

## **Estimation of Total Carbohydrate Present In Dry Fruits**

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**ABSTRACT:** Carbohydrates are an essential source of energy for the body to perform its normal functions. Having a diet that does not contain carbohydrate can lead to muscle breakdown, ketosis and dehydration. This can be prevented by taking 50 to 100 grams of carbohydrate per day. In the present work, quantitative estimation of total carbohydrate present in different dry fruits was done using phenol sulfuric acid method. This is a simple and rapid colorimetric method to determine total carbohydrate in a sample. Concentrated sulfuric acid breaks down all the polysaccharides, oligosaccharides and disaccharides to monosaccharide. Therefore this method determines total sugar present in a sample. In our study, the percentage of total carbohydrate present in cashew came out to be 30.0%, in peanut 24.0%, in almond 18.5%, in coconut 16.5% and in walnut 10.5%. Therefore, from cashew and peanut we get more carbohydrate as compared to almond, coconut and walnut to maintain the energy level of our body.

**Keywords:** Carbohydrate, Ketosis, Quantitative & Energy.

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### **I. Introduction**

Carbohydrates are most abundant class of organic compounds found in living organisms. Carbohydrates are a major source of metabolic energy, both for plants and animals. A diet that does not contain carbohydrate can lead to muscle breakdown, ketosis and dehydration. This can be prevented by 50 to 100gms of carbohydrate per day. In the present work quantitative estimation of total carbohydrate present in different dry fruits were observed using phenol sulphuric acid method. Phenol sulphuric acid method is the most reliable and easiest method (Masuko, T. et al, 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 carbohydrates 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.

### **II. Material and Methods**

A 0.2, 0.4, 0.6, 0.8 and 1ml of working standard (with 0.1mg/ml conc.) of glucose was taken in boiling tubes and the final volumes of each tube was made 1ml by adding distilled water. 1ml of 5% Phenol and 5ml 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 1ml of distilled water and O.D. of each tube was taken at 490nm with the help of spectrophotometer. Then the whole process following Phenol and Sulphuric acid method was repeated with 0.2ml of different samples\* of dry fruits and the O.D.s of sample solutions were taken.

**2.1 Preparation of sample:** Dry fruits were crushed in pestle and mortar, from this 100mg weighed and taken in boiling tube. Boiling tubes were kept in water bath for 3hrs and then removed from water bath and cooled to room temperature. After cooling it was neutralized by adding solid sodium carbonate until effervescence ceases. Then final volume was made to 100ml by adding distilled water and centrifuged. Supernatant was used as sample in further process.

**III. Observations and Results**

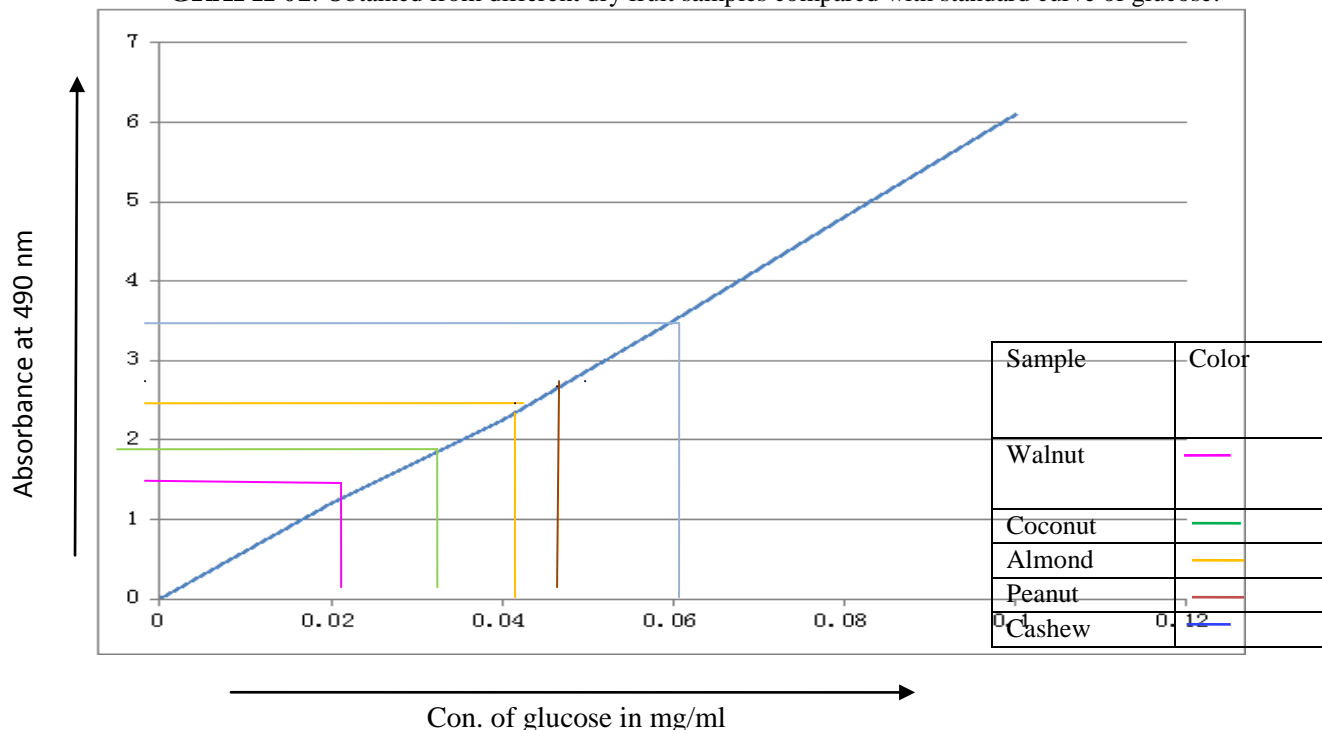
**Table No. 01:** Absorbance at 490 nm with different concentration of working standard of glucose solution

Table 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
Con. 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 dry fruits

Table no.	1	2	3	4	5
	Walnut	Coconut	Almond	Peanut	Cashew
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 dry fruit samples compared with standard curve of glucose:



**Table No. 03:** Con. of total carbohydrates observed in different dry fruit samples according to graph:

Sample	O.D	Con.(in mg/ml)
Walnut	1.23	0.021
Coconut	1.97	0.033
Almond	2.50	0.041
Peanut	2.73	0.048

Cashew	3.56	0.060
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### 3.1 Calculation

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

(Sadasivam&Manickam , 2005)

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

100 ml of sample solution contain = X/0.2100

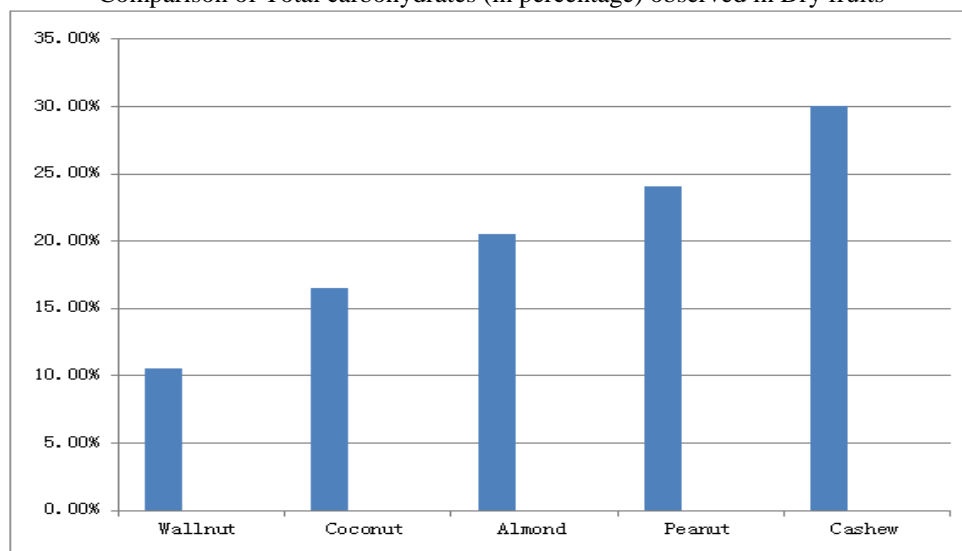
= % of total carbohydrate present

1. Walnut (0.0210.2 ) 100 = 10.5%
2. Coconut (0.0330.2 ) 100 = 16.5%
3. Almond (0.0440.2 ) 100 = 20.5%
4. Peanut (0.0480.2 ) 100 = 24.0%
5. Cashew (0.0600.2 ) 100 = 30.0%

**Table No. 04:** Percentage of total carbohydrates calculated in different dry fruit samples

Sample	% of total carbohydrates
Walnut	10.5%
Coconut	16.5%
Almond	20.5%
Peanut	24.0%
Cashew	30.0%

Comparison of Total carbohydrates (in percentage) observed in Dry fruits



### IV. Discussion

On the basis of results obtained from dry fruits maximum conc. of carbohydrate was found in cashew while minimum in walnut . The readings observed are quite similar to nutrient facts given by nutrient ranking tool (Healthaliciousness.com). The recommendation for general population is that total carbohydrate should supply 50 – 55% of total calories for adults & for athletes it is in between 55 & 65% of total calories (kumaretal. 2012). Through dry fruits we can get high calories of carbohydrate to increase the activity level in the body.

### V. Conclusion

Thus, by knowing the carbohydrate percentage in different food material we can plane our diet as per requirement.

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