AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Research Article

A PHARMACOGNOSTIC, PHYTOCHEMICAL STUDY OF *GODHUMA BIJA* (*TRITICUM AESTIVUM* LINN.)

S Roja Bai[1]*, Renu Dixit[2], K.V.Vijaya Bhaskara Reddy[3], Rajiv Dixit[4]

*[1]Assistant Professor, Dept. of Dravyaguna Vigyana, Dharma Ayurved College and Hospital, Sriperumbudur, Kancheepuram, Tamil Nadu, India.

[2]HOD, Professor and Principal, Dept. of Dravyaguna, [3]Professor and Nodal Officer, Dept of Shalya Tantra, TTD's S.V. Ayurvedic College & Hospital, Tirupati, AP, India.

[4]Senior Research Associate, Sunnybrook Research Institute, Toronto, Canada.

Article info

Article History:
Received: 01-07-2024
Accepted: 11-08-2024
Published: 20-09-2024

KEYWORDS:
Pharmacognostic, Physicochemical, Phytochemical, Standardization, *Godhuma Bija* (*Triticum aestivum* Linn.).

ABSTRACT

Background: *Godhuma Bija* (*Triticum aestivum* Linn.)are used for various conditions of ailments in traditional systems of medicine since ancient times. Pharmacognostic and phytochemical studies make the drugs more standardized and evidence based. **Aims:** This study was designed to lay down the various pharmacognostic and phytochemical standards which will be helpful to ensure the purity, safety, and efficacy of this medicinal plant. **Materials and Methods:** Various methods including macroscopic, microscopic, physicochemical and phytochemical methods were applied to determine the diagnostic features for the identification and standardization of intact and powdered drug of *Godhuma Bija* (*Triticum aestivum* Linn.) **Results:** The shape, colour, odour and surface characteristics were determined for the intact drug and powdered materials of *Godhuma Bija* (*Triticum aestivum* Linn.) Light and electron microscope images of cross-section of stamen and powdered microscopy revealed useful diagnostic features. Phytochemical, physicochemical analysis of powdered drug proved useful to differentiate the powdered drug material. High performance thin layer chromatography analysis showed the presence of important phytoconstituents. **Conclusion:** Morphology as well as various pharmacognostic aspects of *Godhuma Bija* (*Triticum aestivum* Linn.) of the plant were studied and have been described here along with phytochemical and physicochemical studies, which will help in authentication and quality control.

INTRODUCTION

Since ages plants are being used both as food and medicine to treat mankind and the diseases affecting them through the ancient systems of medicine. Even today these medicines are effective and play a prime role in the management of diseases which includes plants and of mineral origin. The utilization of the medicinal plants both for the treatment and in manufacturing of medicinal products are being used since the prehistoric times and currently is on rise across the world. It is also observed by the studies that 80% of the populations in developing countries are relying on the herbal medicine etc traditional medicine. Demand for the development of new drug has made the pharmaceutical companies undergo the stringent regulations for assuring the quality of the drug.[1] The systematic studying of a drug including its history, collection, extraction, cultivation, isolation, its morphological, chemical and biological properties with preparation of crude drugs of natural origin, bio-assaying and quality control is defined as the science of pharmacognosy. This branch also elucidates about the mineral sources used in the preparation of the drugs.[2] The term Pharmacognosy is derived from two Greek words such as *pharmakon* which means drug and *gnosis* is knowledge and was first introduced by Schmidt, an Austrian physician in 1811 and then by

Access this article online	
Quick Response Code	
	https://doi.org/10.47070/ayushdhara.v11i4.1704

Seydler in 1815 in an book known as *Analecta Pharmacognostica.* Thereby, this is considered as the oldest modern science that is involved in the study of drugs of plant and animal origin with inclusion, incorporation and authentication of quality control techniques based on the microscopic and macroscopic procedure of crude drugs. [3]

In developing countries, medicinal plants play a prime role in health care management and a greater number of people have started the usage of traditional medicines or the alternative medicines that which includes Ayurveda, Siddha, Unani, Homeopathy etc. Usage of good quality medicinal plants are important for the effectiveness of the products manufactured and this can be achieved by step by step techniques of pharmacognostic studies. Application of these pharmacological and phytochemical techniques to the drugs helps to evaluate the drug completely with its constituents and also enhance the quality. Hence it is very important for a drug to undergo a standardized evaluation to make the product safe, quality and effective. [4]

In Ayurvedic science, medicinal plants form the major part of the treatment provided by the Ayurvedic practitioners. Though the books such as Ayurvedic Pharmacopeia and Materia medica of Ayurveda has contributed greatly in the field of medicinal plants, it becomes essential to correctly identity the botanical source as it has become an arduous task to work on the synonyms and the usage of vernacular names. This necessitates a scientific exploration of the medicinal plants embodying proper identification and correlation of o the drugs described in Ayurvedic literature. In depth knowledge of gross morphology and anatomy of a drug along with microscopical study also becomes mandatory to serve the purpose. This becomes possible with pharmacognosy and phytochemical studies. Quality control of crude plant drugs is one of the major drawbacks confronted by the manufacturers of Ayurvedic medicines as the therapeutic efficacy of the drug is entirely dependent on the quality of the plant drug used and if this gets adulterated, the quality of the preparation fails to meet the expected level of standardization. For any medicinal product, to make it effective, safe and with good quality, it should begin with the proper identification of plants or the raw materials including microscopic and morphological characteristics. It is also essential to identify the adulterants from crude plant drugs and powdered drugs and this requires various pharmacognostic techniques. Both the pharmacognostic and phytochemical studies ensures the quality and the standardization of a plant drug.

Godhuma, a plant described in the Ayurvedic literature is identified with its botanical name as Triticum aestivum L inn, which is commonly called as bread wheat or the annual grass of the Poaceae family that is native to Southwest Asia and Mediterranean region. The grains of this plant are used as food worldwide with identification of 15-20 species of wheat, out of which 8 are cultivated in India. Triticum aestivum is most commonly used as the base in the preparation of most of the food items. Ayurvedic Nighantus have widely described about the general properties and pharmacological applications of this plant. Acharyas like Charaka, Sushrutha and Vagbhata have mentioned *Godhuma* in their Samhitas as *Pathya aahara* in various diseases. Pharmaceutical preparations of *Godhuma* as the main ingredient is mentioned as a treatment for many diseases in Ayurveda with certain rules and regulations. Different methods of processing or cooking with their indications and contraindications is also available in detail. Recent studies have opined the therapeutic potential of *Godhuma* and is being advised as a major food for the people suffering from diabetes. [5] With the vast literature available on *Godhuma* and its therapeutic effects in Ayurveda, there is definitely a need for the pharmacognostical study that evaluates *Godhuma* and its constituents in detail. Hence the present study was planned and executed to evaluate the role of pharmacognostic study of *Godhuma Bija* - *Triticum aestivum* Linn with HPTLC study of the powdered drug of *Godhuma bija* at S.D.M Centre for Research in Ayurveda and allied sciences. Udupi (Karnataka).

MATERIAL AND METHODS

The study was divided into Pharmacognostic study and phytochemical study.

A) Pharmacognostic study
   1. Macroscopic study
   2. Microscopic study
   3. Powder study
   4. Physicochemical study

B) Phytochemical study

A) Pharmacognostic study of trial drugs

Drug Collection

The drug *Godhuma bija* for the study were acquired from Hampi surrounding place from Local Farmers of Kamalapur. The reason for picking up of the drug from that region was the quality of the drug was too good, even though it is available in our area too. For the present study the fresh drug was taken and it was authenticated by Department of Dravyaguna, it was washed and later on dried in shade. After drying it was pounded to course powder. It was later packed in ziplock pockets of 5g each in an air tight and light resistant container for the study.

Macroscopic studies

Macroscopic and organoleptic studies were conducted on intact and powdered materials. Sample was washed, air dried in shade and observed for color, shape, odor, taste, and other surface characteristics. Flowers which were shade dried for 10–15 days after drying it was pounded to coarse powder and observed for color, odor, taste.

Microscopic studies

Morphological examinations were conducted using a binocular zoom light microscope, semi plan achro (Model AxL, LABO, Germany). Cross-sections were prepared by free hand sectioning cleared with chloralhydrate, stained with freshly prepared dyes safranin and fast green, and different grades of alcohol were used to increase visibility. All the images presented were taken by the author using digital camera.

Physicochemical analysis

Total ash and acid insoluble ash contents are important indices to determine quality and purity of herbal medicines.

Table 1: Results of Identity, Purity and Strength

Parameter	Results
	Godhuma bija
Foreign matter	% w/w
Loss on drying	8.33%w/w
Total ash	0.76%w/w
Acid insoluble Ash	0.29%w/w
Water insoluble Ash	5.33%w/w
Water soluble extracts	5.79%w/w
Alcohol soluble extracts	0.59%w/w

Preliminary phytochemical screening

The Phytochemical study is necessary to understand the basic component of drug which may help to construct the hypothetical action of the trial drug in the disease. Each and every drug has its own physicochemical characteristic which are like finger prints helping in Identifying the drug and isolating it from the closely related drugs of the species.

Plant material: Godhuma Bija curnam

Table 2: Results of Phytochemical Analysis

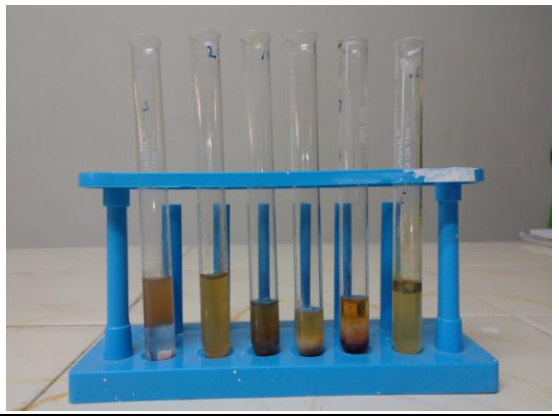
S.No.	Phytochemical	Test Name	*Godhuma Bija*
1.	Alkaloids	Mayer's Test	+
2.	Carbohydrates	Molisch Test	+
3.	Saponins	Saponins Test	-
4.	Phenolic compounds and tannins	Ferric chloride Test	+
5.	Protein and Amino Acids	Lead Acetate Test	+
6.	Test for flavonoids	Shinoda Test:	-
7.	Steroids	Salkowski reaction	+
8.	Starch	Iodine Test	+
9.	Acid test (pH)		6 – 6.8

+Positive; - Negative

Results and observations

Godhuma bija curnam - It showed the presence of carbohydrates, alkaloids, Tannins, Steroids, Starch, Protein and Amino Acids, with pH is 6 – 6.8.

Figure No.1: Phytochemical study of *Godhuma bija*



Phytochemical Study of Godhuma Bija

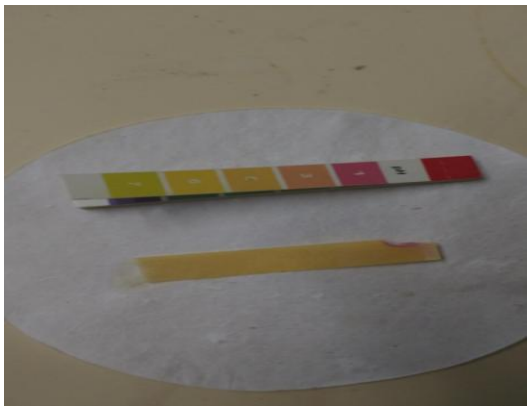


FIG. 8. pH of Godhuma Bija curnam

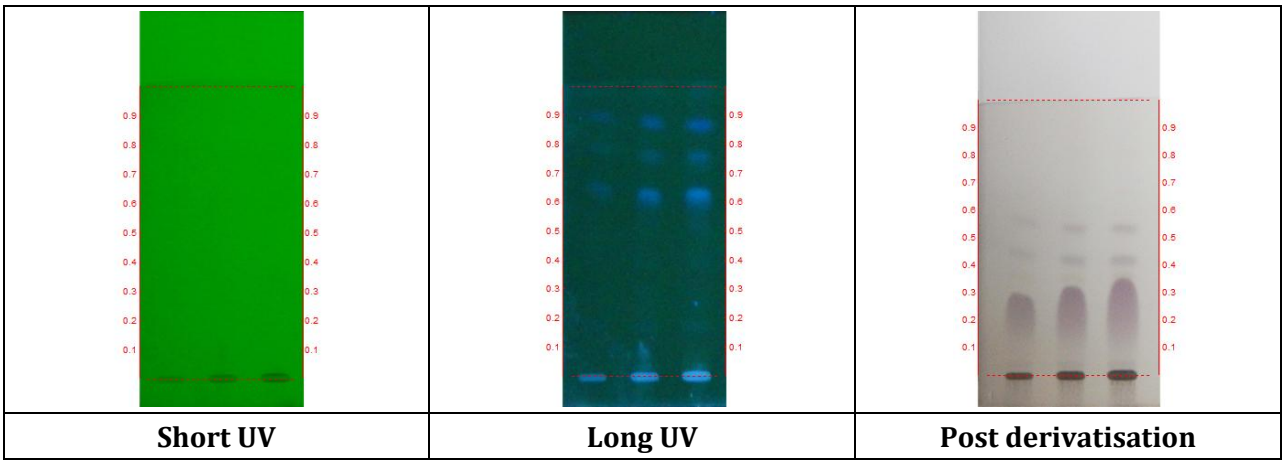
High Performance Thin Layer Chromtography

High performance thin layer chromatography (HPTLC) is an enhanced form of thin layer chromatography (TLC). A number of enhancements can be made to the basic method of thin layer chromatography to automate the different steps, to increase the resolution achieved and to allow more accurate quantitative measurements. The HPTLC study of the powdered drug of *Godhuma bija* was executed at S.D.M Centre for Research in Ayurveda and allied sciences. UDUPI (Karnataka). 1g sample was extracted with 10 ml of alcohol. 3.6 and 9 µl of *Avartaki pushpa curnam* extract was applied on a pre-coated silica gel F254 on aluminium plates to a band width of 7mm using Linomat 5TLC applicator. The plate was developed in toluene: Ethyl Acetate (8:2). The developed plates were visualized in Short UV, Long UV, and then derivatised with vanillin sulphuric acid and scanned under Short UV and Long UV. Rf, colour of the spots and densitometry scan were recorded.

Automation is useful to overcome the uncertainty in droplet size and position when the sample is applied to the TLC plate by hand. One recent approach to automation has been the use of piezoelectric devices and inkjet printers for applying the sample. The spot capacity (analogous to peak capacity in HPLC) can be increased by developing the plate with two different solvents, using two-dimensional chromatography. The procedure begins with development of sample loaded plate with first solvent. After removing it, the plate is rotated 90° and developed with a second solvent.

Although chromatogram development is the most crucial step in the HTLC procedure, important parameters are generally overlooked. HPTLC plates are developed in twin-trough chambers, or horizontal-development chambers. In general, saturated twin-trough chambers fitted with filter paper offer the best reproducibility. Twin- through chamber avoids solvent vapor preloading and humidity. The HPTLC study of the powdered drug of *Godhuma bija* was executed at S.D.M Centre for Research in Ayurveda and allied sciences. UDUPI (Karnataka).

Figure 3: HPTLC Photo-documentation of Ethanol extract of sample of *Triticum aestivum* Linn.



Short UV | **Long UV** | **Post derivatisation**

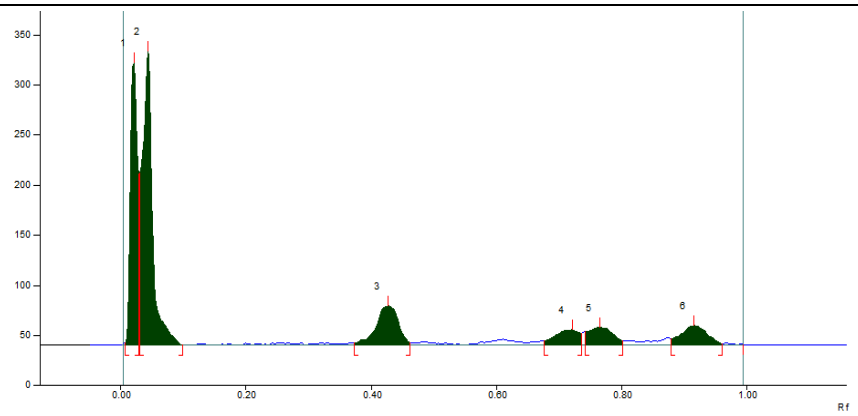
Track 1: *Triticum aestivum*- 3µl, Track 2: *Triticum aestivum*- 6µl, Track 3: *Triticum aestivum*- 9µlSolvent system- Toluene: Ethyl acetate (7.0: 1.0)

Table 4: Rf values of sample of *Triticum aestivum*

Short UV	Long UV	Post derivatisation
-	0.19 (F. blue)	-
-	-	0.24 (Purple)
-	-	0.40 (Purple)
-	-	0.52 (Purple)
-	0.63 (F. blue)	-
-	0.77 (F. blue)	-
-	0.87 (F. blue)	-

* D – dark; F - fluorescent

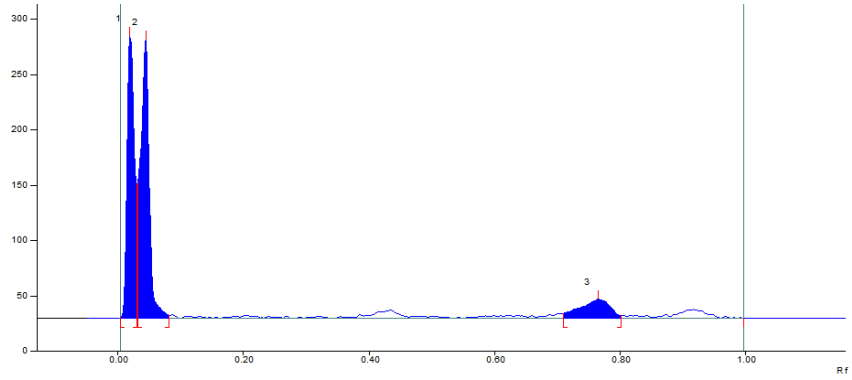
Figure 4: Densitometric scan of the sample of *Triticum aestivum*



rack 3, ID: Triticum aestivum

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	2.0 AU	0.02 Rf	281.5 AU	42.30 %	0.03 Rf	70.7 AU	2241.3 AU	27.19 %
2	0.03 Rf	171.0 AU	0.04 Rf	292.9 AU	44.01 %	0.10 Rf	0.1 AU	3506.2 AU	42.54 %
3	0.37 Rf	2.0 AU	0.43 Rf	38.8 AU	5.84 %	0.46 Rf	2.3 AU	1001.6 AU	12.15 %
4	0.68 Rf	4.5 AU	0.72 Rf	15.1 AU	2.27 %	0.74 Rf	11.6 AU	420.1 AU	5.10 %
5	0.74 Rf	13.2 AU	0.77 Rf	18.0 AU	2.70 %	0.80 Rf	4.4 AU	494.3 AU	6.00 %
6	0.88 Rf	6.2 AU	0.92 Rf	19.3 AU	2.89 %	0.96 Rf	1.1 AU	579.2 AU	7.03 %

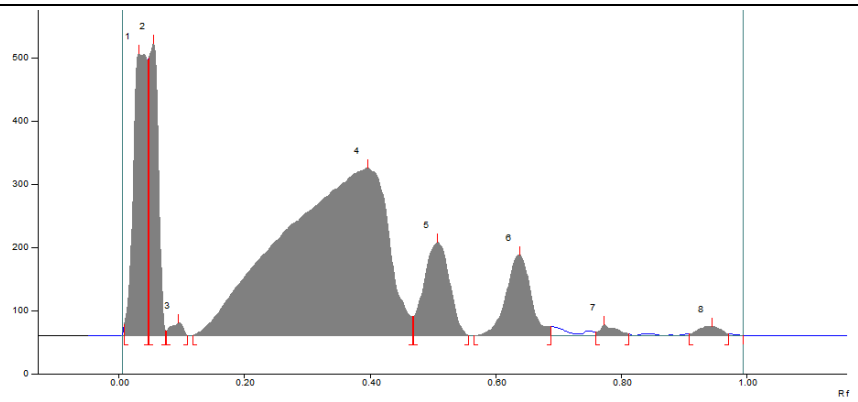
Fig 4a. At 254nm



Track 3, ID: Triticum aestivum

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	1.0 AU	0.02 Rf	255.6 AU	48.70 %	0.03 Rf	20.6 AU	2151.7 AU	40.86 %
2	0.03 Rf	123.0 AU	0.05 Rf	252.2 AU	48.04 %	0.08 Rf	2.7 AU	2521.9 AU	47.89 %
3	0.71 Rf	4.5 AU	0.77 Rf	17.1 AU	3.27 %	0.80 Rf	2.6 AU	592.1 AU	11.24 %

Fig 4b. At 366nm



Track 3, ID: Triticum aestivum

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	16.9 AU	0.03 Rf	445.5 AU	29.73 %	0.05 Rf	34.7 AU	7256.3 AU	13.81 %
2	0.05 Rf	437.5 AU	0.05 Rf	461.3 AU	30.79 %	0.07 Rf	6.7 AU	4786.7 AU	9.11 %
3	0.08 Rf	6.8 AU	0.10 Rf	19.8 AU	1.32 %	0.11 Rf	0.5 AU	280.8 AU	0.53 %
4	0.12 Rf	0.2 AU	0.40 Rf	265.1 AU	17.69 %	0.47 Rf	29.8 AU	31673.6 AU	60.27 %
5	0.47 Rf	30.1 AU	0.51 Rf	147.2 AU	9.82 %	0.56 Rf	0.3 AU	4277.6 AU	8.14 %
6	0.57 Rf	0.4 AU	0.64 Rf	127.7 AU	8.52 %	0.69 Rf	13.7 AU	3575.7 AU	6.80 %
7	0.76 Rf	5.8 AU	0.77 Rf	16.7 AU	1.11 %	0.81 Rf	3.1 AU	311.1 AU	0.59 %
8	0.91 Rf	2.4 AU	0.95 Rf	15.0 AU	1.00 %	0.97 Rf	2.9 AU	387.8 AU	0.74 %

Fig 4c. At 620nm

The given sample of *Triticum aestivum* Linn has been standardized as per standard analytical testing protocol. HPTLC photo-documentation, R_f values and densitometric scan are given in respective tables and figures.

Pharmacognosy of *Triticum aestivum* Linn

Name of the Sample : Godhuma / Atta

Scientific Name : ***Triticum aestivum* Linn.**

Family : Graminae / Poaceae

Plant part : Grain / Kernel

Drug description: Dried grains / Kernels of Wheat devoid of Bran

1. Macroscopic Properties

The drug consists of dried seeds of *Triticum aestivum* Linn. Seeds, they are grey colour, disc shaped, nearly flat, somewhat irregularly bent. Surface is Silky, radially arranged, densely covered closely appressed unicellular lignified covering trichomes. Seeds are extremely hard. Weight of single seed is 1.5 to 1.9gms, 10 - 30 mm in diameter and 4 – 6 mm thickness.

Tranverse section of *Triticum aestivum* Linn *Bija*

Size : Length: 4 to 9 mm

Weight : 30 to 50 mg

Shape : Oval

Colour : Creamish

Odour : Not specific

Taste : Mucilaginous and agreeable

The Grains are Oval in shape, glabrous and has a crease down one side where it was originally connected to the wheat floral axis

Microscopic Properties Microscopic characters

It has two parts namely Testa and Endosperm.

TESTA:

Trich**omes:**

Thick walled, bent and twisted lignified trichomes, emerged from epidermis,

Parallel in one direction.

Length : 600-1000µ , Diameter about 25µ

Epidermal layer:

Single layer, forms lignified trichomes, large thick walled with oblique linear pits.

Collapsed parenchyma:

2 layers, flattened parenchyma.

Endosperm :

Thick walled cellulosic parenchymatous cells. Cell shows hemicelluloses in the cell

Wall and following characteristics:

Plasmoderm :

Fine protoplasmic strands between the walls of endospermic cells.

Aleuronegrains :

About 30µ in diameter. Only globoids are present.

Oil globules :

Fixed oil as small oil droplets in the cells.

(i) T.S. of Grain : Transverse Section of Wheat grain is done by Free hand Section cutting and Simple staining procedure and findings are as mentioned below.

A. Seed coat

- Grains are externally covered with two layers of seed coat i.e. outer Testa and inner Tegmen
- Testa composed of Thick walled columnar , radially elongated cells that are arranged compactly
- Testa followed by few layers of stratified Tegmen

B. Aleurone Layer

- Inside the Seed coat single layered aleurone layer is present, cells are filled with aleurone grains

C. Endosperm

- Inner to the aleurone layer an elaborative endosperm tissue composed of hexagonal, thick walled cells that are arranged compactly without any intercellular spaces is present. Cells filled with aleurone and starch grains.

D. Embryo

- At the region of crease a pigment strand is present
- Opposite to crease embryo with single cotyledon showing radical and coleoptiles is present.
- Embryo is composed of angular, polygonal parenchymatous cells

(ii) Powder Analysis : Powder Analysis is carried out by clarifying with chloral hydrate solution and prepared Glycerin mount, Iodine solution mount and Saffranin solution mount and the following characters are identified.

a) Organoleptic properties

Colour: Cremish

Odour: Characteristic

Taste: Mucilaginous, sticky and agreeable

Texture: Fine Powder

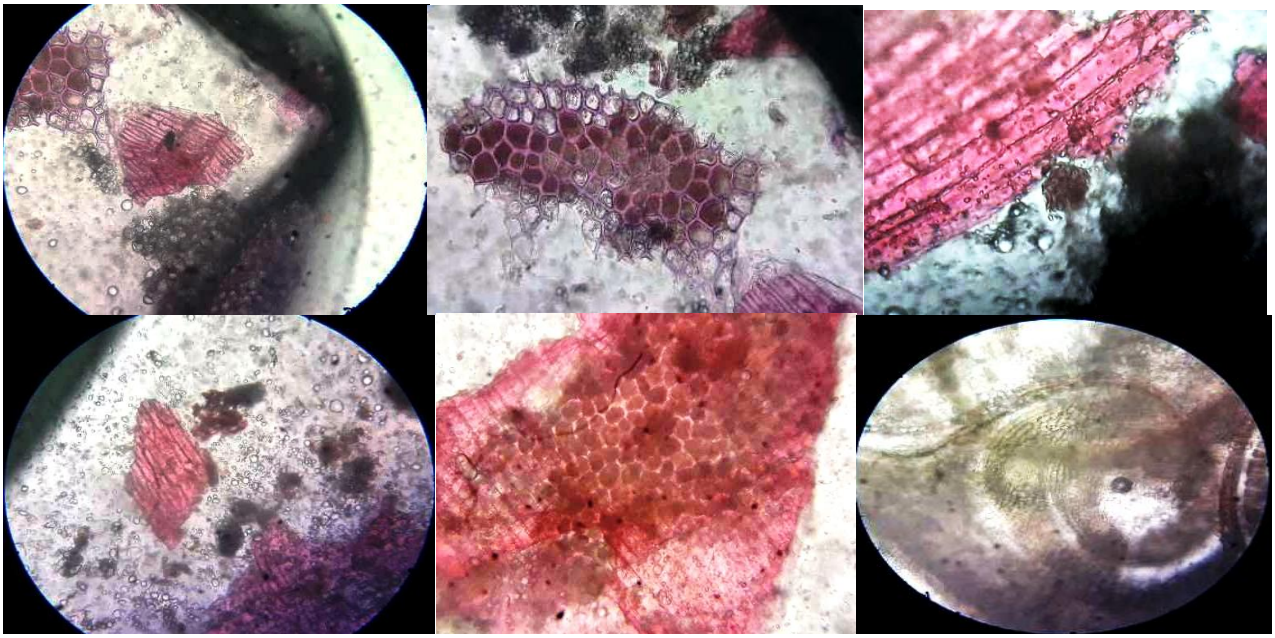
Microscopic Characters

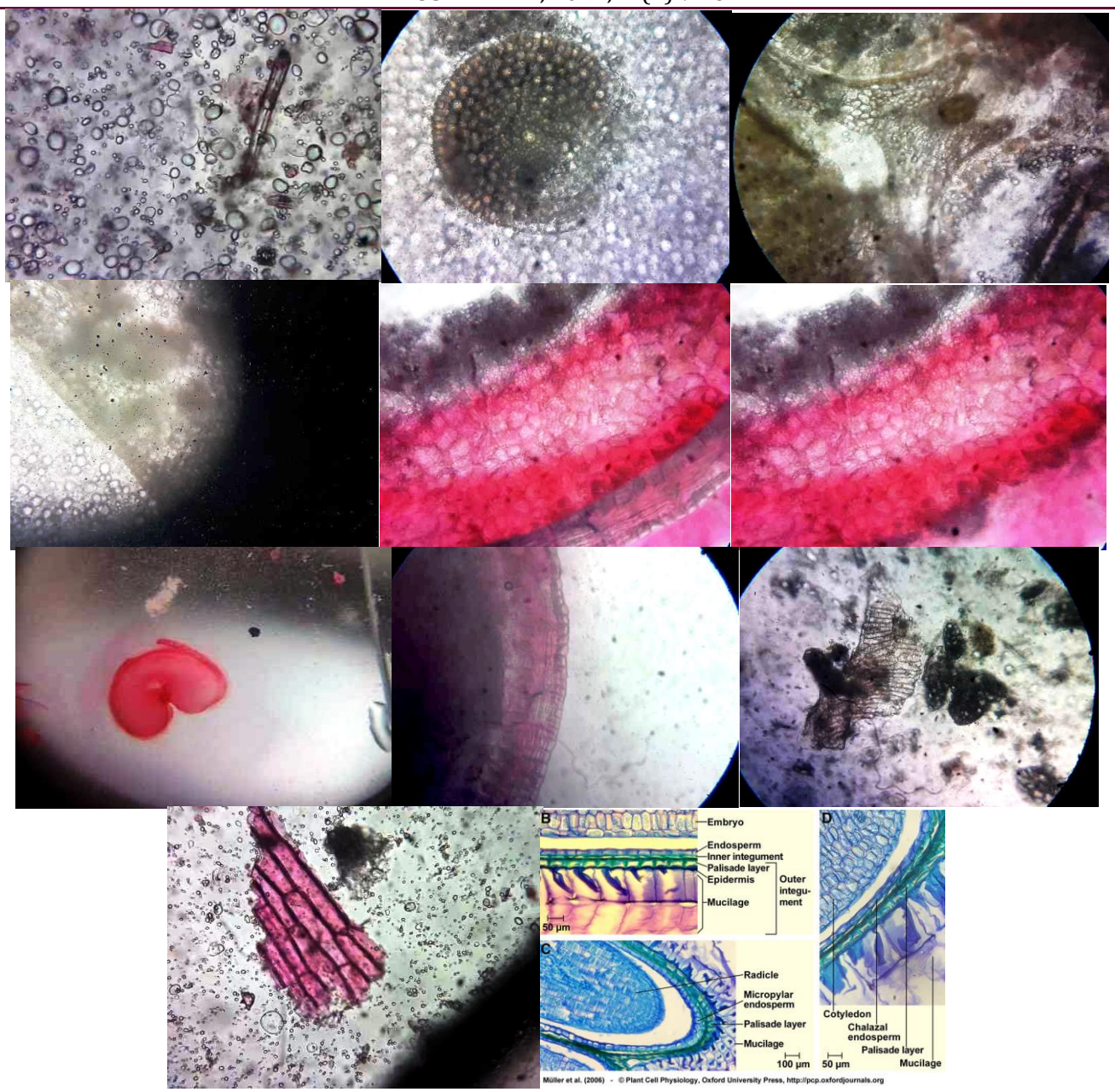
- Numerous simple lenticular starch granules which are circular or oval in shape.
- Starch grains 5 to 50 microns in size.
- Starch granules contain hilum at the centre and having concentric faintly marked striations.
- Rarely compound starch grains with 2 to 4 components are also observed.

Identification Test

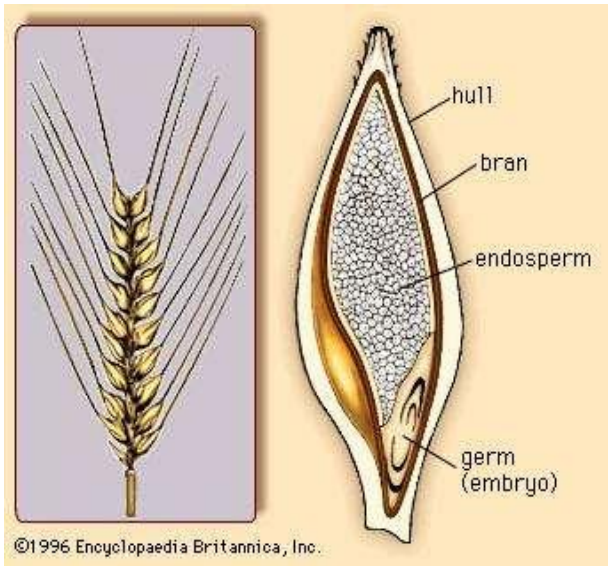
- Starch insoluble in cold water and also in alcohol
- Boiled 1 gm of starch with 15 ml of water and cooled. Translucent viscous jelly is produced.
- Added few drops of Iodine solution to the above jelly, it turns in to deep blue colour.
- The blue colour of the gelly disappeared on warming and reappeared on cooling.

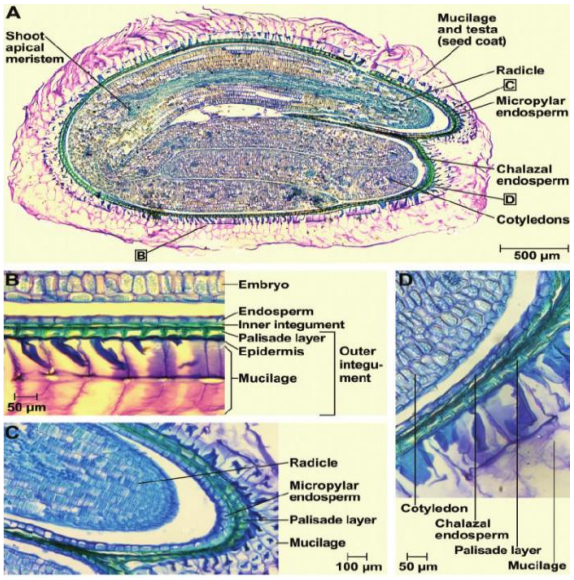
Figure No.2

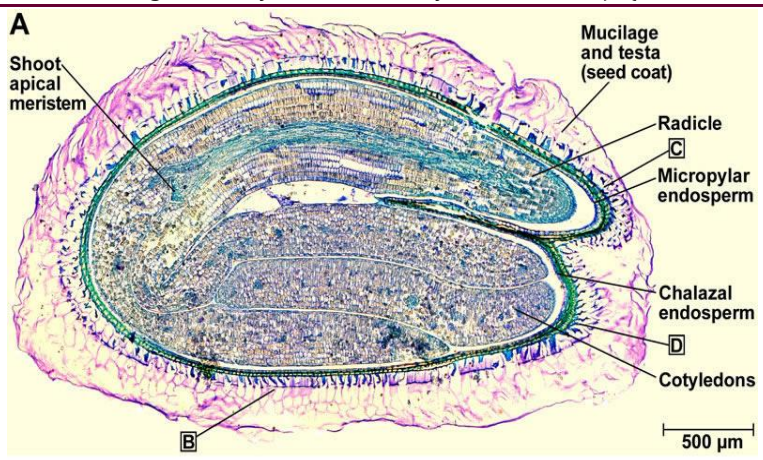




B
Embryo
Endosperm
Inner integument
Palisade layer
Epidermis
Outer integu-ment
Mucilage
50 µm
C
Radicle
Micropylar endosperm
Palisade layer
Mucilage
100 µm
D
Cotyledon
Chalazal endosperm
Palisade layer
Mucilage
50 µm
Müller et al. (2006) - © Plant Cell Physiology, Oxford University Press, http://pcp.oxfordjournals.org


hull
bran
endosperm
germ (embryo)
©1996 Encyclopaedia Britannica, Inc.


A
Shoot apical meristem
Mucilage and testa (seed coat)
Radicle
C
Micropylar endosperm
Chalazal endosperm
D
Cotyledons
B
500 µm
B
Embryo
Endosperm
Inner integument
Palisade layer
Epidermis
Outer integu-ment
Mucilage
50 µm
C
Radicle
Micropylar endosperm
Palisade layer
Mucilage
100 µm
D
Cotyledon
Chalazal endosperm
Palisade layer
Mucilage
50 µm



Müller et al. (2006) - © Plant Cell Physiology, Oxford University Press, http://pcp.oxfordjournals.org

Inductively Coupled Plasma – Optical Emission Spectrometry

Sample particulars : *Triticum aestivum* Linn.

Sample quantity : 5gms

Packing : Packed in plastic cover

Test required : Na, k, Cd, Mn, Cr, Fe, Cu, Ni, Zn, and Pb

Table 6: Test Results

S.No	Name of element analysed	Analysis results in ppm
1	Sodium	15.32
2	Potassium	2838.89
3	Cadmium	Not detected
4	Manganese	Not detected
5	Chromium	14.35
6	Iron	142.606
7	Copper	Not detected
8	Nickel	31.10
9	Zinc	Not detected
10	Lead	Not detected

Instrument used: ICP-MS / ICP-OES, Interpretation of results: NIL, Deviation from the test method conditions: NIL, Sample (s) not drawn by the laboratory, Test results relate only to items tested.

DISCUSSION

Globalization of Ayurveda has unfolded new perspective for Ayurveda practitioners and researchers including pharmaceutical and drug manufacturers. Based on the recent regulations of FDA, standardization of drug formulations has been become very crucial and stringent for the assurance of drug quality and it is going through a rapid revolutionary period. With the application of modern pharmaceutical and analytical techniques, the present manufacturing practices are getting reformed and upgraded. In the pharmacopoeia of Ayurvedic science, vast number of drug formulations are being described that are used in treating various disorders since ages. Charaka Samhita has very beautifully described about the drug as how its rational use can make a substance either a drug or the poison. [6] Therefore, it is high time to expand the quality and the standards of the drug formulations. Application and amalgamation of Ayurvedic pharmaceutical techniques with Modern Pharmaceuticals help us by providing a complete knowledge of any drug or the Dravya including its constituents and health benefits. This is one such study on Godhuma or the *Triticum aestivum* Linn that is used as one of the most important ingredients in our daily food.

CONCLUSION

Morphology as well as various pharmacognostic aspects of Godhuma Bija (*Triticum aestivum* Linn.) of the plant were studied and have been described here along with phytochemical and physicochemical studies, which will help in

authentication and quality control. Standardization of Ayurvedic products is a much needed public and private effort which will help in elevating Ayurveda to the levels it truly deserves in this country and abroad. The present study serves the purpose.

REFERENCES

1. Mahady GB. Global harmonization of herbal health claims. J Nutr. 2001;131:1120S–1123S.
2. Brady L, Robbers J, Tyler V. Pharmacognosy 9th ed. Philadelphia, Pennsylvania: Lea & Febiger. 1988
3. Sarker SD. Pharmacognosy in modern pharmacy curricula. Pharmacogn Mag. 2012 Apr;8(30):91-2. doi: 10.4103/0973-1296.96545. PMID: 22701278; PMCID: PMC3371443.
4. Jana, B & Thenmozhi, S & Suja, M & Rajan, Suyambu & Thiyagarajan, Thirunalasundar. (2012). Pharmacognostical and phytochemical studies of An Ayurvedic drug Saraca asoca stem bark.B Jana, S Thenmozhi, M Suja, S Rajan, T Thirunalasundari Journal of Pharmacy Research 5 (2). The Journal of Pharmacy. 5. 1119-1121.
5. Ram Manohar, Sujithra & Subhramanian, Vimala & Priya, Dr. (2022). Therapeutic Potential of Godhuma (Triticum aestivum L.) (Bread Wheat) as Āhāra and Āuṣadha Across the Bṛhatrayis (Classical Āyurvedic Texts) - A Review. Journal of Natural Remedies. Vol 22 (3) | July 2022.
6. Patil, Sunny Chandrashekhar; Baghel, Arjun Singh; Kamble, Shubhangi B.; Chaudhari, Swapnil Y.[1]; Harisha, C.R; Shukla, Vinay J. Preliminary pharmacognosy, physico-phytochemical and nutraceutical profile of Abhayadi avaleha. International Journal of Ayurveda Research 3(2):p 142-147, Jul–Dec 2022. DOI: 10.4103/ijar.ijar_ 6_22

Cite this article as:
S Roja Bai, Renu Dixit, K.V.Vijaya Bhaskara Reddy, Rajiv Dixit. A Pharmacognostic, Phytochemical Study of Godhuma Bija (Triticum Aestivum Linn.). AYUSHDHARA, 2024;11(4):9-18.
https://doi.org/10.47070/ayushdhara.v11i4.1704
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. S Roja Bai
Assistant Professor,
Dept. of Dravyaguna Vigyana,
Dharma Ayurved College and Hospital, Sriperumbudur,
Kancheepuram, Tamil Nadu, India.
Email: rojajeevan9@gmail.com