

## Ability to Gel of Different Types of Pineapple Lab

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*Group Members:* Kyle C., Cole S., Alex S.

*Purpose:* Does the type of pineapple (fresh, frozen, or canned) affect whether or not it will gel in a Jello salad?

*Independent Variable:* type of pineapple (fresh, frozen, or canned)

*Dependent Variable:* whether or not the pineapple will allow the Jello to gel

*Hypothesis:* If I try to make a Jello salad with fresh, frozen, and canned pineapple pieces, then only the frozen pineapple will gel over (because the fresh and canned pineapple are too moist to allow the Jello to gel).

*Materials:*

- 75g fresh pineapple (diced)
- 75g frozen pineapple (diced)
- 75g canned pineapple (diced)
- 3 packages of Knox Original Unflavored Gelatin
- 1 hot plate
- 1 scale (grams)
- 1 measuring cup ( $\frac{1}{4}$  cup measurement)
- $3\frac{1}{2}$  cups tap water
- 1 large beaker (1000mL capacity)
- 3 small beakers (600mL capacity)
- 1 spoon (any size, for mixing)

*Procedure:*

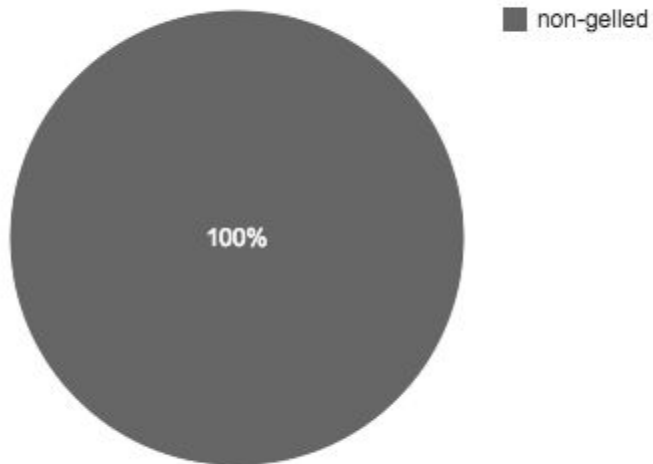
1. Follow instructions on Jello packet to preparing the Jello. Use *water* instead of fruit juice, heat up water in the large beaker (1000mL) on the hot plate, and use only  $\frac{1}{4}$  of the materials. (Step 1 on packet). Do not refrigerate yet.
2. Put the mix and the heated water in a small beaker (600mL).
3. Add fresh pineapple (75g) to mix (in the small beaker).
4. Repeat steps 1-3 with frozen and canned pineapple pieces. Use separate beakers for each one.
5. Refrigerate all three mixes (in the small beakers) for three hours. (If the beaker cannot be taken out after three hours, then leave to refrigerate for *at least* three hours).
6. After the Jello solutions have finished refrigerating, record whether or not each Jello mixture has gelled over. If a Jello is not completely solid but not a liquid either, record observations on the degree at which the Jello has gelled.

*Observations:*

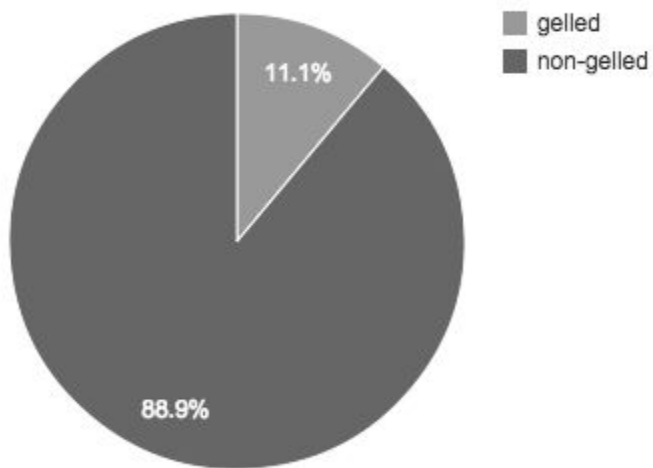
**Gelling of Pineapple Types (Class Data):**

|  | <b>TYPES OF PINEAPPLE</b> |                |                |                |   |
|--|---------------------------|----------------|----------------|----------------|---|
| <b>Students</b>                        | <b>Fresh</b>              | <b>Frozen</b>  | <b>Canned</b>  | <b>Control</b> | <b>Notes</b>                                    |
| <i>Jon, Cole, Kyle, Alex (our lab)</i> | no                        | no             | <b>yes</b>     | <i>none</i>    |   |
| Emily, Bea                             | no                        | no             | <b>yes</b>     | <b>yes</b>     |   |
| Elizabeth, Molly                       | no                        | no             | <b>yes</b>     | <b>yes</b>     | two trials                                      |
| Mahad, Attie                           | no                        | no             | <b>yes</b>     | <b>yes</b>     |   |
| Lindsay, Gwen                          | no                        | no             | <b>yes</b>     | <i>none</i>    |   |
| Jacob, Owen                            | no                        | no             | <b>yes</b>     | <b>yes</b>     |   |
| Rachel, Samantha                       | no                        | <b>partial</b> | <b>partial</b> | <b>yes</b>     | froze a little bit; possible error in procedure |
| Maddie, Jessica, Monicam, Abigail      | no                        | no             | <b>yes</b>     | <i>none</i>    |   |
| Kennedy, Amanda, Jennifer, Dileka      | no                        | no             | no             | <i>none</i>    | possible error in procedure                     |
| <b>Total Gelled</b>                    | 0/9 (0%)                  | 1/9 (11%)      | 8/9 (89%)      | 5/5 (100%)     |   |

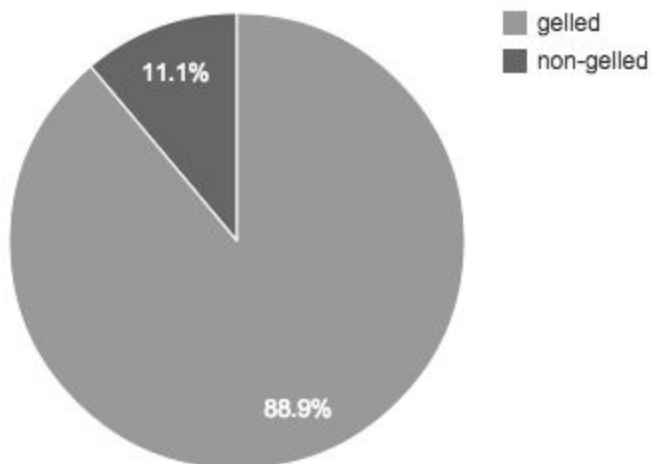
### Fresh Pineapple



### Frozen Pineapple



### Canned Pineapple



*Analysis:*

The results for all the experiment results are very consistent. All the control trials gelled over, and almost all the canned pineapple trials gelled over; on the other hand, no fresh pineapple trials gelled over and almost no frozen pineapple trials gelled over. The two outliers - Rachel and Samantha's group, and Kennedy, Amanda, Jennifer, and Dileka's group - may have been inaccurate because of an error in their procedure, so their experiments may have agreed with the rest of the class if they were correct. The data shows that 0 out of 9 of the fresh pineapple gelled (0%); 1 out of 9 of the frozen pineapple gelled (11%); 8 out of 9 of the canned pineapple gelled (89%); and that 100% of the controls - the plain gelatins - gelled over. The last statistic, the control, is important so we know that making just the Jello by itself will work.

*Conclusion:*

Based on the data, I can conclude that adding fresh or frozen pineapple to a Jello salad will not allow it to gel, but adding canned pineapple will. This is because there is a strong trend shown in our experiments: 0 of the fresh pineapple Jello salads gelled and only one of the frozen pineapple gelled. However, all but one of the canned pineapple Jellos gelled. Based on our class discussion, our results, and some research, I strongly believe that our results and conclusion are accurate because pineapple naturally has an enzyme called bromelain that breaks down proteins, such as the collagen in gelatins that causes them to become solid. The reason that canned pineapple will gel in Jello is because during the canned process, it is heated, during which the bromelain deactivates and no longer functions. However, the fresh and frozen pineapple still have active bromelain, which prevents the gelatin to solidify.

This proves that my hypothesis was very wrong, because the frozen pineapple Jello did not gel, but only the canned one did. It shows that my original prediction that the frozen pineapple is less wet than the fresh and canned pineapple is false or irrelevant.

*Reflection (Comments):*

I am very confident in my conclusion, because we have very consistent. There is also a valid scientific reason - that the bromelain enzyme in the fresh and frozen pineapple does not allow the gelatin to gel - to explain our hypothesis as well. Also, the outliers in our experiments may have been mistakes, so this supports our data as well. Next time, I will have to make sure to include a step to label the beakers so that there is no confusion between which type of pineapple is in which beaker - our group had an issue with this, as we did not label at first and labeled a little carelessly at the end of class because we were starting to run out of time. Because of this, our original results were that the fresh and the canned pineapple Jellos did not gel, but the frozen did; later we had to switch the frozen and canned pineapple results because they were labeled wrong. Also, we should have included more steps to make more measurements for the degree to which each Jello gels over, such as measuring the volume of the liquid before and after and the viscosity of the liquid before and after, because both the frozen and fresh did not gel over - doing so may yield even more accurate and interesting details.