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Research Article

**ESTIMATION OF CARBOHYDRATES BY ANTHRONE
METHOD IN DIFFERENT JUICES**

Karri Prasanna*, Nelakurthi Narayanamma, Lukka JV Naga Bhushana Satya Sai, Irla Prasad, Idupularajesh, Kurapati Vinay Teja
Vishwa Bharathi College of Pharmaceutical Sciences, NRT Road, Perecherla, Guntur AP, 522005

Abstract:

Carbohydrates are one of the essential macronutrients and play a vital role in providing energy for various biological functions. They are organic molecules composed of carbon (C), hydrogen (H), and oxygen (O), typically in a ratio of 1:2:1. Carbohydrates serve as the primary source of energy for living organisms and are found in various food source. quantitative estimation of total carbohydrate present in different fruit juices was done using sulfuric acid[H₂SO₄] method. This is a simple and rapid UV spectrometry 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 vitis vinifera came out to be 75mg, in citrus sinensis(orange)70mg, in malus domestica(apple) 67mg, in punica grantum(pomegranate) 64mg and in citrullus(watermelon) 32mg. Therefore, from grape we get more carbohydrate as compared to orange, apple, pomegranate, watermelon.

Keywords:carbohydrates,ketosis,quantitative and energy

Corresponding author:

Karri Prasanna*,
Department Of Pharm.D,
Vishwa Bharathi College of Pharmaceutical Sciences,
Mail Id:karriprasanna1@gmail.com,
Mobile:6309838461

QR code



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INTRODUCTION:

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 50 to 100gms of carbohydrate per day. Carbohydrates are essential biomolecules that provide energy, aid in metabolism, and support various physiological functions. Carbohydrates are essential macronutrients that serve as a primary source of energy. However, their type, quantity, and quality significantly influence health and disease risk. The general formula for carbohydrates is $(CH_2O)_n$, where n represents the number of carbon atoms. In the present work quantitative estimation of total carbohydrate present in different fruits juices were observed using sulphuric acid method. sulphuric acid [H_2SO_4] method is the easiest method among the quantitative assays for carbohydrate estimation. This method is widely used to determine the total concentration of carbohydrate present in foods. 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 monosaccharides-, disaccharides, oligosaccharides and polysaccharides. This method is non stoichiometric and so it is necessary to prepare a calibration curve using a series of standards of known concentration of carbohydrates.

METHOD AND METHODOLOGY:**Estimation of Carbohydrates Using Anthrone Reagent****Principle:**

- The Anthrone reagent reacts with carbohydrates under acidic conditions to form a blue-green complex.
- Concentrated sulfuric acid (H_2SO_4) hydrolyzes polysaccharides into monosaccharides.
- Monosaccharides undergo dehydration to form furfural (from pentoses) or hydroxymethylfurfural (from hexoses).
- These compounds then condense with Anthrone, producing a blue-green complex that can be quantified spectrophotometrically at 620 nm.

Methodology:**A. Materials Required****1. Equipment:**

- UV-Visible Spectrophotometer
- Vortex Mixer
- Water Bath (90–100°C)

2. Reagents:

- **Anthrone Reagent:** Dissolve 2 g Anthrone in 1 L concentrated H_2SO_4 (prepare fresh).
- **Glucose Stock Solution:** Prepare 200 μ g/mL of glucose in distilled water.
- **Distilled Water**

3. Glassware & Accessories:

- Test Tubes
- Pipettes
- Beakers
- Test Tube Stand

B. Procedure**1. Preparation of Standard Curve:**

- o Take different volumes (50 μ L, 100 μ L, 150 μ L, etc.) of glucose solution in test tubes.
- o Add distilled water to make the volume 1 mL.
- o Prepare a blank with 1 mL distilled water (no glucose).

2. Reaction with Anthrone Reagent:

- o Add 5 mL of freshly prepared Anthrone reagent to each tube.
- o Mix well by vortexing.

3. Incubation:

- o Cover tubes and heat in a boiling water bath (100°C) for 10 minutes.
- o Alternatively, incubate at 90°C for 17 minutes.

4. Cooling & Absorbance Measurement:

- o Cool tubes to room temperature.
- o Measure absorbance at 620 nm using a spectrophotometer.

5. Standard Curve Preparation:

- o Plot absorbance vs. glucose concentration.
- o Use the graph to determine the carbohydrate concentration in unknown samples.

Interpretation of Results:

- The intensity of the blue-green color indicates the carbohydrate concentration.
- Compare the absorbance of unknown samples with the standard curve to quantify carbohydrate levels.

TABLE:1 STANDARD VALUES:

S.NO	GLUCOSE SOLUTION (ML)	GLUCOSE (MG)	DISTILLED WATER (ML)	ANTHRONE REAGENT (ML)	ABSORBANCE(A620)
1	0	-	1000	5	0.046
2	50	10	950	5	0.014
3	100	20	900	5	0.029
4	200	40	800	5	0.058
5	300	60	700	5	0.106

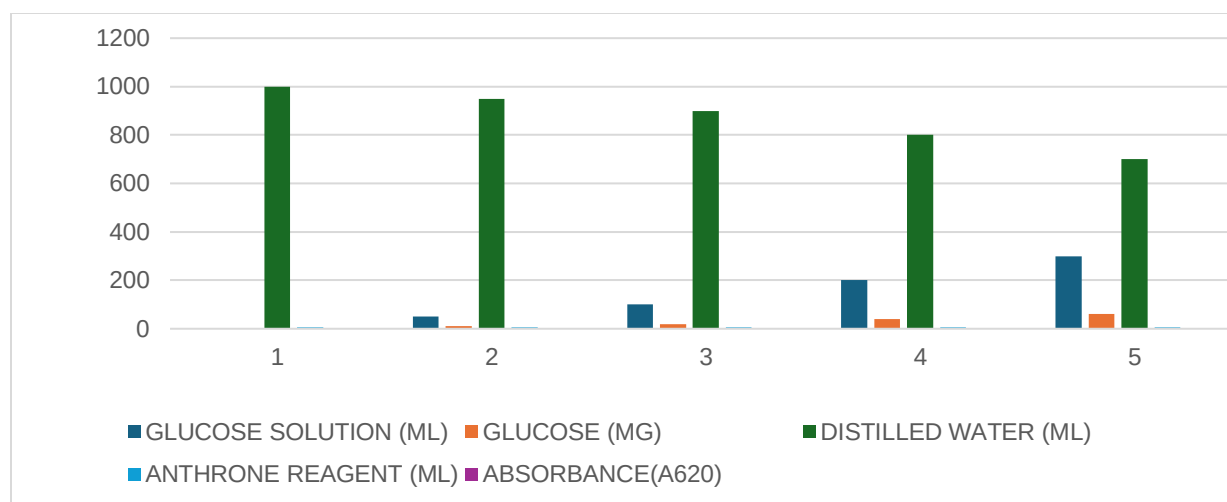
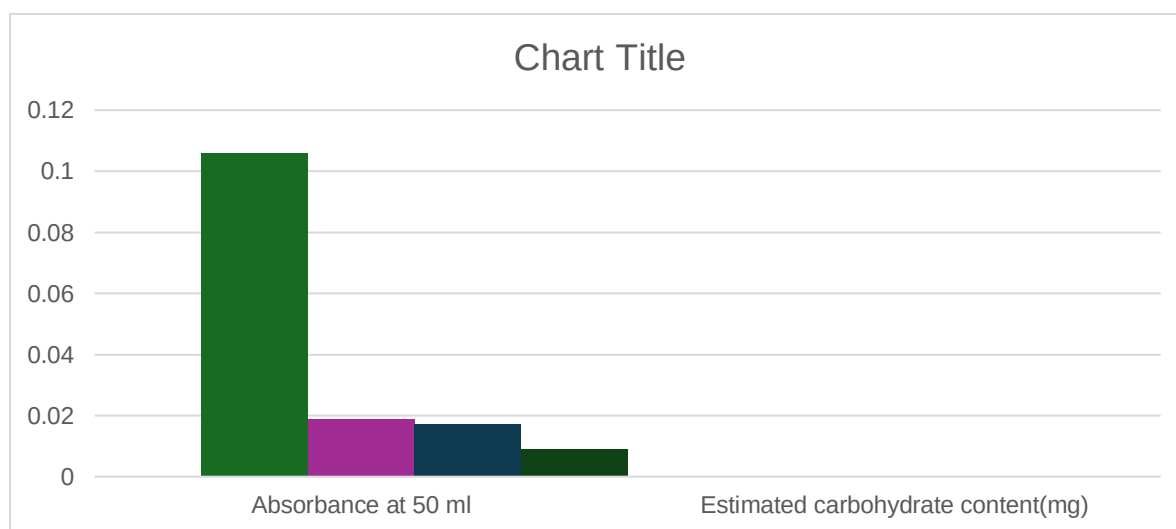


TABLE:2 Carbohydrate Concentration in Fruit Juices

Fruit sample	Absorbance at 50 ml	Estimated content(mg)	carbohydrate
Citrus sinensis(orange)	0.098	70mg	
Vitis vinifera (Grape)	0.106	75mg	
Malus domestica (Apple)	0.019	67mg	
Punica granatum (pomegranate)	0.017	64mg	
Citrullus lanatus (water melon)	0.009	32mg	



Observations

• **Highest Carbohydrate Content:** *Vitis vinifera* (grape) had the highest carbohydrate concentration (75 µg), aligning with its naturally high sugar content.

• **Moderate Carbohydrate Content:** *Citrus sinensis* (orange) and *Malus domestica* (apple) had similar carbohydrate levels (70 µg and 67 µg, respectively).

• **Lower Carbohydrate Content:** *Punica granatum* (pomegranate) had slightly lower carbohydrate content (64 µg), possibly due to its fiber and antioxidant content.

• **Lowest Carbohydrate Content:** *Citrullus lanatus* (watermelon) had the lowest carbohydrate concentration (32 µg), reflecting its high water content and mild sweetness.

CONCLUSION:

The Anthrone test successfully quantified the carbohydrate content in various fruit juices, demonstrating its effectiveness as a simple and reliable method for carbohydrate estimation. The study revealed significant variations in carbohydrate concentrations among different fruits, with *Vitis vinifera* (grape) having the highest carbohydrate content (75 µg) and *Citrullus lanatus* (watermelon) the lowest (32 µg). These findings highlight the natural sugar composition of different fruits, which can be useful for dietary planning, especially for individuals managing diabetes, weight loss, or energy intake. The results suggest that fruits with higher carbohydrate content, such as grapes and oranges, may provide

quick energy, while those with lower carbohydrate content, like watermelon, can be beneficial for hydration and low-calorie diets. Overall, the Anthrone test proved to be a valuable tool for carbohydrate estimation in fruit juices, though further validation using advanced techniques like HPLC is recommended for more precise quantification.

REFERENCE:

1. Estimation of Total Carbohydrate Present In Dry Fruits Neeru Agrawal¹, Divya K. Minj², Khushboo Rani³ (Department of Zoology, Govt. V.Y.T. P.G. Auto. College, Durg(C.G.), India)
2. Determination electrophoresis of carbohydrates in fruit juices by capillary and high-performance liquid chromatography A. Klockowa^{Tb}, A. Paulusa^{*'}, V. Figueiredo["], R. Amadbb, H.M. Widmer["] "Ciba, Corporate Analytical Research, CH-4002 Basle, Switzerland bSwiss Federal Institute of Technology (ETH Zurich), institute of Food Science, CH-8092 Zurich, Switzerland.
3. A new method for rapid determination of carbohydrate and total carbon concentrations using UV spectrophotometry Ammar A. Albalasmeh, Asmeret Asefaw Berhe, Teamrat A. Ghezezehei
4. Study of Apple Juice Extraction Process, Estimation of Carbohydrates, Proteins and Comparative Study. 1Guruprasad Bhandwale, 2Girija Bhalkar, 3Divija Bhivate, 4Aishwarya Charapale, 5Bilwa Navare.
5. Armstrong, F. H. & Fisher, K. C. (1947). J. gen. Physiol. 30, 279. Adler, E., G-unther, G. & Everett, J. E. (1938). Hoppe-Seyl. Z. 255, 27.
6. Kumar V.P., Ch.Madhu, Mannem K., Asha, V.S., Sambasiva Rao ., Prasad M. Sravan. (2012): Quantitative evaluation of carbohydrate levels in fruits by UV- visible spectrophotometer. Asian J. Pharm. Tech., 2(3): Pp 99-100.