

What does each ingredient do in a cupcake?

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Purpose: The purpose of my investigation is to take out flour, sugar, and baking powder, and see which ingredient has the biggest impact on the cupcake.

Hypothesis: If I bake a batch of cupcakes, and I leave out flour, sugar, and baking powder.

Then the batch of cupcakes without flour will have the biggest difference on the cupcake.

The cupcake will have a very sugary taste, the texture won't feel like a cupcake, and the cupcake will still be a little liquidy, because the flour gives the cupcake density, moisture, it helps the cupcake rise in the oven, and it blends all the ingredients together.

Why are ingredients in a cupcake so important? Each ingredient in baking anything is very important, especially cupcakes. The different ingredients contribute a lot to the cupcake. They can affect the appearance of the cupcake, the texture, the taste, and how moist or dry it is. If those ingredients are left out, there will be a big difference in how the cupcake looks, smells, tastes, and feels.

Cupcakes just started out as cakes. However, the first cakes were very different from the ones we have today. They originated from Ancient Egypt and used bread and honey to give it a sweet taste. As time went on, more ingredients and resources were discovered. The first modern cakes were made in Europe in the mid-17th century (the round ones with icing). (Food Timeline, January 23rd, 2015).

Then, in 1796 Amelia Simmons wrote a recipe to bake a light cake, but put it in small cups. (Fun Cupcake Baking Science Fair project, January 26th 2018). From there cupcakes just kept advancing, for example in 1728 Germans started to invent ovens (A brief history of ovens through the ages, October 27th, 2015). Originally, sugarcane was discovered around 8000 BC in New Guinea. Since then, the ideas of the sugarcane kept spreading, until it reached India and that's where the first organized production of sugar began. (Sugar history and facts, 2020)

What does flour do in a cupcake? Flour is the most important ingredient when baking. Flour gives the batter density, moisture and a cupcake like texture. Without flour, the cupcake won't even look like a cupcake. Once the cupcake will come out of the oven, the final result will still be a little liquidy. Flour also contributes to the taste, because it helps

blend the ingredients together. The taste of the cupcake will also be very sugary and too sweet.

What happens if bakers add regular flour instead of cake flour? Each ingredient in a cupcake is very important, especially cake flour. There is a very big difference between regular flour and cake flour because cake flour is made from wheat that is ground and bleached to make it lighter and softer (baking a moment, April 26th 2018). To start off, the cake flour makes the cupcake puffier and gives it a better color. The cake flour will also make the cupcake look more like a cupcake. However, the regular flour makes the cupcake look more like a muffin. The regular flour will also not taste much like a cake and will be more dense (Fun Cupcake Baking Science Fair project, January 26th 2018).

How will leaving out eggs affect the cupcake's texture and appearance? Eggs play a very important role in baking, most bakers don't realize this. Eggs bind ingredients together; they help the batter rise while it's baking. They also make the final result moist and chewy. When the cupcake is baked without eggs, the cupcakes won't rise that high. Egg yolks help to give a mixture a rich, creamy texture (The science of baking, what do your ingredients do?, n.d.).

If bakers leave out sugar, will it affect the taste? The sugar will make the cupcakes sweet and give it a sugary taste. That is what makes the cupcakes so delicious and without sugar the cupcake wouldn't be sweet. However, too much sugar can also affect the cupcake. Too much sugar will make the cupcake frail and then it will fall down and break in the oven. The chemistry of the ingredients play an important role in baking, because the sugar molecules are attracted to water molecules and make the cupcake wet and moist. (The

function of sugar in cake batter, February 28th, 2017) (The science of baking, what do your ingredients do?, n.d.).

What does butter do in a cupcake? Butter is the ingredient that does the most mixing and multitasking in baking. It carries and holds different flavors, making recipes feel very light and not dense at all by holding air bubbles in the mixture. Butter also adds moisture and flavor to the cupcake.(The science of baking, what do your ingredients do?, n.d.).

What does baking soda and baking powder do in the cupcake? These two ingredients are actually very important in baking. They make the cupcake rise while it is baking because they add carbon dioxide to it. It will also give the cupcake some volume. Without baking soda and baking powder, the batter won't rise in the oven. The final result will still be a little liquidy and the texture won't feel much like a cupcake. (Pianfetti, 2019) (The science of baking, what do your ingredients do?, n.d.).

Does salt do anything in a cupcake? In baking, the salt makes the other ingredients spark out and gives them more of a purpose in baking. It also helps mix and blend the ingredients. Salt also does a very good job balancing the ingredients making sure that each one doesn't stand out too much. Salt doesn't do much, but it can contribute to the final result in a cupcake. (Anne and Sue, n.d.)

In conclusion, every ingredient in baking contributes. For example, people might think what does salt do in a cupcake, or if bakers leave out eggs will it affect the texture? Ingredients do more than just make the cupcake taste good, they blend ingredients, balance flavors, give the batter density, and they make the cupcake moist. (science behind cupcakes, February 23, 2018)

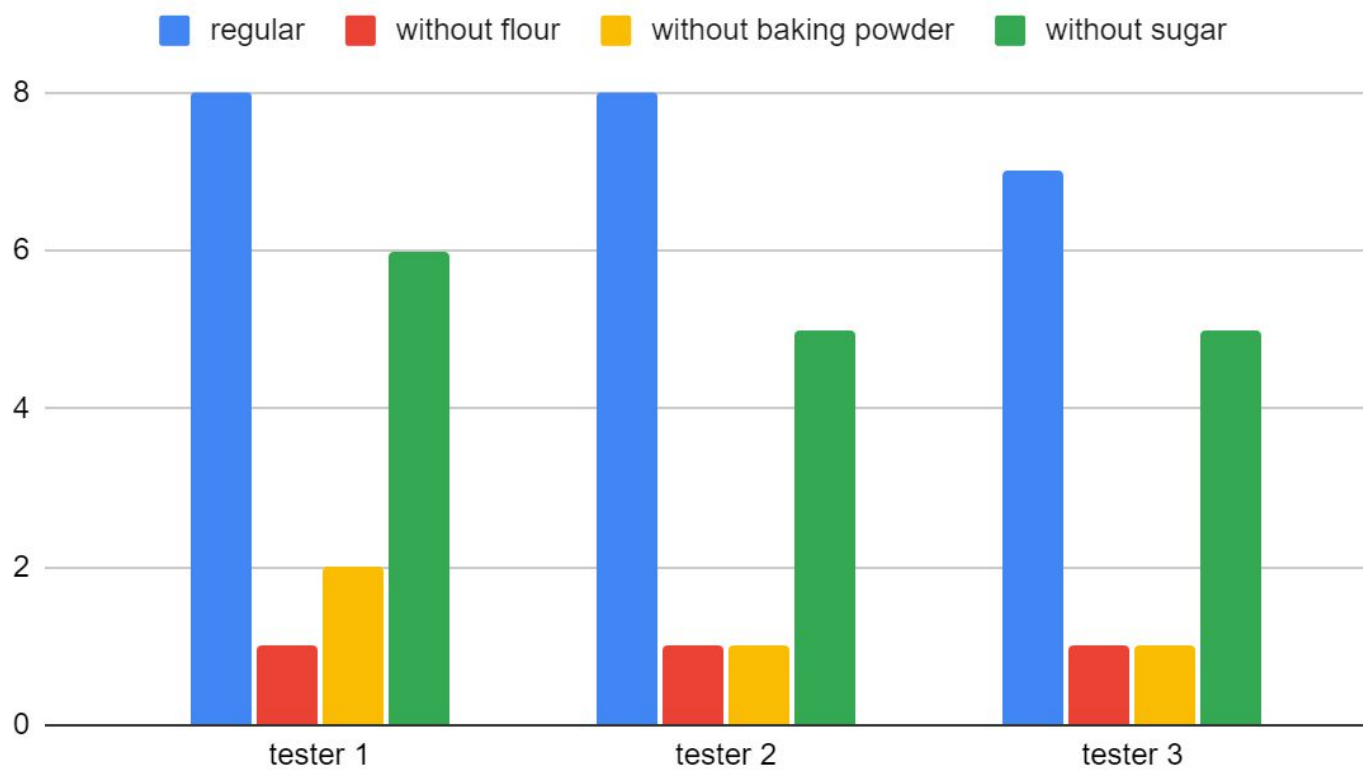
Materials

1 ¼ cups of flour
1 cup of sugar
1 ½ teaspoons of baking powder
½ a teaspoon of salt
½ a cup of milk
¼ a cup of oil
½ a tablespoon of vanilla extract
1 egg
½ a cup of water
An electric mixer
Mixing bowl
Spatula
An oven
Cupcake tins
Baking cups
A spoon
A toothpick
Measuring cups

Procedure

- Step 1: Wash your hands
- Step 2: Get out all the ingredients for the cupcake recipe
- Step 3: Get out the electric mixer and spoon
- Step 4: Preheat the oven to 350 degrees fahrenheit
- Step 5: Add and mix all the ingredients in the mixing bowl except flour
- Step 6: Take out the cupcake tin and the baking cups
- Step 7: Color coordinate the baking cups in the cupcake tin
- Step 8: Pour the batter without flour into the brown baking cup
- Step 9: Add and mix all the ingredients in the electric mixer except the sugar
- Step 10: Pour the batter without sugar to the stripped baking cups
- Step 11: Add and mix all the ingredients in the electric mixer except the baking powder
- Step 12: Pour the batter without baking powder into the dotted baking cups
- Step 13: Put the cupcake tin in the oven
- Step 14: Set a timer for 20 minutes
- Step 15: wait 20 minutes
- Step 16: Take the cupcakes out of the oven
- Step 17: Taste all of the cupcakes
- Step 18: Put all the dishes/ingredients you used away

Cupcake Taste Ratings



Scale: 1- 8

1= worst

8= best

Results

The results on my graph show that the cupcake without flour tasted the worst. Me, Beth and Bella all rated the taste of the cupcake without flour a 0 out of ten, because after it came out of the oven it was a liquid and tasted way too sugary. Beth and Bella rated the cupcake without sugar a 5 out of 10 and I rated it a 6 out of ten, because it tasted just like bread. Lastly for the cupcake without baking powder we all rated it a 2 out of ten, because the texture felt weird in our mouths and the batter never rose in the oven. The cupcake without baking powder tasted weirdly like bananas and a little too sugary.

Conclusion

In conclusion, my hypothesis was correct. The cupcake without flour was very liquidy and tasted like water with lots of sugar. The flour blends ingredients together, it gives the cupcake a cupcake like texture, and it helps the batter rise in the oven. The sugar and baking powder made a difference too, but not as much as the flour. This was a very fun experiment and I learned that ingredients in a cupcake do much more than just make the cupcake taste good.

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