

INVESTIGATING JELL-O

BACKGROUND INFORMATION:

The protein found in Jell-O is called collagen. This is the same type of protein found in hair, muscle, skin, and other bodily tissues. Collagen's quaternary structure consists of three spiral proteins that are coiled together to form a triple helix. The collagen found in Jell-O has been denatured. It consists of only one polypeptide instead of three. This is why Jell-O is a liquid when it is first mixed with water. After it is mixed with water, the polypeptide chains start to form hydrogen bonds with each other, causing it to form a semi-solid gel. They do not reform the original triple helix shape.

PURPOSE:

The purpose of this lab to determine whether or not certain foods disrupt the ability of Jell-o to turn into a solid.

HYPOTHESIS:

1. If fresh pineapple is added to Jell-O, then...
2. If canned pineapple is added to Jell-O, then...
3. If fresh pears are added to Jell-O, then...
4. If canned pears added to Jell-O, then...

MATERIALS PER GROUP:

1. ½ box of Jell-O (approximately 42 grams of Jell-O powder)
2. 115 milliliters of hot water
3. 115 milliliters of cold water
4. 1 piece each of fresh pineapple, canned pineapple, fresh pear, canned pear
5. 5 small cups
6. stirring rod
7. triple-beam balance
8. 100 ml graduated cylinders
9. 400 milliliter beaker

PROCEDURE:

1. Label 5 small cups as follows:
 - cup 1 = control
 - cup 2 = fresh pineapple
 - cup 3 = canned pineapple
 - cup 4 = fresh pear
 - cup 5 = canned pear

- Using a balance, measure out 42 grams of Jell-O powder. Pour it into a 400 milliliter beaker.
- Add 115 milliliters of hot water. Stir very well. Now add 115 milliliters of cold water. Stir very well again.
- Divide the Jell-O mixture evenly into the 5 small cups. There should be approximately 46 milliliters of in each cup.
- Add one piece of the appropriate fruit into cups 2-5. Do not add anything to cup 1, since it will be used as a control.
- Refrigerate for at least 2 hours. Check to see which cups solidified and which did not. In the data table, record whether the Jell-O was LIQUID or SOLID.

RESULTS:

CUP	CONTENTS	RESULT
cup 1	control	
cup 2	fresh pineapple	
cup 3	canned pineapple	
cup 4	fresh pear	
cup 5	canned pear	

ANALYSIS QUESTIONS:

- What is the purpose of cup 1?
- Which cup of Jell-O did not turn into a solid?
- Which cup of Jell-O was affected by the enzyme bromelain?
- Which cups of Jell-O were not affected by the enzyme bromelain?
- What is the effect of heating (canning) on the enzyme bromelain? How do you know? In your answer, compare the results of cups 1-3.
- Why is bromelain a main ingredient in meat tenderizer? HINT: Meat contains a lot of protein!
- Hypothesis one or two ways in which you think bromelain could be used by a doctor or a pharmacist.
- Explain the effect of bromelain in terms of the four levels of protein structure.
- Name one or two ways in which this lab could be improved.

