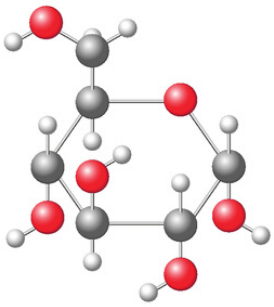
Digesting Sugars

Simple Sugars

Simple sugars are made from single sugar molecules. These molecules are absorbed right away because they have already been broken down!



Simple Sugar Molecule

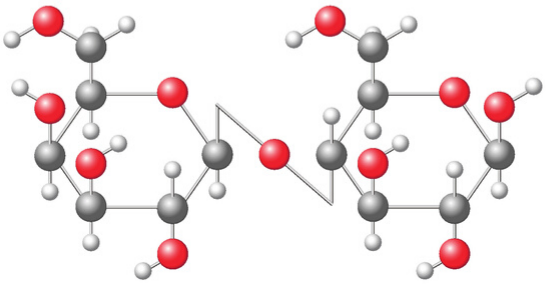
Examples:

Sports Drinks

Candy

Complex Sugars

Complex sugars are sugars that are made from two or more simple sugar molecules that are linked together. These sugar molecules must be broken down before our body can absorb them. The more simple sugar molecules there are linked together, the longer it takes our body to break them down.



Complex Sugar Molecule

Examples:

Bread

Milk

The complex sugar that milk contains is called lactose. When people digest lactose, it breaks down into simple sugars. One of these sugars is called glucose. Glucose is easy for people to quickly absorb into their blood stream and use for energy.

Testing for Lactose

Follow the steps below to determine how much lactase is needed to digest lactose molecules.

In Steps 1-3, you will test to see if 4 different drinks to see if they test positive for glucose. Drinks that test positive for glucose do not have lactose. Drinks that test negative for glucose have lactose or no sugar at all.

Step One: Testing a Negative Control

In your experiment, you will use water as a negative control. This means that water is a material that you know contains no lactose or glucose. This experiment will show you what results look like when there is no sugar present.

1. Add 1/2 cup of room temperature water to a cup.
2. Quickly dip a glucose test strip in the water.
3. Blot the extra water off the strip on a paper towel.
4. Compare the strip to the chart that came with glucose strips to read the glucose value.
5. Record the the glucose value in the table.

Step Two: Testing a Positive Control

In your experiment, you will use a sports drink as a positive control. This means that the sports drink is a material that you know contains glucose. This experiment will show you what results look like when there is a lot of glucose present.Add 1/2 cup of room temperature water to a cup.

1. Add 1/2 cup of room temperature sports drink to a cup.
2. Quickly dip a glucose test strip in the water.
3. Blot the extra liquid off the strip on a paper towel.
4. Compare the strip to the chart that came with glucose strips to read the glucose value.
5. Record the the glucose value in the table.

Step Three: Testing Different Milk Varieties

In your experiment, you will test a few different milk varieties to determine if they contain glucose. If the glucose test strip shows a positive result, it means that the milk contains glucose. If the glucose strip shows a negative result, it means that the milk does not contain glucose. The milk that tests negative contains lactose.Add 1/2 cup of room temperature sports drink to a cup.

1. Add 1/2 cup of each room temperature milk to individual cups. Label each cup.
2. For each type of milk:
    a. Quickly dip a glucose test strip in the milk.
    b. Blot the extra milk off the strip on a paper towel.
    c. Compare the strip to the chart that came with glucose strips to read the glucose value.
    d. Record the the glucose value in the table.

Step Four: Adding Lactase

Next, you will add lactase to the milk that contains lactose to determine how much lactase enzyme is needed to turn all of the lactose into glucose. If all of the lactose turns into glucose, this means that the glucose can be absorbed into the bloodstream of someone who is lactose intolerant!Add 1/2 cup of each room temperature milk to individual cups. Label each cup.

1. Place 1 lactase tablet in the bowl and crush with a metal spoon.
2. Pour the crushed lactase tablet into the 1/2 cup of Regular 2% Milk.
3. Mix with mixing spoon for at least 60 seconds.
4. Test the glucose value of Regular 2% Milk and lactase enzyme mixture.
    a. Quickly dip a glucose test strip in the milk.
    b. Blot the extra milk off the strip on a paper towel.
    c. Compare the strip to the chart that came with glucose strips to read the glucose value.
    d. Record the the glucose value in the table.
5. Keep repeating this process (adding 1 lactase tablet, mixing and testing) until the glucose value rises to the same value as the Lactose free 2% Milk.
    a. This is the number of lactase tablets needed change all of the lactase into glucose so that it won't hurt a lactose intolerant person's stomach!

Data Tables

Glucose Testing

Drink	Glucose Test Results
Water	
Sports Drink	
Regular 2% Milk	
Lactose Free 2% Milk	

Changing Regular Milk to Lactose Free Milk

Drink	Number of Lactase Tablets	Glucose Value
Regular 2% Milk	1	
	2	
	3	
	4	