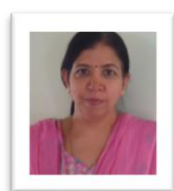


Periodic Research

Carbohydrate in Different Types of Fruits



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Abstract

Fruits are considered among the healthiest sources of carbohydrates because sugar in fruits is mostly in the form of monosaccharides which are easily absorbed through the intestine without undergoing any digestion. In the present work quantitative estimation of total carbohydrates present in different types of fruits was done through a spectrophotometer using phenol sulphuric acid method. Sulphuric acid causes all non reducing sugars to be converted to reducing sugar so that this method determines the total sugar present in food. In our findings we got maximum carbohydrate in banana i.e., 26.5% & minimum in orange i.e., 15.5%. Therefore from banana we gain high amount of calories which increase the energy level in our body. By knowing the carbohydrate %age in different fruits we can plan our diet as per our requirement.

Keywords: Carbohydrate, Ketosis, Reducing sugar, Quantitative & Energy level.

Introduction

Sugars are a form of carbohydrate found in a variety of natural foods like whole grains, vegetables, fruits and legumes. There is no need to consume refined sugar because excessive consumption of sugar can lead to type II diabetes and cancer (**Health Aliciousness.com**). It is more important to eat carbohydrates from healthy food. Fruits are considered ideal source of carbohydrates because sugar in fruits, being mostly monosaccharide pass through the stomach and are absorbed through the walls of intestine. In the present work quantitative estimation of total carbohydrate present in different fruits were observed using phenol sulphuric acid method.

Phenol sulphuric acid method is the most reliable and easiest method (**Masuko.T .etal, 2005**) among the quantitative assays for carbohydrate estimation ,This method is widely used to determine the total concentration of carbohydrate present in foods (**Roberts R, Elias R 2011**). The results are expressed in the terms of a single carbohydrate, usually glucose. In this method , in hot acidic medium glucose is dehydrated to hydroxy methyl furfural, this forms a yellow brown coloured product with phenol and has absorption maximum at 490nm. (**Sadasivam and Manikam, 2005**)

The sulphuric acid causes all non reducing sugar to be converted to reducing sugar so that this method determines the total sugar present in foods. The method detects all classes of carbohydrates, including mono-, di, oligo- and polysaccharides. Although the method detects almost all carbohydrates, the absorptivity of the different carbohydrate varies(Nielsen S, 2010). This method is non stoichiometric and so it is necessary to prepare a calibration curve using a series of standards of known concentration of carbohydrate.

Method

A 0.2,0.4,0.6,0.8 and 1 ml of working standard (with 0.1 mg/ml conc.) of glucose was taken in boiling tubes and the final volumes of each tube was made 1 ml by adding distilled water.

1 ml of 5% Phenol and 5 ml of 96% Sulphuric acid was added one by one in each tubes and shook well so that the Phenol and Sulphuric acid get mixed thoroughly with working standard .After 10 minutes all the tubes were placed in water bath at 25-30°C for 15 minutes.

Blank was set with 1 ml of distilled water and O.D. of each tube was taken at 490 nm with the help of spectrophotometer. Then the whole process following Phenol and Sulphuric acid method was repeated with 0.2 ml of different samples* of fruits and the O.D.s of sample solutions were taken.

Preparation of Sample

100 mg of fruit pulp was taken in boiling tubes and hydrolyzed by adding 5 ml of 2.5 N HCL in it. Boiling tubes were kept in water bath for

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3 hrs and then removed from water bath and cooled to room temperature. After cooling, it was neutralised by adding solid sodium carbonate until effervescence ceases. Then whole volume was made 100 ml by adding distilled water and centrifuged. Finally supernatant is used as a sample in further process.

Observations & Results

Table No. 01 Absorbance at 490 nm with different concentration of working standard of glucose solution

Tube no.	Blank	1	2	3	4	5
Glucose sol. (in ml)	0	0.2	0.4	0.6	0.8	1
Distil water (in ml)	1	0.8	0.6	0.4	0.2	0
5% phenol sol. (in ml)	1	1	1	1	1	1
96% sulphuric acid sol. (in ml)	5	5	5	5	5	5
O.D	0	1.20	2.25	3.50	4.20	6
Conc. of glucose mg/ml	0	0.020	0.040	0.060	0.080	0.10

Table No. 02: Absorbance at 490 nm with different sample solutions of fruits

Tube no.	1	2	3	4	5
	Orange	Pomegranate	Pineapple	Apple	Banana
Sample sol. (in ml)	0.2	0.2	0.2	0.2	0.2
Distil water (in ml)	0.8	0.8	0.8	0.8	0.8
5% phenol sol. (in ml)	1	1	1	1	1
96% sulphuric acid sol. (in ml)	5	5	5	5	5
O.D	1.84	2.02	2.38	2.60	3.12

Graph 01: Obtained From Different Fruit Samples Compared With Standard Curve of Glucose

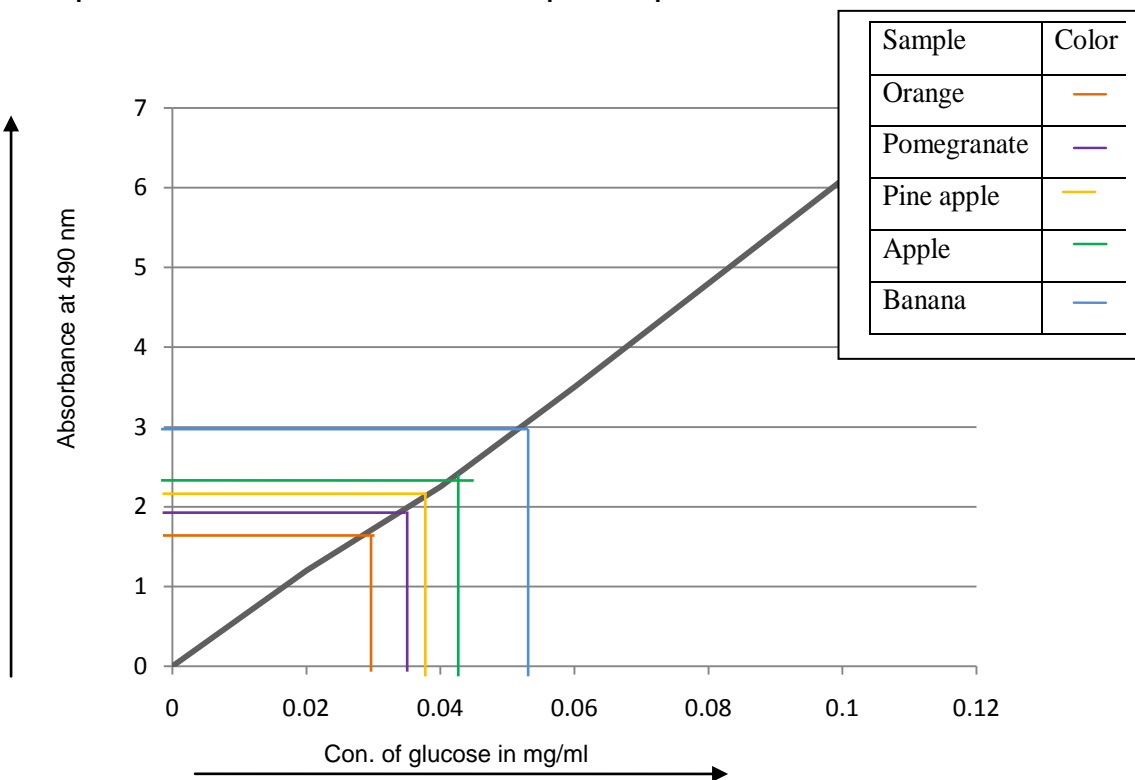


Table No. 03
Con. of Total Carbohydrates Observed in Different Fruit Samples According To Graph

Sample	O.D	Con. (in mg/ml) X
Orange	1.84	0.031
Pomegranate	2.02	0.038
Pine apple	2.38	0.040
Apple	2.60	0.045
Banana	3.12	0.053

Calculation

Percentage of total carbohydrate present in fruits is determined by following method.

(Sadasivam & Manickam, 2005)

Absorbance corresponds to 0.2 ml of test = X mg of glucose

100 ml of sample solution contain = $X/0.2 \times 100 = \%$ of total carbohydrate present

Table No. 04
Percentage of Total Carbohydrates Calculated in Different Fruit Samples

Sample	% of total carbohydrates
Orange	15.5%
Pomegranate	19.0%
Pine apple	20.0%
Apple	22.5%
Banana	26.5%

Discussion

"The recommendation for general population is that total carbohydrate should supply 50 – 55% of total calories (130 gm / day or 520 calories / day) for

male & female adults & for athletics in between 55 & 65% of total calories (Kumar et al 2012). Fruits are considered among the healthiest sources of carbohydrates. In our findings we got % of total carbohydrate in banana as 26.5%, apple 22.5%, pine apple 20.0%, pomegranate 19.0% and in orange 15.5% which shows moderate quantity of carbohydrate in all types of fruits tested. Sugar content in fruits is low compared to other foods in our diet (WeightLoss For All.com). Fruit calories are made up of mostly simple carbohydrates, some proteins and very little fat (www.freedieting.com) therefore fruit can be thought of as a "healthy crab".

Conclusion

In the present project work % of total carbohydrate in different fruit samples like orange, pomegranate, apple, pineapple and banana was observed using phenol sulphuric acid method. In all fruit samples we observed moderate amount of carbohydrate.

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