

Testing for Sugars and Starch

Carbohydrates are the body's most important and readily available source of energy. Even though they've gotten a bad reputation in the 2000s and have often been blamed for the obesity epidemic in America, carbs are a necessary part of a healthy diet.

The two major forms of carbohydrates are:

- **simple sugars** (simple carbohydrates), such as fructose, glucose, and lactose, found in nutritious whole fruits.
- **starches** (complex carbohydrates), found in foods such as starchy vegetables, grains, rice, and breads and cereals



Carbohydrates are a main fuel source for some cells, especially those in the brain, nervous system, and red blood cells. Muscles also rely on a dependable supply of carbohydrate to fuel intense physical activity. Yielding on average 4 kcal per gram, carbohydrates are a readily available fuel for all cells, both in the form of blood glucose and that stored in the liver and muscles as glycogen.

The glycogen stored in the liver can be used to maintain blood glucose availability in times when the diet does not supply enough carbohydrate. Regular intake of carbohydrate is important, because liver glycogen stores are depleted in about 18 hours if no carbohydrate is consumed. After that point, the body is forced to produce carbohydrate, much of which comes from breakdown of proteins in the body. This eventually leads to health problems.

Carbohydrate comes from various food sources. Currently, the top five carbohydrate sources for U.S. adults are with bread, soft drinks, cookies and cakes (including doughnuts), sugars/syrups/jams, and potatoes. Clearly many Americans should take a closer look at their main carbohydrate sources and strive to improve them from a nutritional standpoint more whole grains, fruits, and vegetables.

Part #1:

Purpose: To investigate the presence of simple sugars in various food products.

Materials: Hot plate, 500 mL beaker, 6 test tubes, Water, 6 food products (choose from grain products, milk products, and fruits or vegetables), and Benedict's Solution

Method

1. Turn an electric plate on high and place a 500 mL beaker half full of water, to make a hot water bath.
2. Place foods in separate test tubes.
 - if the food is liquid, pour enough to just cover the bottom of the glass.
 - If the food is solid (e.g., banana, apple, potato chips), crush a small amount and add enough water to cover the bottom of the tube.
3. Add 10 drops of Benedict's Solution to each test tube.
4. Place the test tubes in the hot water bath and note your observation.

Observations:

Complete the chart below using the food your group has compiled. The Benedict's Solution provides a test for the presence of simple sugars. If sugar is present, the Benedict's Solution will turn color (shades of yellow, orange, brown).



Part #2:

Purpose: To investigate the presence of starch in various food products.

Materials: Bunsen burner, 6 test tubes, 6 food products (choose from grain products, milk products, and fruits or vegetables), Iodine solution.

Method

1. Place a sample of each food into the test tube. Test similar amounts of each food.
2. Place a few drops of iodine solution on each food.
3. Make observations immediately.
4. Wait a few more minutes and note any other changes.

Observations

Complete the chart below using the food your group has compiled. When drops of iodine solution are applied to a food containing starch, the solution will turn dark blue, purple, or blackish.

Data table:

Food product	Description before testing	Description after testing	Conclusion: are complex sugars present?
1.			
2.			
3.			
4.			
5.			
6.			

