

Both complex carbohydrates and simple sugars are sources of energy. Complex carbohydrates are long, chain-like molecules that take time to digest and give us a slow, steady stream of energy. However, simple sugars are smaller molecules that give us a faster “burst” of energy when we eat them. Too much sugar is bad for our health because this burst of energy can strain the systems that keep the sugar in our blood from getting too high.

### Starch to Sugar

Starches are complex carbohydrates that are made of glucose molecules (simple sugars) joined together in chains and branches. So our bodies digest starches by first breaking them down into glucose molecules. One way we digest food is with special proteins called **enzymes**. And in fact, digestion starts when you chew: your saliva contains lots of enzymes that start to break down food before it even hits your stomach! In this experiment, you can find out if your saliva is able to break starch down into glucose!

### Materials:

- Water
- Cornstarch (1 teaspoon)
- Iodine
- 2 plastic cups
- Eye dropper
- Pot
- Stove (adult supervision required)
- Measuring cup
- Stirring sticks
- Marker or pen

### Procedure:

1. Put 1 cup of water and 1 teaspoon of cornstarch into a small pot.
2. **With adult supervision**, bring this solution to a boil. Boil for 10 minutes or until the solution is clear. You will need to stir the pot occasionally to prevent it from boiling over.
3. Allow the solution to cool to room temperature.
4. While the cornstarch solution is cooling, label two cups “saliva” and “control”.
5. Collect your saliva in the labeled cup. You will need at least one teaspoon or so. You can just spit directly into the cup in order to collect your saliva. **Important:** Do not collect mucus with your saliva. This experiment relies on the activity of saliva alone. Mucus does not contain the enzymes required to digest starch. To ensure that you are getting only saliva into a cup, collect the saliva that is towards the front of your mouth and don't forcefully collect the saliva that does not come out easily.
6. Put a volume of water equal to the volume of saliva in the “control” cup (e.g., 1 tsp. saliva to 1 tsp. water). It is OK to estimate, but try to make sure you have the same amount of liquid in each cup.
7. Use the eyedropper to add a few drops of the cooled cornstarch solution to each cup. Make sure to add the same amount to each, and stir them to combine. Use a clean stirrer for each cup.
8. Wait 10 minutes.
9. After the 10-minute incubation, put 1-2 drops of iodine in each cup and observe the results.

### Claims and Evidence

What happened to the iodine in the saliva cup? What about the control cup?

Remember that iodine turns blue in the presence of starch but stays brown if it comes into contact with a sugar such as glucose. Make a claim about what enzymes in saliva do to starch, and explain what evidence in your experiment supports that claim.