Be a Food Scientist

Carbohydrate testing

Standard Laboratory Operating Procedure #205

Laboratory: Biotechnology | Location: Food Science Lab

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General: Carbohydrates make up a large group of chemical compounds found in cells. Carbohydrates are an energy source found in foods providing fuel for cells. Testing for the presence of these molecules using indicators is a useful tool in the food science industry. For example, Benedict's solution is an indicator for monosaccharides (simple sugars) and Lugol's Iodine is an indicator for starch (polysaccharides).

Safety: Safety Glasses, Hot Gloves, Test Tube Holder

Materials

distilled water	blue pipette tips	test tube rack
Lugol's iodine	disposable pipettes	microwell plate
micropipette	2 mL of food sample solution	hot plate/stirrer
graduated cylinder	Pyrex test tubes	vortex
Benedict's Solution	mortar and pestle	food samples

Preparation of food sample

1. Weigh out 5g of food sample using electronic balance, place sample into a mortar.
2. Add 20mL of distilled water to food sample in mortar, grind sample with a pestle to make into a slurry.
3. Filter slurry using filter paper and funnel, to collect liquid food sample into a small, graduated cylinder, beaker or plastic cup.
4. Use the filtrate to complete the Carbohydrate Indicator Tests.
5. Repeat steps 1-4 for each sample.

Monosaccharide Indicator Standard Test (Glucose)

1. Add 500µL of food sample solution with 1mL of Benedict's solution in a test tube.
2. Use Vortex to give sample a quick mix.
3. Place test tube containing food sample and Benedict's solution in a boiling water bath and heat for 2 minutes.
4. The glucose present in the solution reacts with the copper sulfate in the Benedict reagent creating copper oxide, which results in an orange to red-brick precipitate. The intensity of the color depends on the concentration of glucose present in the sample.
5. Rate the precipitate color change as 0=no color change/negative, 1=weak/positive, 2=strong/positive, 3=very strong/positive

Starch Indicator Standard Test

1. Add 500µL of food sample solution with 250µL of Lugol's Iodine Solution in a microwell plate.
2. Gently mix with a stir stick. DO NOT HEAT!
3. A bluish black color indicates a positive test for starch.
4. Rate the precipitate color change as 0=no color change/negative, 1=weak/positive, 2=strong/positive, 3=very strong/positive