

Determination of carbohydrate levels in fruits by UV-Visible Spectrophotometer

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Abstract- Fruits are very nutrient-dense and incredibly healthy. A rapid method was developed for the quantitative estimation of carbohydrates present in the different natural green leafy vegetables by UV-Visible Spectrophotometer. A study was carried out to determine the soluble carbohydrate content of some selected fruit which include apple, banana, custard apple, guava, papaya, grapes, pineapple, orange, pomegranate, kiwi fruit, mango, strawberries. Soluble carbohydrate was determined by Anthrone method Spectrophotometry at wavelength of 750 nm¹. For most people, between 40% and 60% of total calories should come from carbohydrates, preferably from complex carbohydrates (starches) and naturally occurring sugars².

This study was aimed at evaluating the soluble carbohydrate content of some selected fruits consumed locally with a view to determine whether they meet the dietary requirement of consumers. It is envisaged that the findings of the investigation would provide additional information on the nutritional status of the fruits.

Key words: Carbohydrates, UV-Visible Spectrophotometer, Wavelength, Anthrone
Introduction

Carbohydrates are compounds made up of carbon hydrogen and oxygen, thus they are regarded as hydrates of carbon represented as C (H₂O). Carbohydrates act as the primary source of energy which is converted into glucose to generate energy essential for metabolism in every cell of the body¹ and are of special importance as they constitute more than 50% of the dry weight of most fruits. Though there is no absolute requirement of carbohydrates, they are essential to ensure that energy is available to the body to perform its normal functions. Carbohydrates perform numerous roles in living things. Polysaccharides serve for the storage of energy (e.g., starch and glycogen), and as structural components (e.g., cellulose in plants and chitin in arthropods)³⁻⁷. The 5-carbon monosaccharide ribose is an important component of coenzymes (e.g., ATP, FAD, and NAD) and the backbone of the genetic molecule known as RNA. The related deoxyribose is a component of DNA². Saccharides and their derivatives include many other impor-

tant biomolecules that play key roles in the immune system, fertilization, preventing pathogenesis, blood clotting, and development.

In food science and in many informal contexts, the term carbohydrate often means any food that is particularly rich in the complex carbohydrate starch (such as cereals, bread, and pasta) or simple carbohydrates, such as sugar (found in candy, jams, and desserts) For most people, between 40% and 60% of total calories should come from carbohydrates, preferably from complex carbohydrates (starches) and naturally occurring sugars⁶. Complex carbohydrates provide calories, vitamins, minerals, and fiber. Carbohydrates formula is $C_{12}H_{22}O_{11}$.

Material and Methods

Instrumentation- Ultraviolet visible spectroscopy refers to absorption spectroscopy or reflectance spectroscopy in the ultraviolet-visible spectral region. The absorption or reflectance in the visible range directly affects the perceived color of the chemicals involved. In this region of the electromagnetic spectrum, molecules undergo electronic transitions. Ultraviolet-visible spectroscopy was recorded on ELICO SL-160, India.

Sample preparation- Apple, banana, custard apple, guava, papaya, grapes, pineapple, orange, pomegranate, kiwi fruit, mango, strawberries were taken as samples. 5 gm of each sample was extracted separately in 25ml of distilled water⁵.

Chemicals and Reagents- Anthrone, Sulphuric acid were purchased from Merck Specialties pvt. Ltd.

Reagent Preparation- 0.2gm of anthrone was weighed accurately and dissolved in concⁿ sulphuric acid and make up the volume up to 100ml and finally transferred it in to a 100ml of reagent bottle⁷.

Procedure- Pipette out the 1ml of each extracted sample in to a 25ml of volumetric flask and add 2ml of freshly prepared anthrone reagent in each volumetric flask and finally make up the volume up to the mark with distilled water. Reference was prepared by taking 2ml of anthrone reagent in a 25ml of volumetric flask and make up the volume up to the mark with distilled water. To the above prepared samples wavelength was check in UV visible spectrophotometry and wavelength was set at 750nm at that wavelength the developed colour absorbances were noted for the above mentioned samples⁷.

Results and Discussion

From the experiment in apple 1.255%, banana 1.35%, custard apple 1.26%, guava 0.55%, papaya 0.685%, grapes 0.79%, pineapple 1.015, orange 0.77%, pomegranate 1.3%, kiwi fruit 0.6%, mango 1.75%, strawberries 0.4% of carbohydrates are evaluated. The recommendation for the general population is that carbohydrate should supply 50 to 55 percent of total calories, and 130 grams per day (520 calories per day) for male and female adults and for athletes is between 55 and 65 percent of total calories.

Table -1

S.No	Name of Fruit	Carbohydrate content (%)
1	Apple	1.386
2	Custard apple	1.33
3	Banana	1.48
4	Guava	0.45
5	Papaya	0.745
6	Grapes	0.889
7	Pineapple	1.095
8	Orange	0.86
9	Pomegranate	1.64
10	Kiwi fruit	0.65
11	Mango	1.88
12	Strawberries	0.48

Conclusion

From the Mango we gain high calories of carbohydrates of total calories to increase the activity levels in the body.

Disclaimer Statement

Authors declare that no competing interest exists. The products used for this research are commonly used products in research. There is no conflict of interest between authors and producers of the products.

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