

# Sweetened With Science



## Statement of Purpose/Question

Does using different sweeteners impact baking results?

Will using maple syrup or applesauce instead of regular granulated sugar negatively affect the taste, texture, and consistency of the cookies? It might, because it might change required baking times, which could alter the texture or consistency. It might also cause them to not taste as sweet. With this project, I hope to find out if there is a sugar substitute that could help me make a unique but delicious cookie. I would also like to use this to find a way to make cookies for family members who can not have as much sugar due to health reasons.

## Independent Variable

Sweetening agent

I will be replacing regular granulated sugar with maple syrup and then applesauce.

## Dependent Variable

Taste, texture, and consistency of the cookies

The baking results (taste, texture, and consistency) will depend on the sweetener used.

## Constant/Controls

Sugar cookie recipe (other than the sweetener), oven, baking materials

I will use the same recipe for all cookies, only swapping out the sweetener. All cookie batter will be made using the same baking utensils and materials. We will use the same oven for all cookies.

## Materials

- Mixing bowls
- Measuring cups (1 cup, 1/2 cup, 1/4 cup)
- Measuring spoons (1 tsp, 1 T)
- Whisk
- Baking sheet
- Parchment paper
- Recipe
- Ingredients
  - Butter (sticks), softened
  - Granulated sugar/sugar substitutes (maple syrup and applesauce)
  - Eggs
  - Vanilla extract
  - All-purpose flour
  - Baking soda
  - Baking powder
  - Salt
- Oven with timer
- Cooling rack
- Score sheets for tasters

## Procedure

1. Make a control batch of cookies according to the recipe.

### Ingredients

- 1 cup butter, softened
- 1 1/4 cups granulated sugar
- 1 egg
- 2 tsp vanilla extract
- 1/2 tsp almond extract (optional)
- 2 1/2 cups all purpose flour
- 1/2 tsp baking soda
- 1/2 tsp baking powder
- 1/4 tsp salt

### Instructions

- Preheat oven to 350 degrees and line a baking sheet with parchment paper (or coat with baking spray).
- In a large bowl with a standing mixer or hand mixer, cream the butter and sugar together until light and fluffy, about 1 minute.
- Add in the egg, vanilla extract, and almond extract, beat until combined.
- Add in flour, baking soda, baking powder, and salt. Mix until just combined, making sure to scrape down the sides of the bowl every now and again.
- Roll dough into 1" balls, and roll in sugar.
- Place on baking sheet, about 2" apart. Bake for 10-11 minutes, or until cookies have set.
- Allow to cool.
- Have the volunteer tasters score the cookies on the three given categories (taste, texture, and consistency).
- Make a batch of cookies using maple syrup instead of granulated sugar (1/2 cup maple syrup for every 1 cup of granulated sugar).
- Have the volunteer tasters score the cookies on the three given categories again.
- Repeat steps 3 and 4 for four more batches of cookies.
- Make a batch of cookies using applesauce instead of granulated sugar (1/2 cup applesauce for every 1 cup of granulated sugar).
- Have the volunteer tasters score the cookies on the three given categories again.
- Repeat steps 6 and 7 for four more batches of cookies.

## Hypothesis

Using different sweeteners will result in poorly cooked cookies.

I believe that using different sweeteners will impact baking results. For example, using fruit could cause the cookies to be extremely wet and runny, causing them to be undercooked, but if you adjust the measurements and ratios of the sugar substitutes to granulated sugar, the cookies will cook properly. I believe that the taste, texture, and consistency of the cookies will ultimately be negatively impacted by the sugar substitutes though.

## Results

Compared to the scores that my control batch of cookies received, both the maple syrup cookies and the applesauce cookies were lower in taste, texture, and consistency. The applesauce cookies had the lowest scores in all three categories overall. They also took twice as long to bake.

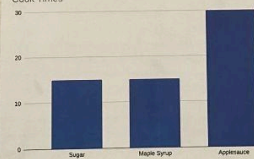
## Conclusion

My results do support my hypothesis that using different sweeteners will result in poorly cooked cookies. For example, using fruit (applesauce) caused the cookies to have more moisture in the batter, which resulted in them needing a much longer cooking time (30 minutes as opposed to 10 minutes). According to my survey data, using different sweeteners also negatively affected the taste, texture, and consistency. The average taste scores varied the most. For my control batch, the average taste score was 9 out of 10, while using maple syrup resulted in an average of 6.8, and using applesauce resulted in an average of only 3. The average texture score for my control batch was 9 out of 10, while the maple syrup had an average of 6.7, and the applesauce had an average of 4.8. Finally, my control batch had an average score of 8 out of 10, while the maple syrup had an average of 6.5, and the applesauce had an average of 4.7. In conclusion, if you are able to use regular granulated sugar in your cookies, that is what I would recommend for the most consistent baking times, along with the best taste, texture, and consistency.

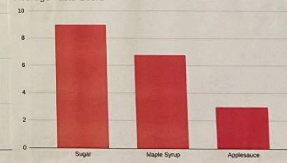
## Real-Life Applications

- Learn to bake cookies that everyone can enjoy, even those with health concerns (like diabetes)
- Learn what can be used as a replacement if a person does not have enough regular granulated sugar on hand

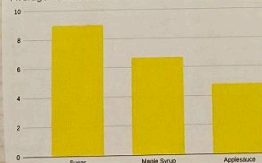
Cook Times



Average Taste Score



Average Texture Score



Average Consistency Score

