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Life Sciences **Research Article……!!!**

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FIXING OF OPEN CHAIN PERCENTAGE OF D(+)-FRUCTOSE BY CONDENSATION WITH BORSCHE'S REAGENT

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Keywords:

Fructose, 2, 4 DNPH, open chain form, gravimetry

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ABSTRACT

The present study is carried out to determine the percentage of open chain form of D (+)-Fructose by condensation with 2, 4-dinitro phenyl hydrazine. The product has been estimated by gravimetric method. It is reported that the constant percentage is obtained by this method even with the variation of concentration of sugar. It is observed that the product formation takes place only through the open chain form unlike oxidation by Fehling's solution.

INTRODUCTION

Fructose is a 6-carbon poly hydroxyl ketone. Crystalline Fructose has a cyclic six-membered structure, owing to the stability of its hemiketal and internal hydrogen-bonding. Technically this form is called as D-fructopyranose. Fructose exists as an equilibrium mixture of 70% fructopyranose and about 22% fructofuranose in solution form, including three other forms in small amounts along with the acyclic structure. Yeast and bacteria can anaerobically ferment the fructose(1-3).

Borsche's reagent is an important reagent which can be mainly used for the determination of carbonyl group. It is used as a mutagen. The DNPH-Uracil compound showed antioxidant properties. This reagent has significant role in biological, agricultural and pharmaceutical applications (4-9).

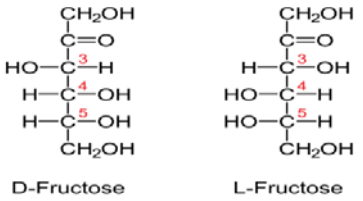
MATERIALS AND METHODS

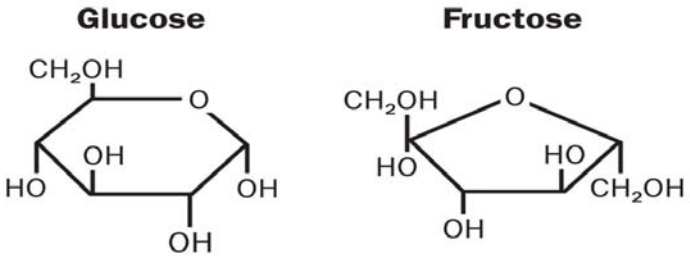
All the reagents used are of analytical reagent grade.

METHOD

The condensation product of D (+)-Fructose with 2,4-dinitro phenyl hydrazine has been estimated by gravimetric method(10). Excess of regent is added to known weights of D (+)-Fructose taken in Erlen Meyer flasks. The flasks are shaken for five minutes to ensure that the sugar samples are dissolved. These flasks are allowed to stand for one hour in an ice bath. The product is filtered through aweighed sintered glass crucible and washed with 2 N HCl, followed by water. The crucibles are dried to constant weight at 100^0c in an oven.

Illustrations:





Open chain forms

Tables:

s.no	Weight of D(+)-fructose taken (g)	%yield		Amount of open chain form
		Theoretical yield	Actual yield	
1	**0.5**	0.24	0.9991	0.1201
2	**1.0**	0.25	1.9982	0.1201
3	**1.5**	0.3	2.9901	0.1504
4	**2.0**	0.24	3.9964	0.1201
5	**2.5**	0.28	4.9955	0.1401
6	**3.0**	0.26	5.9946	0.1301
7	**3.5**	0.23	6.9937	0.1151
8	**4.0**	0.31	7.9928	0.1551
9	**4.5**	0.3	8.9920	0.1501
10	**5.0**	0.25	9.9911	0.1251

RESULTS

The condensation reaction between D (+)-Fructose and Borsche's reagent results in corresponding hydrazone. InFehlings and iodometric methods, the complete oxidation of sugars takes place.But in this condensation process,the reaction leads to quantitative determination of only the open chain form(11). Therefore with the variation of concentration of sugar, the yield of the product does not vary and nearly the same amount of product is obtained.

DISCUSSION

In case of Fructose, the beta anomer is heavily favored in equilibrium by a ratio of 70:1. This is because in the minor alpha anomer, the bulky CH_2OH group occupies an axial position. The percentages of alpha and beta anomers present at equilibrium do not add up to 100%.This is because fructose can also exist in solution as a five-membered cyclic hemiketal, referred to in carbohydrate nomenclature as fructofuranose.In the formation of fructofuranose from open-chain fructose, the hydroxyl group on the fifth carbon attacks the ketone. We have carried out ten individual experiments for determination of D(+)-Fructose by 2, 4-DNPH by gravimetric method. The near constant percentage obtained by this method is due to the open chain form present in equilibrium mixture along with α and β cyclic forms. The fixed percentage of open chain form which exists in the mixture reacts to give an indication of aldehydic form. The present study confirms about 0.1137g of open chain form in the equilibrium mixture. Our study fixes the existence of more percentage of open chain form than Glucose.

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