

# Food Analysis



**Real World Energy  
Learner Activity Instructions  
Grade Level: 9-12**

## What you will learn:

You will investigate the composition of a variety of food items through a variety of tests. You will also observe a test that finds the heat content (energy) of food items.

## What you will need:

B3 Food Analysis Backgrounder  
 B3 Food Analysis Learner Worksheet  
 16 test tubes (100 mL)  
 Test tube rack (to hold up to 8 test tubes)  
 Dropping pipette  
 4 graduated cylinders (50 mL - to hold solutions and distilled water)  
 Stirring rods  
 8 Rubber stoppers for test tubes  
 9 Test (depression) plates (watch glasses)  
 Benedict's solution (24 mL)  
 Biuret solution (16 mL)  
 Iodine solution (10 drops)  
 Brown paper (e.g., paper grocery bag, parcel wrapping paper), 25 x 25 cm, cut into pieces – one piece for each food item plus one for the control  
 Hot plate  
 600 mL Beaker  
 Distilled water (3 mL)  
 Tap water (300 mL)  
 Food items such as apple juice, potato, margarine, onion, skim milk, regular and diet pop, hot dog, Jello (For each group, four pieces of each food type are required.)

## Background

If a sample contains sugar, the Benedict's solution changes colour. In the starch test, the presence of starch (carbohydrate) in an iodine solution will make the food item change colour from red-brown to a deep purple-blue or black. The iodine will not change colour when mixed with a sugar (carbohydrate). In the protein, test the Biuret reagent reacts with the protein molecules, resulting in a colour change. The colour can change from pink to violet to purple depending on the amount of protein. For the translucence test, if a translucent spot forms, there is a presence of fats or oils. The calorimetry test will demonstrate a change in temperature in water depending on the amount of energy in the food item.

## How to do it

1. You will be working in learner groups.
2. Obtain the materials listed above from your instructor.
3. Perform the tests below.

## Sugars Test:

- Prepare a water bath by filling a 600 mL beaker to 300 mL level with tap water.
- Place it on a hot plate and bring it to a temperature of about 80 degrees Celsius.
- Label one test tube "C" for control.
- Label the other test tubes with the type of food being tested.
- Add each food item into different test tubes.

- Pour 3 mL of Benedict's solution into each test tube.
- Record observations using the colour chart.
- Clean all equipment carefully.

#### Starch Test:

- Obtain test (depression) plates.
- Label one test plate "I" for the iodine.
- Label another test plate "C" for control.
- Label the other test plates with the name of one of the food items.
- Add 2 drops of iodine to the "I" test plate and record the colour of the iodine.
- Add two drops of distilled water to test plate "C," followed by two drops of iodine. Observe the colour.
- In the other test plates, add the food item to match the label.
- Add two drops of iodine to each of the food test plates and observe the colour.
- Record your observations.
- Clean all equipment carefully.

#### Proteins Test:

- Label one test tube "C" for control.
- Label the other test tubes for each food item.
- Add 2 mL of distilled water to test tube "C" and 2 mL of Biuret solution. Record the colour of the Biuret solution.
- Place the food items into each test tube.
- One at a time, add 2 mL of Biuret solution to the test tube.
- Place a stopper on the test tube and gently tap the test tube to mix the materials.
- Record your observations of the colour of the Biuret solution.
- Clean all equipment carefully.

#### Fats Test:

- Obtain pieces of unglazed brown paper.
- Label one "C" for control and label the other pieces according to the food items.
- Place a drop of distilled water on the "C" paper and spread with a clean stirring rod.

- Record the effect of the water on the paper.
- With a clean stirring rod, spread the food items on the appropriate labeled piece of unglazed brown paper.
- Allow the test to dry.
- Hold up the control paper to the light and compare each test to the "C" test by placing it in the light next to it.
- Record differences between the control and each test piece of paper in terms of their translucence. If a translucent spot forms, there is a presence of fats or oils.
- Clean all equipment carefully.

#### Test Result Charts:

##### Sugars: Benedict's Test

| Colour                           | Test results (+ or - for sugars) |
|----------------------------------|----------------------------------|
| blue                             | - for sugar                      |
| green, yellow, orange, red-brown | + for sugar                      |

##### Starch: Iodine Test

| Colour   | Test results (+ or - for starch) |
|--|----------------------------------|
| no change  | - for starch                     |
| changes from a red-brown to a purple-blue or black | + for starch                     |

##### Proteins: Biuret Test

| Colour               | Test results (+ or - for protein) |
|----------------------|-----------------------------------|
| no change            | - for protein                     |
| pink, violet, purple | + for protein                     |

##### Fats: Translucence Test

| Colour          | Test results (+ or - for fats) |
|-----------------|--------------------------------|
| not translucent | - for fats                     |
| translucent     | + for fats                     |