of oxygen produced by enzymatic activity.

Help Received
My teacher loaned materials for experiment and helped me with several difficulties in my project; my mom and dad took me to the library and printed out the color graphs at their companies.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Scott A. Wood

Project Number
J0499

Project Title
Which Substance Has the Most Effect on Inhibiting Platelet Adhesion?

Abstract

Objectives/Goals
I wanted to see which medicine would have the most effect on the patelet activity.

Methods/Materials
I used the Surgicutt Jr. bleeding time tester and blotting papers.
I also used Aspirin, Gingko Biloba, Ginseng, and Garlic.
I conducted the bleeding time test after the subjects took a controlled amount of each substance.

Results
The aspirin was by far the most effective blood thinner. The Ginseng was the most effective herb.

Conclusions/Discussion
My hypothesis was partially correct. Aspirin was the most effective of all but garlic wasn't the most effective herb. Ginseng was.

Summary Statement
Finding what medicine effected platelets most.

Help Received
Mother helped with internet. Dr. Craig Carpenter and Dr. Jamin Boggs helped with research. Grandpa helped build boards.