Date .... Name .... Group ....

Lab report from the practical lesson on biochemistry

Topic: **Reactions of saccharides. Thin layer chromatography. Polarimetry**

Task 1: Analysis of unknown sample of saccharide by means of color reactions

Principle:

Reaction	**Chemical principle of the test**	**Main reagent components**	**Positively reacting substances**
Molisch reaction			
Bial reaction			
Selivanov reaction			
Benedict reaction			
Barfoed reaction			
Reaction with Schiff reagent			
Reaction for starch			

Molisch reaction:

	Test tube 1 FRUCTOSE	Test tube 2 MALTOSE	Test tube 3 UNKNOWN	Test tube 4 BLANK
Result				

Bial reaction:

	Test tube 1 XYLOSE	Test tube 2 GLUCOSE	Test tube 3 UNKNOWN	Test tube 4 BLANK
Result				

Selivanov reaction:

	Test tube 1 GLUCOSE	Test tube 2 FRUCTOSE	Test tube 3 SUCROSE	Test tube 4 UNKNOWN	Test tube 5 BLANK
Result					

Benedict reaction:

	Test tube 1 GLUCOSE	Test tube 2 MALTOSE	Test tube 3 SUCROSE	Test tube 4 ASCORBIC ACID	Test tube 5 UNKNOWN	Test tube 6 BLANK
Result						

Barfoed reaction:

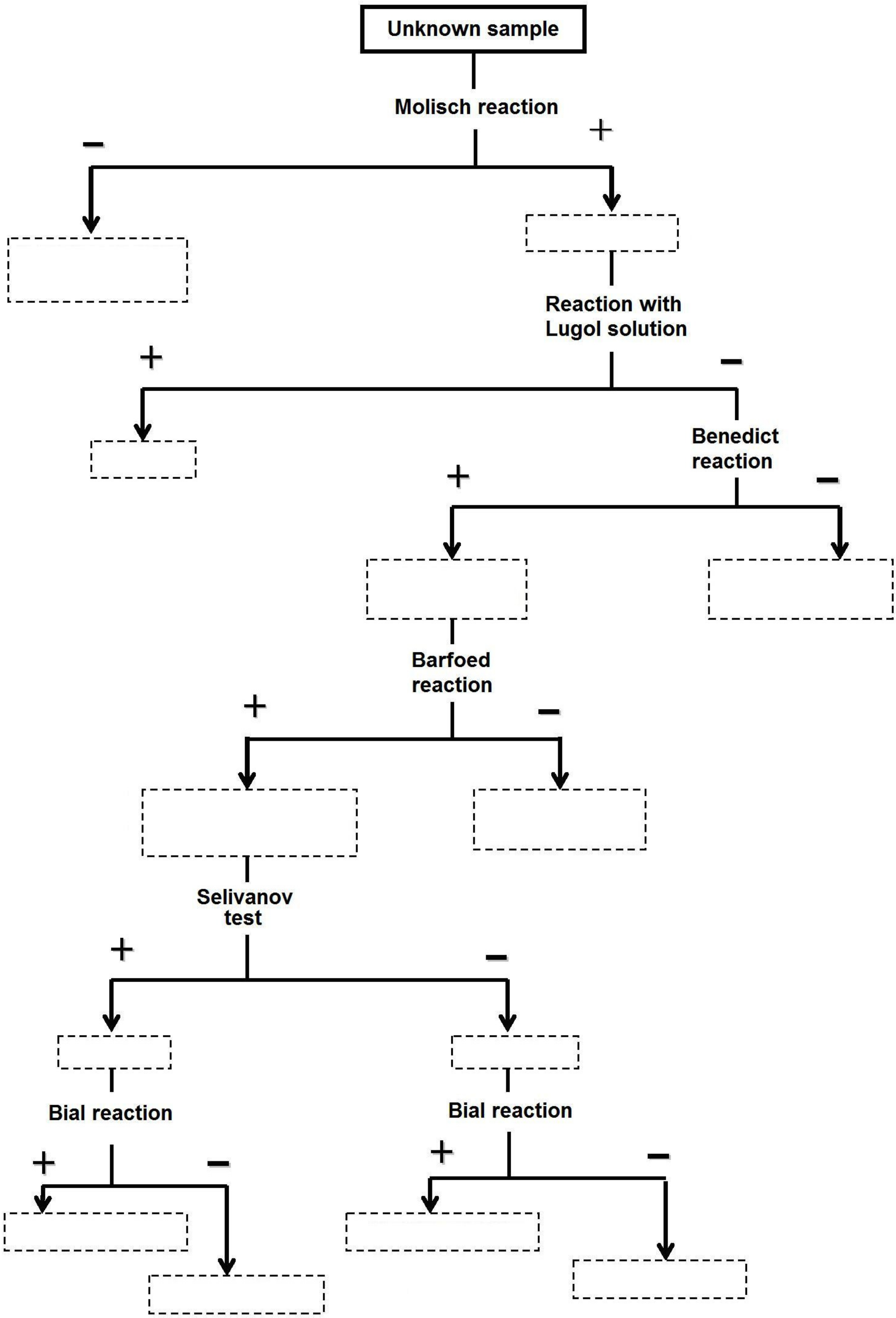
	Test tube 1 GLUCOSE	Test tube 2 MALTOSE	Test tube 3 SUCROSE	Test tube 4 UNKNOWN	Test tube 5 BLANK
Result					

Reaction with the Schiff reagent:

	Test tube 1 GLUCOSE	Test tube 2 FORMALDEHYDE	Test tube 3 UNKNOWN	Test tube 4 BLANK
Result				

Reaction for demonstration of starch:

	Test tube 1 GLUCOSE	Test tube 2 STARCH	Test tube 3 UNKNOWN	Test tube 4 BLANK
Result				


Unknown sample
Molisch reaction
–
+
Reaction with Lugol solution
+
–
Benedict reaction
+
–
Barfoed reaction
+
–
Selivanov test
+
–
Bial reaction
+
–
Bial reaction
+
–

Discussion to particular color reactions and analysis of unknown sample:

Task 2: Thin layer chromatography of saccharides

Principle:

Evaluation:

1. Draw a scheme of the developed chromatogram. Notice all the spots present and their colors after detection. Measure the distance of the solvent front from the start and also the distance of the center of each spot from the start. Use these values to calculate the R_f for each saccharide and summarize the results in the table.
2. Try to identify the saccharide in the unknown sample on the basis of comparison of its R_f value with the R_f of the standards.

Scheme of chromatogram:

	Spot color	**Distance a** (start – center of spot) in cm	**Distance b** (start – solvent front) in cm	R_f
Galactose				
Maltose				
Lactose				
Fructose				
Unknown sample				

Conclusion:

Thin layer chromatography indicates that the unknown sample No. …. is **……………………**

Summary of results and discussion of the analysis of the unknown sample both by means of the color reactions and the thin layer chromatography:

Task 3: Inversion of sucrose

Principle:

Results:

Optical activity of the ***original sucrose*** solution: α = …………..

Optical activity of the ***hydrolysate of sucrose***: α = …………..

Evaluation:

1. Calculation of the original concentration of sucrose:

$$w(g/l) = \frac{\alpha \times 100}{[\alpha]_D^{20°C} \times 1}$$

l = 0.2 m; specific rotation for sucrose: $[\alpha]_D^{20°C}$ = + 66.5 °

w (g / l) = …………………

2. Calculation of the optical activity of invert sugar after hydrolysis of sucrose (verification of hydrolysis completion):

Sucrose c(mol/l) = ………………………… (MW of sucrose: 342)

Predicted mass concentration of the hydrolysis products glucose and fructose:

Glucose w(g/l) = fructose w(g/l) = …………………….. (MW of glucose = MW of fructose: 180)

Predicted optical activity of the solution after hydrolysis:

$$\alpha = [\alpha]_{D\ \text{D-glucose}}^{20°C} \times \frac{1 \times w}{100} + [\alpha]_{D\ \text{D-fructose}}^{20°C} \times \frac{1 \times w}{100}$$

Specific activity for D-glucose: $[\alpha]_D^{20°C}$ = + 52.5 °; for D-fructose: $[\alpha]_D^{20°C}$ = – 92.4 °

α =

Conclusion:

(Was the hydrolysis of sucrose achieved? Was it complete?)