Alexis Tardalo

September 28, 2014

Jell-O Formal Laboratory Report

Title: Pineapple Enzymes and Jell-O Molds

Introduction:

Your introduction should contain all relevant information you gathered while researching your experiment. My introduction for my senior research project was 19 pages long. Your introduction should also contain MLA formatted citations. The purpose is to present the research that is driving your experiment, and the facts available from which you designed the experiment and derived your hypothesis. Never use pronouns, and remove all fluff. Give me the facts! Your hypothesis should be an "If....then" statement. It will be clear that your hypothesis is your hypothesis without labeling it.

 The very desirable dessert, Jell-O, is actually composed of undesirable animal parts like skin, bone, and cartilage, that are leftover from the slaughter process. The main component of these "parts" is collagen, a protein found in the connective tissues of animals. When boiled, collagen produces gelatin, that solidifies as it cools. This congealing process is the result of bonds that form between the collagen proteins present in the gelatin. Pineapple is known to break these bonds, and Jell-O labels even warn that adding pineapple to Jell-O will prevent it from setting. This is because pineapple contains bromelain, a mixture of proteolytic enzymes that destroy the bonds between protein molecules. Enzymes are proteins that are conformed to fit specific substrates at their binding sites, allowing them to perform their roles. However, being proteins themselves, enzymes are also capable of being denatured. Denaturation is the process in which the weak bonds that hold the protein structure together are broken, resulting in the loss of conformation, and therefore function. Environmental extremes, such as heat or cold, can denature a protein and diminish or destroy functionality. Fresh, frozen, cooked and canned pineapple were placed in samples of Jell-O to determine their effect on Jell-O's ability to solidify. This was used to gauge whether the bromelain enzymes were inhibited in pineapple that has been processed in some way. If the bromelain enzymes were denatured due to exposure to unfavorable conditions, then cooked, canned, and frozen pineapple should have contained inactive or low functioning bromelain enzymes, allowing bonds to form between the proteins in Jell-O, and the Jell-O to solidify.

Materials:

List materials, be as specific as possible. I know you guys can make lists, I was not going to be too hard on you being super specific here. However, expect to be SUPER specific in your college labs, especially during individual research.

Procedure:

List steps of procedure, specifically, so that the procedure can be repeated by anyone. This is important. Anyone should be capable of reproducing your experiment and getting the same results. The scientific community does not take kindly to "crying wolf." When you guys all become big shots in the industry, your research needs to be reproducible in order to be viable. If you do something awesome (or say you did something awesome) and no one else can do it using your procedure, it will ruin your career.

Data:

You want to present your data in any way possible and in as many ways as possible- pictures, tables, graphs. You want to make your data as easy to view and understand as possible. You want to format your data so that you may refer to it easily while writing your analysis. Labeling what the image is and numbering them removes vagueness.

Image 1: Control, No Pineapple test tube

Image 2: Fresh Pineapple test tube

Image 3: Pineapple Cooked on hot plate test tube

Image 4: Canned pineapple test tube

Image 5: Frozen Pine apple test tube 24 hours

Chart 1: The effects of different kinds of pineapple on Jell-O's consistency

|  |  |  |
| --- | --- | --- |
| Kind of Pineapple | Solid Jell-O | Liquified Jell-O |
| No Pineapple(Control) | X |  |
| Fresh Pineapple |  | X |
| Canned Pineapple | X |  |
| Cooked Pineapple | X |  |
| Frozen Pineapple |  | X |

Discussion:

Observations are strictly that, observations, no thoughts or conclusions, just go over the data you presented. Tell me exactly what the tables and pictures show. Don't tell me why just tell me what.

Point out emerging patterns in your data.

The control tube Jell-O was solidified after the 24 hour refrigeration period (Image 1). Both the tubes that contained cooked and canned pineapple were also both solidified after the refrigeration period (Images 3 and 4). Fresh and frozen pineapple tubes did not solidify (Image 2 and 5). The color of the Jell-O was consistently red (Images 1-5). When the Jell-O was removed from the tubes and placed in petri dishes for further analysis..... You get the picture. It is important to note that the processed pineapple (cooked and canned) resulted in solidified Jell-O with the exception of frozen pineapple, while unprocessed pineapple (fresh) resulted in liquified Jell-O.

Conclusions:

In your observation you tell me what your results were, here you can tell me what they mean. What do they mean for your hypothesis. You can tell me why you think you got the results you did. What may have had an effect on your results. What you would change if you could do it again and what further research you'd like to pursue relating to this experiment.

The fresh and frozen pineapple contained active bromelain enzymes that did not allow the Jell-O to solidify. It was assumed that freezing pineapple would denature the bromelain enzymes, but the results are indicative of active enzymes. It is possible that the frozen pineapple thawed during laboratory preparations, and managed to renature. The results of the fresh pineapple were consistent with active enzymes, as expected. The canned and cooked pineapple contained inactive bromelain enzymes that allowed the Jell-O to solidify. It was later determined that canned pineapple is cooked prior to packaging. These results are consistent with the expected outcomes, due to denaturation by heat. Further research would be required to determine the effects of the freezing process on pineapple enzymes. Frozen pineapple may thaw under regular refrigeration temperatures. Another experiment could be conducted with a better freezer and leaving the frozen pineapple in the freezer until the procedural step where it is required.