

## **Lab Report Guidelines**

You are expected to write a full lab report in complete paragraphs.

Pay careful attention to the instructions. If you are unsure about what to do, contact any of the TA's for the course.

### **Introduction**

For this week, you will need to write a formal introduction in paragraph format. For the introduction to this week's laboratory report, answer each question full sentences, and then organize into paragraphs that will constitute your introduction.

1. What is a leavening agent and what is its purpose?
2. What are the three major types of leavening agents (classified based on how the agents introduce leavening to a baked good)?
3. Describe leavening agents that fall into each of the three categories and how they produce leavening in a baked good.
4. Describe the three mixing methods for quick breads and how they incorporate different methods of leavening to create a final product with unique textural qualities.

### **Purpose, and Hypothesis**

Based on your introduction, write the purpose of this lab. You can start the sentence with the following: *The purpose of this experiment is to ...*. Remember that your introduction segues into the purpose of the experiment.

Based on what is being tested in this lab, write a sentence describing what you think the outcome will be. You can start the sentence with the following: *I hypothesize that ....*

### **Methods**

Re-read the laboratory procedure for the experiment this week. The procedure provides you with a set of instructions. A methods section is a description in sentences of what was actually done during the experiment, such that someone could read it and be able to repeat what you did on their own. The methods section contains the essential information for reproducing the results, but is not meant to be an instruction manual. If necessary, make sure to update the information with any changes that were made in lab and include information on any statistical analyses that you performed. It is often helpful to break it up into sections.

### **Results**

Calculate the % increase in volume of the water for the following experimental conditions:

1. BS or BP in cold water vs BS or BP in hot water
2. BS or BP in cold water vs BS or BP in cold water + vinegar
3. BS or BP in cold water vs BS or BP in hot water + vinegar
4. BS in hot water + vinegar vs BP in hot water + vinegar

**Figures:**

1. Using your section's data, create a bar chart (include error bars) of the % increase in volume of water for the above conditions. Do an ANOVA to determine whether there is a significant difference between the leavening agents and/or the treatments. Don't forget to label the axes and include an appropriate figure caption.

Describe your observations from all 3 parts of the experiment. Make sure to include the following information in your summary.

Sensory Evaluation of Cakes. Write a paragraph comparing and contrasting the sensory qualities (taste, texture, and appearance) of each cake variation. Make sure to compare those variations made with differing amounts of the same leavening agent. Do you prefer one of the cake variations?

Sensory Evaluation of Scones. Write a paragraph comparing and contrasting the sensory qualities of each scone variation. In particular, compare and contrast the scones that used baking powder for leavening agent but were made with either all-purpose or gluten-free flour. Do you prefer one of the scone variations?

**Discussion**

The discussion section is the section where you will interpret your results. The questions below are provided to guide you to thinking about the data that was collected and its meaning. It would be helpful for you to answer the questions, and then organize into paragraphs that will constitute your discussion section.

1. Discuss what was happening when we compared the baking powder and baking soda in cold water, hot water, and with the addition of vinegar. Over time, did you notice a difference in how the graduated cylinders looked?
2. Compare the sensory qualities of the cakes made with the baking soda variations (6 g vs 24 g). Did the all-purpose and gluten-free variations (both using 6 g of baking soda) differ? Why or why not? Did adding 4 times the amount of baking soda produce an acceptable cake? Why or why not?

3. Compare the sensory qualities of the cakes made with the baking powder variations (4 g vs 16 g). Did adding 4 times the amount of baking powder produce an acceptable cake? Why or why not? Can baking powder be used to replace baking soda? Justify your answer based on what you know about the composition of baking powder.
4. One cake variation used a combination of cornstarch, baking soda, and cream of tartar as the leavening agent. In terms of sensory qualities, which cake variation did the combination most closely resemble? Based on your knowledge of leavening agents, why might this be?
5. Compare and contrast the sensory characteristics of each of the scone variations to the scone made using baking powder and all-purpose flour. How did the taste, texture, and appearance differ when the scones were made with different leavening agents? Do these changes correspond with your expectations based on the leavening agent used in each variation?
6. Did any of the other leavening agents produce a scone similar to the scone made with baking powder? Why or why not? Justify your answer with what you learned about the chemical reactions of each leavening agent.
7. Describe the mixing method used to make the scones and discuss what would happen if the scones were overmixed. What would happen if too much liquid was added to the dough?
8. For the gluten-free variation, describe how the sensory characteristics differed from the variation made with flour.
9. Think back to the bread lab. Describe how the sensory qualities differ between breads made using chemical-based leavening versus yeast-leavening. Be sure to describe the differences between the gluten-free variations in your answer.

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