

Preliminary Phytochemical Evaluation and Spectrophotometric Estimation of Total Polysaccharide Content of Gum Isolated From *Cordia dichotoma* Fruits

Harshal Ashok Pawar^{1*} and Pravin Jadhav²

¹Assistant Professor and Head of Department (Quality Assurance), Dr. L. H. Hiranandani College of Pharmacy, Ulhasnagar-421003, Maharashtra, India

²Department of Quality Assurance, Dr. L. H. Hiranandani College of Pharmacy, Ulhasnagar-421003, Maharashtra, India

Abstract

Cordia dichotoma Forst belonging to family Boraginaceae is medium sized tree grows in India, Srilanka and other warmer countries. Fruits of *Cordia dichotoma* are used traditionally as analgesic, anti-inflammatory, hepato protective, diuretic, aphrodisiac, and anti-helmentic activities.

Gum was isolated from the ripe fruits of *Cordia dichotoma* by solvent precipitation technique using ethanol (95%). Preliminary phytochemical evaluation of the gum was carried using standard reported methods. The total polysaccharide content of isolated gum was determined spectro photometrically using Phenol-Sulphuric acid method. The total polysaccharide content of *Cordia dichotoma* fruit gum was found to be 70.29 % w/w.

Keywords: *Cordia dichotoma*; Polysaccharides; Natural gum; Boraginaceae

Introduction

Cordia dichotoma Forst belonging to family Boraginaceae is medium sized tree found in India, Srilanka and other warmer countries [1]. The whole plant of *Cordia dichotoma* is edible and is used as a food. Immature fruits are used as vegetable and also in the preparation of pickles [2]. Mixture of flowers of this plant and curd are used to protect body against heavy sun heat waves. The rural people of coastal areas of Orissa eat the ripe fruits raw [3]. The seed kernels of *Cordia dichotoma* contain high quantity of fatty oils and proteins which has potential as cattle feed [4]. New natural cellulose fabrics were identified from the branches of the *Cordia dichotoma* [5]. Leaves contain quercetin and quercitrin whereas fruit has been reported to contain arabinoglucan i.e. D-glucose (67.6 %) and L-arabinose (13.2%) [6]. Fruits of *Cordia dichotoma* are used traditionally as analgesic, anti-inflammatory, hepatoprotective, diuretic, aphrodisiac, and anti-helmentic activities [7].

Natural polymers (gums and mucilage's) have been extensively used in the pharmaceutical industry as thickener, emulsifier, stabilizer, gelling agent, granulating agent, suspending agent, binder, film former, disintegrant and as sustained release matrix. Demand for these natural gums / polymers are increasing now a day and are preferred over synthetic polymers in the field of drug delivery since they are non-toxic, cost effective and easily available. Further, they are eco-friendly, capable of multitude of chemical modifications, potentially degradable and compatible due to their natural origin. The physicochemical properties and applications of gum depend upon its polysaccharide content.

The present investigation deals with isolation, preliminary phytochemical evaluation and spectrophotometric estimation of total polysaccharide contents of *Cordia dichotoma* fruit gum by using Phenol-sulphuric acid method [8].

Materials and Methods

Collection of plant material

Cordia dichotoma fruits were collected from Maharashtra region (India) in the month of June. Plant material was authenticated by Dr. Rajendra D. Shinde, Associate Professor, Blatter Herbarium; St. Xavier's College, Mumbai and was identified as *Cordia dichotoma* G. Forst (Herbarium Specimen no. 1702 of S.M. Almeida.). The specimen sample

of the plant is preserved with department of Quality Assurance, Dr. L. H. Hiranandani College of Pharmacy, Ulhasnagar, and Maharashtra, India. All the chemicals and reagents were of analytical grade.

Instrumentation

SHIMADZU 1800 UV -VIS Spectrophotometer was employed for all spectroscopic measurements using a pair of matched quartz cells.

Isolation of gum from *Cordia dichotoma* fruit

The gum was isolated from *Cordia dichotoma* fruit using solvent precipitation method [9]. Ripe fruits of *Cordia dichotoma* were extracted with water (1:2) by stirring for 3h. The viscous solution obtained was filtered through Muslin cloth. Ethanol (95%) was added with continuous stirring to the viscous solution obtained in the ratio 1:1 to precipitate out gum present in the fruit. The precipitated gum was transferred to an evaporating dish and treated consecutively with ethanol to make it free from impurities. The gum obtained was dried in oven at temperature 40-45°C. The dried gum was then size reduced by passing through 60 # sieve and stored in airtight container.

Preliminary phytochemical evaluation

The isolated gum was investigated for the presence of various phyto constituents such as carbohydrates, proteins, flavanoids, alkaloids, tannins, saponin, glycosides, and phytosterols [10,11]. The specific chemical tests were performed to confirm the presence of gum [12].

Estimation of polysaccharide content

The total polysaccharide contents of *Cordia dichotoma* fruit gum

***Corresponding author:** Harshal Ashok Pawar, Dr. L. H. Hiranandani College of Pharmacy, Smt. CHM Campus, Opp. Ulhasnagar Railway Station, Ulhasnagar-421003, Maharashtra, India, Tel: +91-8097148638; E-mail: harshal.dlhcop@gmail.com

Received November 01, 2014; **Accepted** December 20, 2014; **Published** February 01, 2015

Citation: Pawar HA, Jadhav P (2015) Preliminary Phytochemical Evaluation and Spectrophotometric Estimation of Total Polysaccharide Content of Gum Isolated From *Cordia dichotoma* Fruits. Nat Prod Chem Res 3: 165. doi:10.4172/2329-6836.1000165

Copyright: © 2015 Pawar HA, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

was determined by using Phenol-sulphuric acid method as described below:

Preparation of blank solution: To a test tube containing 1 ml of distilled water, 1 ml of 5% phenol was added followed by addition of 5 ml of concentrated sulphuric acid.

Preparation of standard solution: A stock solution 100 µg/ml of glucose was prepared in distilled water. Aliquots were withdrawn from the stock solution to get sugar concentrations 60 µg/ml, 70 µg/ml, 80 µg/ml, 90 µg/ml and 100 µg/ml. To each 1ml of sugar solution, 1 ml of 5% phenol solution was added separately followed by addition of 5ml of concentrated sulphuric acid. The absorbances were measured after 10 minutes at 488nm against blank.

Preparation of test solution: About 10mg of isolated gum powder was dissolved in 100ml of distilled water. From this 1ml was used for sugar analysis. To estimate the polysaccharide content in *Cordia dichotoma* gum, 1ml of 5% phenol added to the 1 ml of gum solution, followed by addition of 5 ml of concentrated sulphuric acid. The absorbance was measured after 10 minutes at 488 nm against blank [13]. The experiment was carried out in triplicate (i.e. Test-1, Test-2 and Test-3).

Test	Results
Test for Carbohydrate	+
Test for Proteins	-
Test for Tannins	-
Test for Alkaloids	-
Test for Glycosides	-
Test for Flavonoids	-
Test for Saponin	-

(+) Positive, (-) Negative

Table 1: Results of phytochemical screening of *Cordia dichotoma* fruit gum.

Sr. No.	Test	Observation	Result
1	Gum solution + Iodine solution	No Purplish coloration	Negative
2	Gum solution + Ruthenium red solution	No pink coloration of particles	Negative

Table 2: Specific test for gums.

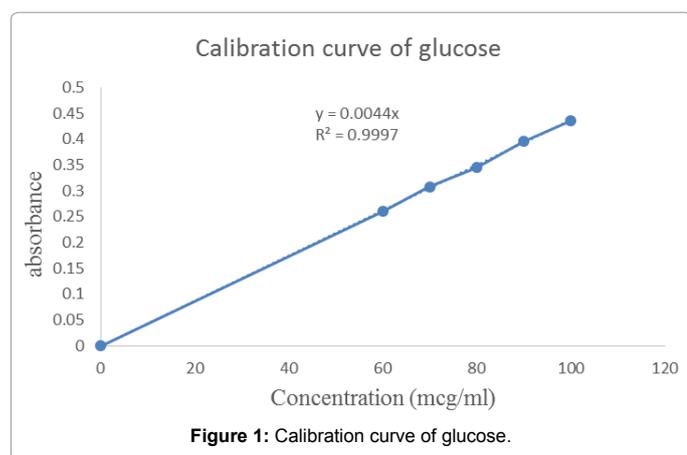


Figure 1: Calibration curve of glucose.

Sr. No	Absorbance of Test			Mean	S.D.*	% RSD**	Total Polysaccharide Content (%w/w)
	Test-1	Test-2	Test-3				
1	0.3096	0.3098	0.3094	0.3096	0.0002	0.0 65	70.29

*S.D: Standard deviation **RSD: Relative standard deviation

Table 3: Results of Total Polysaccharide Content.

Result and Discussion

The polysaccharide isolated from *Cordia dichotoma* fruits was a light brown colored powder. The results of preliminary phytochemical screening of isolated gum sample are reported in (Table 1). The results of specific chemical test are summarized in (Table 2). Results indicated that the isolated sample is gum which contains carbohydrates and is devoid of starch. The preliminary phytochemical evaluation indicated absence of glycosides and other phytoconstituents in the isolated gum thereby indicating its purity.

The calibration curve for different concentration of glucose is represented in (Figure 1). Using the proposed method, the calibration curve was found to be linear in the range of 60-100 µg/ml. A correlation coefficient of 0.9997 indicates good linearity between the concentrations and their respective absorbances obtained. The % Relative Standard Deviation (% RSD) of three test absorbances was found to be 0.065 which indicates that the used method is precise. The total polysaccharide contents were obtained using regression equation $y = 0.0044x$ (Where y is absorbance and 'x' is concentration of sugar), obtained from the calibration curve. The total polysaccharide content of *Cordia dichotoma* gum was found to be 70.29 % w/w. The results of results of total polysaccharide content are shown in (Table 3).

Conclusion

The use of natural gums isolated from plants has been increased significantly in pharmaceutical industry since they are freely available, edible, non-toxic and easy to manufacture. Quantitatively analyzing the total polysaccharides in complex mixture is difficult task. Phenol-sulphuric acid technique was found to be simple, rapid, precise and accurate spectroscopic technique for the determination of total polysaccharide content in *Cordia dichotoma* fruit. The total polysaccharide content of *Cordia dichotoma* gum was found to be 70.29 % w/w.

Acknowledgement

Author is thankful to Dr. Paragjide, Principle of Hyderabad Sindh National Collegiate Boards (HSNCB's) Dr. L. H. Hiranandani College of Pharmacy, Ulhasnagar for his continuous support and encouragement.

References

- Kuppast IJ, Vasudev NP (2006) Wound healing activity of *Cordia dichotoma* Forst. F.fruits. Nat Prod Rad 5: 99-102.
- Hussain N, Kakoti BB (2013) Review on ethno botany and psychopharmacology of *Cordia dichotoma*. J Drug Deliv Ther 3: 110-113.
- Gaurav S, Navneet N, Sandeep R, Singh P, Porwal A, et al. (2010) Effect of aqueous leaves extract of *Cordia dichotoma* on blood glucose levels of normoglycemic & alloxan induced diabetic wister rats. Int J Pharm Res Dev 2: 13-14.
- Orwa FF (2009) Boraginaceae. Nairobi: Agroforestry Database 4.0.
- Jayaramudu J, Maity A, Sadiku ER, Guduri BR, Rajulu AV, et al. (2011) Structure and properties of new naturalcellulose fabrics from *Cordia dichotoma*. Carbohydr Polym 86: 1623-1629.
- Thirupathi K, Kumar SS, Raju VS, Ravikumar B, Krishna DR, et al. (2008) A review of medicinal plants of the genus *Cordia*: their chemistry and pharmacological uses. J Nat Rem 8: 1-10.
- Foster DS, Cornella TS (1961) Colorimetric Method of Analysis. Van Nostrand company Inc 2: 162.
- Maisale AB, Attimarad SL, Haradagatti DS, Karigar A (2010) Anthelmintic Activity of Fruit Pulp of *Cordia dichotoma*. International Journal of Research in Ayurveda & Pharmacy 1: 597-600.
- Pawar HA, Jadhav P (2015) Isolation, characterization and investigation of *Cordia dichotoma* fruit polysaccharide as a herbal excipient. Int J Biol Macromol 72: 1228-1236.

-
10. Kokate CK (1999) Practical Pharmacognosy, Vallabh Prakashan, 4th edition 107: 124-125.
 11. Brain KR, Turner TD (1975) The practical evaluation of phytochemicals. Wright Scientechica, Bristol 190-191.
 12. Smith F, Montgomery R (1959) The Chemistry of plant gums and mucilage. Reinhold Publishing Corporation,40-53.
 13. Varkhade CB, Pawar HA (2013) Spectrophotometric Estimation of Total Polysaccharides in *Plantago ovata* Husk Mucilage. International Journal of Chemical and Pharmaceutical Analysis1: 2-4.