Abstract: Science and Engineering Fair of Houston

3441

Category:

Plant Sciences

Quantifying Antioxidant Capacity of Moringa Leaf Extracts Using Smartphone Colorimetry and an Apple-Browning Bioassay: A Low-Cost Approach Relevant for Resource-Limited Communities

Avery Wong

Fort Bend ISD /Austin High School

Enzymatic browning of apples (Malus domestica) occurs when the fruit phenols come in contact with oxygen, which is catalyzed by Polyphenol Oxidase (PPO). This study is aimed at finding out if and how Moringa oleifera (Moringa) can prevent enzymatic browning in apples by using Moringa's relatively high polyphenolic and flavonoid compound levels and Moringa's availability around low-income areas. Apple slices were subjected to three different extracts (Moringa, Spinach, and Green Tea) and also comprised an untreated control group for the experiment. All the apples were sourced from the same place, cut into equal pieces of about 0.5mm, and kept at the same temperature. A Colorimetric visual assessment of apple slices was performed to check if the treatments affected the enzymatic browning rates, which were scored according to a system at time intervals that were pre-determined. The study's data revealed that the slices that had been given Moringa extract treatment experienced the least amount of browning, thus proving that Moringa extract is a source of antioxidants. Moringa leaf extracts have been reported to reduce Polyphenol Oxidase activity, or they may scavenge excess oxygen, thus preventing the enzymatic oxidation of phenolic compounds. Therefore, this study's findings confirm that due to the Moringa leaves' very high concentrations of polyphenolic and flavonoid constituents, they can offer a low-cost and effective way to preserve foods in low-resource environments.

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Abstract: Science and Engineering Fair of Houston

3442

Soil Detox: Testing Natural Metal-Binders and their Combinations for Lead Immobilization in Contaminated Soil

Sachi Lee, Hana Lee

Conroe ISD /AST: Academy of Science and Technology

Category:

Plant Sciences

Lead, a heavy metal found in soil, can be and has been introduced to environments through industrial activities and pesticides. Exposure to it can be harmful to plants, leading to weakened structural systems, wilting, and discoloration -affecting photosynthesis processes. To reduce the bioavailability of this soluble contaminant, the natural detoxifiers phosphate, zeolite, and bentonite clay were used individually and in combinations for experimentation to determine which would be most effective in reducing the uptake of lead into Grand Rapids Lettuce plants. All three detoxifiers are known for having an effective trapping reaction when coming in contact with lead, whether it participates in a precipitation reaction or a cation exchange, and has properties that naturally immobilize lead to plants. For experimentation, plants were potted with soil that was contaminated with 500 parts per million of lead nitrate, equivalent to 7.50 mL of contamination mixed into the 450 g of soil, and grown for four weeks. Data was collected through the experimenters' variation of the growth index, in which different plant health indicators such as plant height, root depth, and germination rate were all individually calculated then averaged together in order to determine the overall success rate of each individual/combination plant/s. Two control groups were used, one of which was grown solely with the lettuce seeds and the other was grown with lettuce and contamination- in order to isolate the effects of lead exposure to the lettuce. When compared to the controls, the phosphate and zeolite combination demonstrated the greatest improvement, proving our hypothesis correct, as it had a success rate of 83%, while zeolite alone achieved a success rate of 70%.

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Abstract: Science and Engineering Fair of Houston

3443

The Effects of Water PH on Chlorophyll of Radish Leaves

Emily Mendez Hernandez, Jasmine Hernandez

Fort Bend ISD /Willowridge High School

Category:

Plant Sciences

This project aims to test the effect different wat pH levels have on radish leaves and their chlorophyll content. To test the hypothesis, we ran three trials each for 3 different pH levels of water. To make a basic water, we used baking soda until the pH reached 9. We also tested on neutral pH of 7 which came from tap water. After exposing the leaves to these solutions, we did an alcohol extraction to see a color gradient based on the amount of chlorophyll in the extraction. Our highest alcohol extract pf chlorophyll came from our Baking Soda/Basic water exposure, while the lightest color intensity came from the vinegar solution.

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Abstract: Science and Engineering Fair of Houston

3444

Category:

Plant Sciences

Forecasting Latent Plant Disease Emergence: A Time-Series and Climate-Based Predictive Model for Pre-Symptomatic Risk in Crop Systems

Advaith Potti, Ishan Pendyala, Viraj Gorijala

Fort Bend ISD /Dulles High School

We developed a computational pipeline to predict latent disease emergence risk for cereal rusts across multiple U.S. states using historical surveillance bulletins and climate time series. Weekly USDA Cereal Disease Laboratory rust bulletins (2018–2025) were mined to extract the first reported occurrence date each year for several rust types (e.g., wheat stripe rust, wheat leaf rust, wheat stem rust, oat crown rust) at the state level. For each state–rust–year, we paired the emergence date with daily NOAA weather variables (TMAX, TMIN, PRCP) and engineered short-term time-series features (3/7/14-day rolling means, precipitation sums, wet-day counts, and cumulative growing degree days). We framed prediction as a 7-day early warning task, labeling each day as positive if an emergence event would occur within the next seven days. Using an interpretable baseline model (logistic regression with walk-forward, year-held-out evaluation), we generated daily risk scores and produced state-level risk curves that rise leading into observed emergence dates. This project demonstrates that publicly available surveillance reports combined with climate time series can be converted into a scalable, field-relevant early warning system for plant disease. The resulting framework is lightweight, reproducible, and extensible to additional pathogens and finer spatial resolution, supporting improved timing of scouting and targeted fungicide interventions while reducing unnecessary applications.

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Abstract: Science and Engineering Fair of Houston

3445

From Crater to Crop: Testing Hydrogels with NPK on Simulated Lunar Soil

Amiya Casperson, Mikayla Marroquin, alix duggan

Conroe ISD /ASHP: Academy for Science and Health Prof

Category:

Plant Sciences

Growing plants on the Moon is an important step toward supporting human life beyond Earth, however, it is a very difficult task.[3] The biggest issue is the Moon's soil, which contains no nutrients, and the surrounding atmosphere does not allow a sustainable and secure environment for plant life.[1] It is important to note that the four essential stages for a romaine lettuce seed germination being activation, emergence, growth and photosynthesis.[4] The purpose for this experiment was to test if Nitrogen, Phosphorus and Potassium (NPK) hydrogels can help romaine lettuce plants grow and establish a new innovation for sustaining life in space exploration.[5] For this experiment 15 romaine lettuce plants were used and split into 3 groups: 100% potting soil, 100% lunar soil, 10-10-10 NPK hydrogel soil, 20-20-20 NPK hydrogel soil, and 30-30-30 NPK hydrogel soil. Over the course of 8 weeks, each plant was watered every 5 days with 150mL of water. Physical characteristics were recorded in each cycle, while standard deviation evaluated NPK results and temperature for every cycle. The results concluded that there was no significant difference in growth and would not be enough to support plant life on the moon by adding NPK infused hydrogels, but found that a seed germinated in 100% lunar soil and allowed for the embryonic root to emerge. The density and composition of the lunar regolith soil does not allow for the embryonic roots of a seed to anchor and absorb nutrients, as there are no nutrients in lunar regolith soil.

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Abstract: Science and Engineering Fair of Houston

3446

Flower Color

Category:

Plant Sciences

Jeremiah Franklin, Alexa Pena

Aldine ISD/Avalos PTech

Most modern paints that are used in classrooms are safe-grade paints and water-based paints, considerably safer to use and safe for outdoors. This can't be said the same for some paints, like oil-based paints that release volatile organic compounds (VOCs) as the paint dries, becoming airborne. In addition to this, some pigments and dyes found in all types of paint contain many heavy metals like lead, cadmium, cobalt, and mercury that are highly toxic to the human body. The problem that we are investigating is whether "A plant-based paint is better for the environment and human than other paints, while also being a great paint?" We believe that plant-based paint is safer and more sustainable than other products. We tested 2 flowers and 2 fruits (Hibiscus, Blue Butterfly Pea Flower, Pumpkins, and Oranges) to create 8 paints, 4 are made in an oil paint style, while the other 4 are made as watercolor paint. The flower-based oil paint recipe includes sunflower oil, almond flour, and school glue in addition to the flower petals/ fruits and water. The flower-based watercolor paint recipe includes Sodium Bicarbonate (Baking Soda) and cooking-grade white vinegar (acetic acid), in addition to the flower petals (or fruits) and water. We decide to test the paints on individual canvases. The results that we received were not expected at all, the way the results had come about was uniquely different then we expected. This experiment opened the possibilities for better options for both paint and pigment, which are both sustainable and effective.

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Abstract: Science and Engineering Fair of Houston

3447

Airborne pollen monitoring in Galveston in comparison with Houston monitoring

Sara Horiuchi

Galveston ISD/Ball High School

Category:

Plant Sciences

Monitoring airborne pollen counts is crucial for people with allergies (hay fever) because it helps them predict and manage allergy symptoms, allowing them to make informed decisions such as staying indoors, avoiding outdoor activities (running, gardening), or taking medication on high-pollen days to reduce sneezing, congestion, and itchy eyes. High counts, influenced by weather (warm, dry, windy), signal increased allergens, enabling proactive avoidance of triggers and a better quality of life during allergy seasons. Although the Houston Health Department provides daily monitoring data, Galveston has no system for monitoring airborne pollen. I hypothesize that Galveston has a unique pollen count compared to Houston, because Galveston receives wind from the Gulf. I counted daily airborne pollen in Galveston and compared the results with those from Houston. The patterns of the airborne pollen count were very similar between Galveston and Houston in July, and similar in September, October, and November. The pattern of the airborne pollen counts was different in August. The major airborne pollen in Galveston was grass, and the same was true in Houston in August. This may be because of the weakest wind in August in Galveston, and the pollen count was not covered by pollens from Houston. Since we do not have the official pollen monitoring in Galveston, we may rely on the data in Houston, but we need to be careful not to just trust data from Houston.

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Abstract: Science and Engineering Fair of Houston

3448

Blue Dye or Blue Die? Butterfly Pead Tea used as an alternative to Blue No. 2 and Blue No. 2

Andrew Ramirez

Aldine ISD/Avalos PTech

Category:

Plant Sciences

Most modern paints that are used in classrooms are safe-grade paints and water-based paints, considerably safer to use and safe for outdoors. This can't be said the same for some paints, like oil-based paints that release volatile organic compounds (VOCs) as the paint dries, becoming airborne. In addition to this, some pigments and dyes found in all types of paint contain many heavy metals like lead, cadmium, cobalt, and mercury that are highly toxic to the human body. The problem that we are investigating is whether "A plant-based paint is better for the environment and human than other paints, while also being a great paint?" We believe that plant-based paint is safer and more sustainable than other products. We tested 2 flowers and 2 fruits (Hibiscus, Blue Butterfly Pea Flower, Pumpkins, and Oranges) to create 8 paints, 4 are made in an oil paint style, while the other 4 are made as watercolor paint. The flower-based oil paint recipe includes sunflower oil, almond flour, and school glue in addition to the flower petals/ fruits and water. The flower-based watercolor paint recipe includes Sodium Bicarbonate (Baking Soda) and cooking-grade white vinegar (acetic acid), in addition to the flower petals (or fruits) and water. We decide to test the paints on individual canvases. The results that we received were not expected at all, the way the results had come about was uniquely different then we expected. This experiment opened the possibilities for better options for both paint and pigment, which are both sustainable and effective.

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- [ ] no

Abstract: Science and Engineering Fair of Houston

3449

Sustainable Soil Strategies: Comparing High and Low Nitrogen Fertlizing Methods

Elise Bernadac

Spring Branch ISD/Stratford - HS

Category:

Plant Sciences

Around 35% of nitrogen applied to crops is absorbed into the plants. The other 66% becomes excess washing away into run-off water and creating problems such as pollution, algae growth, and contaminated water. If a fertilizer made from amino acids is added to soil then it will grow at a faster rate as a nitrogen fertilizer. To conduct this experiment I added glycine, serine, arginine, proline, GABA, beta alanine, and glutathione in powder form into 3 conainers, nitrogen fertilizer was added into another, 3 containers, the last 3 containers contained no fertilizer. My hypothesis was proven correct and the fertilizer containing the amino acids grew at a faster rate than the nitrogen fertilizer. These results can be applied to the real world by helping decrease the usage of nitrogen in fertilizers for crops grown worldwide. This transition would help benefit the world in many ways by decreasing the harm done to the crop's soil, pollution, the nitrogen carried in run-off water, underground water contamination, and algae growth.

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Abstract: Science and Engineering Fair of Houston

3450

Investigating Whether AMF-Produced Glomalin Increases Temperatures in the Maize Rhizosphere.

Sristi Shetty, Sahasra Vellore

Conroe ISD /AST: Academy of Science and Technology

Category:

Plant Sciences

This research investigates the relationship between Arbuscular Mycorrhizal Fungi (AMF) and maize plants, specifically focusing on how the secretion of glomalin increases thermal stability within the rhizosphere. AMF extends hyphae into the soil to enhance nutrient absorption in exchange for plant sugars. These fungi produce glomalin, a sticky glycoprotein that acts as a "natural glue" to bind soil particles into stable aggregates. By improving soil porosity and water retention, this protein acts as a natural buffer that protects the root zone from temperature fluctuations and enhances plant flexibility in cooler environments. We hypothesized that this improved soil structure would create a more stable thermal environment, supporting growth during cold temperatures. The experiment involved 12 Golden Bantam maize plants, divided into two groups: one inoculated with AMF and the other with a sterile control. Over eight weeks, successful fungal colonization in the AMF-inoculated plants was confirmed through microscopic analysis, which identified key structures such as hyphae, vesicles, and arbuscules. Starting in Week 5, precision soil thermometers were used to record 28 readings per pot to track temperature variations. A two-way ANOVA was used to confirm a significant correlation between AMF presence and improved plant growth. Furthermore, the T-test results demonstrated that the fungi created a significant thermal difference in the soil. These findings confirm that AMF-produced glomalin stabilizes the rhizosphere, suggesting that fungal inoculation is a viable, sustainable strategy for protecting crops against climate variability.

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Abstract: Science and Engineering Fair of Houston

3451

Exploring the Impact of PEMF on Cotton Plants' Heat Stress Resistance During Early Development

Avery McCartney

Conroe ISD /ASHP: Academy for Science and Health Prof

Category:

Plant Sciences

Rising temperatures in Texas pose a significant threat to cotton production due to the crop's sensitivity to heat stress during early developmental stages. Pulsed electromagnetic frequencies (PEMF) have been investigated as a potential treatment to enhance plant growth and overall health. This study evaluated whether PEMF treatment could increase heat tolerance in cotton plants under elevated temperature conditions. Cotton plants were divided into heat-stressed and non–heat-stressed groups, with subsets receiving PEMF treatment. Results indicated that PEMF treatment produced statistically significant effects in limited parameters: a negative impact on plant height in the non–heat-stressed group, a negative impact on stem count in the heat-stressed group, and a positive effect on leaf coloration in the heat-stressed group. Overall, cotton plants exposed to heat stress demonstrated greater growth benefits from the heat chamber than non–heat-treated plants. The findings suggest that while PEMF treatment did not broadly enhance growth or heat tolerance, it may contribute to maintaining leaf health in heat-stressed cotton plants.

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Abstract: Science and Engineering Fair of Houston

3452

Hydro-Bio Jar

Ameen Naser, Ali Audeh

Private/Iman Academy Southwest

Category:

Plant Sciences

This project investigates the role of plants in the water cycle, focusing on how transpiration contributes to atmospheric moisture and overall water movement. The study explores the hypothesis that areas with more plant coverage release more water vapor into the atmosphere than areas with little or no vegetation. Using a simple experimental setup with a jar covering plant leaves, water condensation is observed and measured over time. Data are analyzed by comparing moisture levels in the experimental setup to a control without plants. The expected outcome is that plants will significantly increase water vapor in the enclosed environment, demonstrating their essential role in the water cycle. Understanding this process is scientifically important because it highlights the interconnectedness of Earth's systems and the influence of vegetation on climate and precipitation patterns. Societally, the research emphasizes the need to preserve plant life to maintain water availability, support ecosystems, and reduce environmental disruptions caused by deforestation or urbanization.

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Abstract: Science and Engineering Fair of Houston

3453

CRISPR (wip)

Category:

Plant Sciences

Dylan Moniaga, Julio Garcia

Harmony Public Schools - North District/Harmony School of Advancement

This project investigates the use of CRISPR-Cas9 as a modern genetic engineering tool to target and disable specific genes in maize (corn) in order to evaluate its effectiveness compared to traditional breeding methods. By simulating the CRISPR gene-editing process through DNA analysis techniques, this experiment examines how precisely and efficiently CRISPR can alter targeted genetic sequences. The results help demonstrate how CRISPR-Cas9 offers a faster and more accurate approach to crop improvement, with potential applications in increasing yield, enhancing nutritional value, and improving disease resistance in agricultural plants.

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Abstract: Science and Engineering Fair of Houston

3454

Nature Armor: Protecting Crops from Acid Rain

Victoria Bednarski

Conroe ISD /AST: Academy of Science and Technology

Category:

Plant Sciences

Acid rain, a result of atmospheric pollutants such as sulfur dioxide and nitrogen oxides, changes soil pH, making it more acidic, and acts as a stress factor for plants by limiting their ability to absorb the nutrients they need to survive. This is a problem that affects agriculture, especially farming-dependent regions. This paper reports an investigation into the potential of three bio-safe soil treatments: biochar, limestone powder, and crushed eggshells to help soybean seedlings withstand acid rain stress. The soybeans were planted in loam soil and sprayed with simulated acid rain made of diluted white vinegar for six weeks. Each treatment group, plus a control, was kept in the same environment for observation. Every five days, plant height, leaf color, stem strength, and soil pH was measured in order to monitor the progress of the plants and the changes in soil. All three bio-safe treatments treated the soil in a way that reduced its acidity level and improved the health of the plants when seen compared to the control group that did not receive any treatment. From the treatments tested, limestone powder was the most efficient at maintaining high soil pH levels and supporting the normal development of plants. These plants ended up being taller, stronger, and showed healthier leaf coloring. Both biochar and eggshell treatments had a positive impact on the plants, but their effect on neutralizing acidity wasn't as consistent. According to this study, limestone powder is the best solution both in terms of efficiency and environmental friendliness.

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Abstract: Science and Engineering Fair of Houston

3455

Drip vs Gravity Fl0w

Nathan Hudgins

Fort Bend ISD /Hightower High School

Category:

Plant Sciences

This project investigates aerodynamic principles and determining flight performance of paper airplanes. The study is to determine how wing shape, aspect ratio and folding technique affect the flight distance and the time it was in the air. Five different Paper airplanes will be created to compare on which design is superior. And to take it to extreme, these paper planes will be tested in an windy environment first to dictate how it would do in the conditions. Studies and experiments like this will help with an efficient aerodynamic lift, such as a higher aspect ratio.

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Abstract: Science and Engineering Fair of Houston

3456

Electrolysis pH Modification of Aquarium Water for Hydroponics

Charles Taylor

Houston ISD/Lamar HS

Category:

Plant Sciences

Aquaponics is a type of farming where wastewater from fish is used to grow plants hydroponically. One problem with this is that fish and plants prefer different water pH for optimum development. The usual way to alter hydroponic water pH is through chemicals. A previous attempt has been made to use salt bridge electrolysis to alter the water pH in an aquaculture system electrically, however, that form of electrolysis still adds chemicals to the water in the form of salt ions. A proton exchange membrane (PEM) electrolysis cell might be able to accomplish the same pH shift without any chemical addition to the water. This experiment tested the growth rates of Spicy Brown Oriental Mustard microgreens grown hydroponically in aquarium wastewater with the pH adjusted to approximately 6.7 using a PEM electrolysis cell. For comparison a control group of similar microgreens were grown under similar conditions with wastewater from the same aquarium wastewater batch but without the electrolysis treatment to adjust pH. The results of this experiment showed an over 10% increase in mean microgreen plant weight over its 8 day growth period for the pH adjusted group vs. the control group. T-test analysis of these results indicates an approximately 95% chance the results are significant.

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply):

[ ] Human participants [ ] potentially hazardous biological agents

[ ] Vertebrate animals [ ] microorganisms [ ] rDNA [ ] tissue

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Abstract: Science and Engineering Fair of Houston

3457

Optimization of Spartina alterniflora–Microbe Interactions to Enhance Methane Degradation in Wetland Environments

Vibhan Emmi

Conroe ISD /AST: Academy of Science and Technology

Category:

Plant Sciences

Methane is a highly potent greenhouse gas, and an increasing fraction of global methane emissions originates from biological processes in wetland ecosystems. However, wetlands also harbor rhizospheric microbial enzymes, such as methane monooxygenase. These enzymes can oxidize methane but are inhibited by low levels of copper and oxygen, which are crucial for enzyme activation and related processes. This experiment delves into how the plant-microbe symbiotic relationships can help tackle the methane crisis. 51 bacterial species were isolated from Spartina alterniflora, a resilient grass species native to the Galveston Wetlands, with six bacteria showing methane monooxygenase activity in a methanol-methane-infiltrated environment, indicated by consistent substrate depletion and byproduct formation. Virtual simulations were used to optimize ACS and COPT gene expression to create ideal conditions with high Cu2+ and O concentrations for methane monooxygenase activity within the rhizosphere of S. Alterniflora, addressing the biological limitations to natural methane oxidation. These simulations predicted a 2.7-2.9x increase in methane-oxidation potential and provided concentration data points that were used to physically replicate enhanced conditions within the soil and root systems of S. alterniflora. As a result of these amplifications, levels of methane bioremediation and oxidation increased approximately 71% over a six-week testing period. Additionally, the plant growth performance of treated plants remained largely unaffected when compared to wild-type controls. Overall, the findings of this study exemplify the ability of genetic engineering to enrich plant-microbe interactions as a promising solution to the increasingly pressing issue of greenhouse gases.

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Abstract: Science and Engineering Fair of Houston

3458

AlgaGrow

Eva Chan

Harmony Public Schools - South District/Harmony Science Academy-Houston

Category:

Plant Sciences

Many communities in food deserts are often faced with difficulties to grow their own food sources, mainly because of the lack of resources and financial issues. Algae is a sustainable, alternative resource for fertilizer as it is rich in nutrients and grows quickly. This project tests if algae slurry (Arthorospira platensis) could be effectively used as a nutrient source for hydroponically grown mung beans (Vigna radiata) . The goal of this research project is to investigate the effect of algae slurry on the growth of mung beans compared to plain water. It was hypothesized that the mung beans grown with algae slurry would grow more than those with water alone, based on the algae's nitrogen, phosphorus, and micronutrient content. The mung beans were grown hydroponically with controlled light and temperature. There's two systems of mung beans: System A, grown with the algae slurry and System B, grown with no algae slurry. We measured the differences in plant growth through the height, leaf number, root length, and overall color of the plants. The results showed that the plants grown with algae slurry had greater growth than the water - only system. System A showed greater height, healthier leaves, and better root development than System B. These results suggest that algae slurry can serve as a low - cost, eco - friendly alternative to commercial fertilizers. Thus research supports the potential use of algae - based nutrients in sustainable agriculture and future studies could continue investigating how algae could be optimized to other crops, not just mung beans.

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Abstract: Science and Engineering Fair of Houston

3459

The Carnivorous Catalyst: Starch Digestion in Nepenthes miranda

Desiraye Guevara

Conroe ISD /AST: Academy of Science and Technology

Category:

Plant Sciences

The digestive fluids of carnivorous plants contain amylase, the enzyme responsible for the breakdown of starch. This prompted the question, is the amylase found in carnivorous plants able to be utilized as amylase supplements for human digestion? This was done by extracting the digestive fluids from a Nepenthes miranda, allowing it to react to starch for 5 minutes, then adding liquid iodine and letting it settle for 3 minutes. The digestive fluids were then put into a spectrometer in order to determine the absorbance of light of the fluid. This was then compared to the potato control in which the same steps occurred but the fluid tested was distilled water instead of digestive fluids. At the end, the results showed that the Nepenthes miranda digestive fluids are a superior way to digest starch in comparison to the distilled water on average. By analyzing the results, amylase activity in a Nepenthes miranda fluctuates if the fluids are repeatedly extracted. Using the data collected, it can be concluded that a Nepenthes miranda's digestive enzymes have the potential to be used as a supplement if it is allowed to replenish its enzymes in between extractions.

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Abstract: Science and Engineering Fair of Houston

3460

The Variation of Vitamin C Concentration in Various Tangerine Sources

Sophie Huynh

Clear Creek ISD /Clear Lake High School

Category:

Plant Sciences

This experiment aimed to reveal the differences in vitamin C concentration in various sources of tangerines, which included homegrown tangerines, conventionally storebought tangerines and organic storebought tangerines. This was done via a iodine-starch essay, in which an iodine solution was put into a mixture of starch and tangerine juice to determine the iodine needed to cause a iodine-starch reaction, where the solution turns into a dark violet color. Following the experiment, it was determined that homegrown tangerines had the highest concentration of vitamin C, averaging at 7.81%, then followed by the organic tangerines at 5.73% and lastly the conventional storebought tangerines at 3.39%. This aligned with the hypothesis, which was determined by the background information regarding the growth and harvesting process of tangerines and how it could impact the vitamin C concentration. This project was important to all consumers as vitamin C is vital to the success of human bodies. Vitamin C contributes to the production of white blood cells and collagen. This makes it vital that humans truly understand what they are consuming and how it could impact their body. This experiment determined that homegrown tangerines are the healthiest, however, the concentration compared to organic and conventional oranges will not cause significant health issues. Overall, this iodine-starch experiment was successful in highlighting the differences of different tangerine sources and not only revealed a discovery regarding food-health but showed the use of iodine-starch titrations in the real world.

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