

Name _____

Chemistry 4X, Sec _____

The Chemistry of Carbohydrates

Experiment #5

Pre-lab Exercise

1. Show the chemical reaction that takes place when Benedict's reagent (Cu^{2+}) reacts with glucose (use open chain Fisher projection).
2. Do you expect fructose to give a positive reaction with Barfoed's reagent? Explain why or why not.
3. Indicate which of the test carbohydrates (glucose, fructose, lactose, sucrose, starch) would give 5-hydroxymethylfurfural when heated with hydrochloric acid.

4. Describe the reaction that takes place when starch is hydrolyzed by an enzyme? What is the product of starch hydrolysis? What is the name of the enzyme in saliva that would hydrolyze starch?

Name _____

Section _____

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Data & Report Sheet

Observations for Parts B thru E.

Unknown number _____

Carbohydrate	Benedict Test	Barfoed Test	Seliwanoff Test	Iodine Test
Glucose				
Fructose				
Lactose				
Sucrose				
Starch				
Water				
Unknown #				

B-1. What conclusions can you make regarding your unknown after the test with Benedict's reagent? Is your unknown a reducing sugar?

C-1. What conclusions can you make about your unknown after the test with Barfoed's reagent? Is your unknown a monosaccharide? An aldose?

D-1. What conclusions can you make about your unknown after the test with Seliwanoff's reagent? How does the final color of your unknown in the Seliwanoff test support your conclusion?

E-1. What conclusions can you make about your unknown after the test with iodine reagent?

Summarize your conclusions. What is the identity of your unknown (aldose or ketose; monosaccharide, disaccharide or starch)?

Name _____

Section _____

Part A. Observations. Indicate whether each test was positive or negative and indicate what color each solution was after performing the tests.

Starch mixture	Benedict's Test	Iodine Test
Starch/Saliva	S1	S2
Starch/Buffer	B1	B2

A-1. Describe what caused the observed results in the Benedict's Test for starch/saliva vs. starch/buffer mixtures. Does either solution contain a reducing sugar (such as glucose)?

A-2. Describe what caused the observed results in the iodine test for the starch/saliva vs. starch/buffer mixtures. Does either solution still contain starch?

A-3. What conclusions can you make regarding the action of saliva on starch? What is the product of this reaction?

A-4. What enzyme is involved? You may want to consult the text book for this.