



Project ID: 641

JR - Chemistry

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Does Flour Affect the Height of a Cookie?

The purpose of this project was to discover if the type of flour used in cookie dough affects the height of a cookie. It is hypothesized that All-Purpose flour would make the tallest cookies. To conduct this experiment, batches of cookie dough were made using All Purpose, Almond, Brown Rice and Coconut flour. Ten cookies from each group were baked and then measured for height. Results showed that the type of flour does affect the height of a cookie. The coconut flour produced the tallest with an average height of 2.47 cm. The hypothesis was not supported. Coconut flour produces the tallest cookies.



Project ID: 642

JR - Chemistry

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Measuring Protein and Vitamin C Level in Foods after Different Types of Cooking

Nutritious food is essential for a healthy body. A well-balanced diet provides us with energy to stay active throughout the day. Proteins and vitamins are essential for growth and repair, helping us to stay strong and healthy and to fight illnesses. Since most of the food we consume today is cooked I was particularly interested in finding out how cooking affects our food, especially in protein and vitamin C. My hypothesis was if I bake my food types then the nutrient level will be optimal.

The control variables in my experiment were the different types of food like salmon sirloin, chicken for protein and for vitamin C. I had red bell peppers, tomatoes and broccoli. The independent variables were the different types of cooking method like baking, frying and grilling and the dependent variables are the protein and vitamin C levels in the cooked food. I used the Biuret test for protein and the iodine titration for the vitamin C food types.

Procedure: Gather different kinds of food, like salmon, chicken, sirloin, broccoli, red bell peppers and tomatoes. Cook them with different cooking methods like grilling, baking and frying. Run test for proteins, using Biuret Reagent test and the iodine titration test for Vitamin C. Record the data.

Results: These tests have shown that in the Vitamin C group tomatoes have done the best with an average of 31.33% followed by Broccoli with 26.883%, then Red Bell Peppers with 26.15%. In the protein food group, Salmon crushes the competition with a very high average value of 49.66% protein content followed by the chicken with an average of 42.916% and last is Sirloin with 41.66% protein content in its dishes. From the data averages it is clear that protein foods hold their nutrients better when cooked over the vegetables.

Conclusion: My hypothesis was supported by my data. My experiments have shown that on an average salmon with 49.6% retains the highest protein value after being cooked. Similarly, tomatoes with an average of 31.3% have the highest vitamin content after being cooked by the various methods. Among the different cooking methods, frying is the worst and baking shows the best nutrient retention. For protein, it is clear that baking is the best to preserve the nutrient levels, sirloin had 1.74 milligrams of protein, chicken had 2.1 milligrams and salmon had 2.2 milligrams of protein. For the Vitamin C, the best cooking method was baking as well, 0.8 mg of vitamin C for red bell peppers, 0.7 mg for tomatoes and 0.8mg for broccoli. So we can conclude that frying is the worst type of cooking method while baking is the best when it comes to preserving the nutrients.

**Project ID: 643****JR - Chemistry****Gianluca Corona**

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*Scoville Heat Units*

This research project was focusing on which type of additive best dilutes the Scoville Heat Units (SHU) in foods with high levels of spice. It is hypothesized that milk is the best additive to dilute SHU in the habanero paste. For this experiment, the Scoville Heat Units were used to measure the levels of spice in habanero paste. Different additives can help with reducing the spice levels in food. The additives that were used in the experiment are milk, honey, and peanut butter. To test the hypothesis, two ounces of plain habanero paste was measured for its initial SHU. Then one ounce of each additive was mixed with habanero paste to test the SHU. These procedures were repeated 10 times. The results indicated that the hypothesis was not supported, honey was the best additive to decrease the SHU. Before the additives were combined the habanero paste was approximately 31,100 SHU. When peanut butter was added it was around 16,550 SHU, when milk was added the results were 15,000 SHU, and when honey was added it was approximately 12,690 SHU. In conclusion, honey is the best additive to decrease SHU in the habanero paste. The recommendation for this testing is that honey is one of the best additives for decreasing the spiciness level in certain foods that have a lot of SHU.



Project ID: 644

JR - Chemistry

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Testing Water from Different Zip Codes

Making sure that the water your drinking is always a good thing to know because you want to know what's inside your water and to make sure nothing dangerous is inside it.

Procedure: I went around the city to different zip codes and got different water from 5 zip codes. After I had collected the water I used testing strips to find the data for alkalinity and pH. I collected all the data and put all of it in a Google Sheet.

Results: after testing all 5 of the different water cups from the zip codes I started to put the data on graphs and compare my results. The zip code with the highest pH level was 92129 with a pH level of 6.6 and the highest alkalinity was 92129 again with 110. 92129 was the highest out of all 5 by a decent margin.



Project ID: 645

JR - Chemistry

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The Effects of Different pH Level Waters In Rotting Food

In my experiment, I wanted to find a way to naturally postpone mold and bacteria from growing in food. I made two types of food: bread and waffles, and stored them in airtight containers. One batch was made with alkaline (pH 9) water, and one with regular pH (~pH 7) water. I would then check every night to see how much each had molded. I hypothesized that if the water used in a recipe is pH 8 or higher, then the food will be kept good for longer than the foods made with lower pH. My results show that my hypothesis was incorrect, and instead, the foods made with alkaline water molded faster than the foods made with lower pH. The alkaline bread molded 1.44 days before the pH 7 bread did, and the alkaline waffles molded 1.25 days before the pH 7 waffles did (both are averages). None of these experiments required special chemicals, which many food companies use to make their food last longer. In conclusion, there may be a way for us to prolong the lives of our foods naturally but alkaline water is not the answer.



Project ID: 646

JR - Chemistry

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Dyeing Natural and Synthetic Fabrics

This project solves the problem of which type of fabric to use if one desires to dye a fabric a vibrant color - natural, which is plant or animal-based, or synthetic, which is made from chemical synthesis. The hypothesis is that when compared to synthetic and semi-synthetic fabrics, the hue of dyed natural fabrics will be more consistent with the manufacturer's color chart, its saturation will be higher, and its brightness will be lower.

Six fabrics were tested - two natural, cotton and a linen/cotton blend; two semi-synthetic, a linen/viscose blend and rayon; and two synthetic, nylon and polyester. Three fabric square samples were dyed red, three were dyed blue, and three were dyed green.

The 6 Å— 3 Å— 3, or 54, samples were then scanned and analyzed to get their hue, saturation, and brightness.

The average hue values of the natural, semi-synthetic, and synthetic samples were 1% more, 3% less, and 17% less than those of the manufacturer's color chart. The average saturation values of the natural, semi-synthetic, and synthetic samples were 73, 70, and 11. The average brightness values of the natural, semi-synthetic, and synthetic samples were 68, 66, and 99.

This revealed that the hypothesis was correct for the natural and synthetic fabrics; however, the semi-synthetic fabrics unexpectedly shared more hue, saturation, and brightness characteristics with the natural fabrics than the synthetic fabrics. Results could be refined by supplementing with other dye colors, and adding variety with additional semi-synthetic, natural-synthetic blend, and prepared-for-dyeing (PFD) fabrics.



Project ID: 647

JR - Chemistry

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The Effect of Water Temperature on Ammonium Nitrate Activation

For this project, the researcher wonders if the difference in the temperature of the activator for ammonium nitrate would make a difference in how effective it is, meaning how much the temperature drops. The researcher hypothesizes that when the ammonium nitrate is combined with the cold water (35° Fahrenheit), it will on average have decreased by more degrees than the ammonium nitrate activated by the room water temperature of 75°. The researcher plans to investigate this by combining the ammonium nitrate from instant cold packs with two different temperatures of activator, or water, and then checking the temperatures of each until it stops going down and rises. The researcher will record them in a notebook and then calculate the average degrees dropped for each temperature. There will be ten trials for each of the two conditions. Then they will compare the data from the lowest temperature point and the degrees dropped from both temperature and all trials. The hypothesis was not supported. On average, the degrees dropped were higher for the room temperature water trials.