

CARBOHYDRATE LAB

Objective: To establish test protocols for the detection of starch and sugar, and to understand the limitations of each test.

Materials:

Iodine solution ** avoid eye/skin contact, stains skin and clothing **

Benedict's solution ** avoid eye/skin contact **

Small beakers (100 - 250 ml)

Test tubes, rack, holder

Tape & marker

Pipettes

Hot plate - Beaker of water (about 90° C)

Hot plate – Beaker of water (about 37°C)

Starch solution (positive control for starch)

Glucose solution (positive for reducing sugars)

Plant tissues (potato, carrot, radish, apple, orange)

Solutions of fructose, sucrose, lactose, maltose

Other materials to be tested (7up)

TEST FOR STARCH - Question: Which foods contain starch?

Hypothesis: If iodine is placed on _____, then it (they) will turn purple because it (they) contain starch.

Procedures:

Put a drop or two of iodine solution into a small beaker containing a small amount of starch solution...record the results of this positive control.

(Note: Use white paper for a background for better color detection.)

Repeat with a beaker with a small amount of water...record the results of this negative control.

Test for the presence or absence of starch in a variety of materials.

Controlled variables:

Manipulated variable:

Responding variable:

Experimental control:

Data:

+ starch present

- no starch

	+ starch present	- no starch	
Starch solution	+		
Water	-		

Conclusion:

TEST FOR SUGARS - Question: Which solutions contain “reducing sugars”?

Note: Benedict's test will be positive only for 'reducing' sugars (usually monosaccharides).

Hypothesis: If Benedict's solution is added to _____ then it (they) will turn orange because _____.

Procedures:

Put about 5 ml each of sugar solution and Benedict's solution into a test tube.

Place the tube into hot (almost boiling) water for 3-5 minutes.

** Glucose is positive; water is negative **

Test other sugars, starch solution, soft drinks, etc...and record results.

Try diluted solutions of known positives.

Controlled variables:

Manipulated variable:

Responding variable:

Experimental control:

Data: **+ reducing sugars present** **- reducing sugars not present**

Glucose	+		
Water	-		

Conclusion:

TEST FOR ENZYMES

CAUTION: Wash all tubes in a bleach solution after use

Label 3 tubes “fresh saliva”, “boiled saliva”, and “control”.

Have a member of your group deposit 1 cm saliva into 2 tubes and 1 cm water into the control.

Immerse one of the tubes in boiling water for 5 minutes, then cool it back to room temp.

Put a few drops of starch solution into each of the three tubes and mix.

Incubate at 37° C (body temp) for 15-20 min.

Add Benedict’s solution to each of the tubes until the fluid inside is blue.

Place the tubes into a hot (nearly boiling) water bath for 2-3 minutes.

Record your data and your theory explaining the results below:

TASTE INDEX

** Wash your hands thoroughly before starting and between tests!! **

With a damp finger, touch the sugar solution to be tested and taste it.

Measure each sugar on a scale of one to ten (10 - sweetest).

Glucose	Fructose	Sucrose	Lactose	Sweet & Low	Stevia

ANALYSIS

What are two limitations of the iodine and Benedict’s tests?

Write a conclusion for the jello demonstration in class.