This Flour For The Bread Instead!

Science SARSEF project

Introduction

I wanted to learn more about baking and how much one ingredient could drastically change the outcome of a recipe. This topic is very important because many people love to bake since it encourages creativity, motor skills, and teaches basic math. I really think that my project may help people who are allergic to a certain flour or looking for an alternative.

Research Question

How does using different types of flour (gluten free, almond, etc.) affect the height of bread after baking?

Prediction / Hypothesis

My hypothesis is that the All-purpose flour would definitely help the bread rise much more because it is the most popular and most recommended.

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Variables

Independent variable

- Type of flour: wheat, almond and all-purpose.

Dependent variable

- Height of the bread after baking (measured in centimeters)

Controlled variable

- Amount of yeast
- Amount of water
- Oven temperature
- Baking time
- Mixing technique (stirring, kneading)

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Procedures

1. Use the same recipe for all types of flour(almond, all-purpose and gluten free), keeping yeast (1/2 tbsp), water (1 tbsp), and mixing methods (stirring) the same using a spatula. Let yeast rest in water for 10 minutes until you see bubbles.
2. Add yeast with water into the flours as well as ¾ tablespoon of salt.
3. Mix the flours with yeast and salt until it has a doughy texture.
4. Put wrap around the bowl with dough for 10 minutes and then knead it. (repeat about 4 times)

Procedures

5. Bake all breads at the same oven temperature (475 degrees) for 45 minutes.
6. Measure the height of each bread after baking using a ruler/ a tape measure.

Materials:

- Types of flour (Wheat, All-purpose and Almond)
- Mixing bowl
- Baking pan
- Oven
- Measuring cups
- Yeast- ½ tbsp
- Water- 1 tbsp
- Salt- ¾ tbsp

Hazards:

Make sure you are being supervised by a parent or adult to be safe since we are working with fire and hot temperatures.

Results

All-purpose flour	Gluten free flour	Almond flour
Height after baking: 5.5 cm	Height after baking: 4.5 cm	Height after baking: 3 cm

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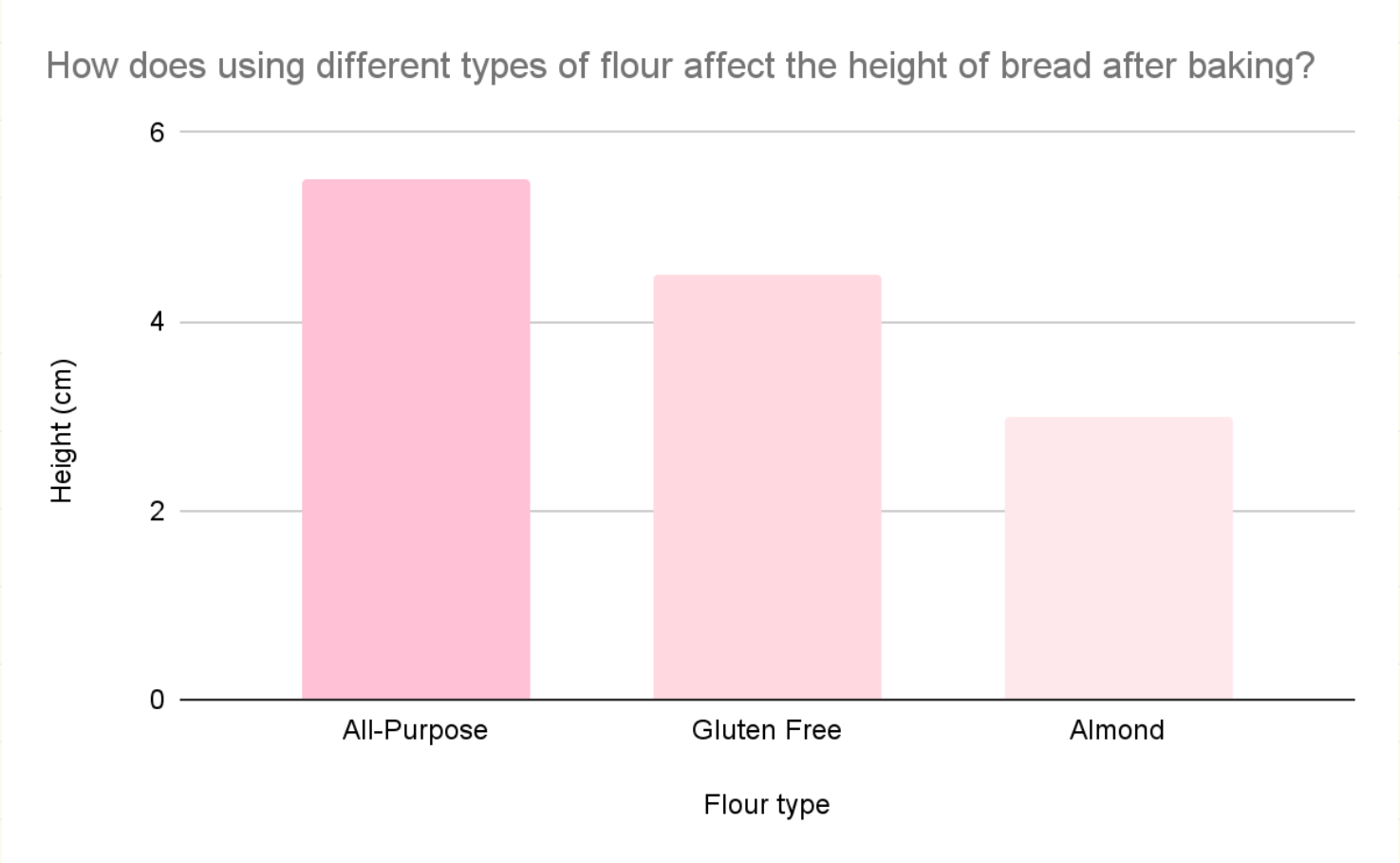
Graphs and Charts



Discussion

- All-purpose flour:

During the mixing process, this flour was very dense and lumpy, but this flour was the one that gave best results, making my hypothesis correct.

- Gluten free flour:

Also while mixing, this flour was very smooth and easy to mix, but while baking it wasn't the best option since it didn't rise much.

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Discussion

- Almond flour:

This flour was somewhat grainy and didn’t want to mix much, making it liquidy and it tastes very salty. At the end, this flour wasn’t the best result because it didn’t raise at all.

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Conclusion

To answer my SARSEF question; the All-purpose flour was the one that had the most height of all the breads that were baked.
I also learned that you have to be very careful while baking so you can achieve the best results.
I would also recommend and add to bake 2+ batches so your evidence is more reliable and understandable.

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Real-world connection

My SARSEF project could help people who love baking or are maybe allergic to a certain type of flour and need to find a safer alternative that could help them complete the recipe without changing anything and the recipe could still work.

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Future Research

If I did this project again, the thing that I would change would be for how long the bread were in the oven for, therefore, all flour’s would be cooked throughout and some parts wouldn't be raw. I would also add to bake 5+ batches so the evidence is more reliable and understandable.

References

1. HadiNezhad M, Butler F. Effect of flour type and baking temperature on cake dynamic height profile measurements during baking. Food and bioprocess technology. 2010 Aug;3(4):594-602.

1. Andersson, M., 2016. Protein enriched foods and healthy ageing: Effects of almond flour, soy flour and whey protein fortification on muffin characteristics.

1. Gómez M, Gutkoski LC, Bravo-Núñez Á. Understanding whole-wheat flour and its effect in breads: A review. Comprehensive Reviews in Food Science and Food Safety. 2020 Nov;19(6):3241-65.

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