

# A Research on Formulation and Evaluation of Herbal Candy

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## ABSTRACT

*Bacopa monnieri* (Linn.) widely used Ayurvedic herbs as neural tonics to enhance intelligence and memory (improve neurocognitive functions). Nervines are herbs that strengthen the functional activity of the nervous system. They may be stimulants or sedatives and can be used to correct excesses or deficiencies of nervous function. Brahmi is nootropic herb which is popular known as brain tonic. In Ayurveda it is widely used for anxiety, anger, insomnia, nerve pain, nervous debility, muscle spasm, paralysis, anemia venereal disease, weak immune system. Now-a-days there is lots of disease and disorder come in front of human beings. Due to disturb mentality and work load many people face problems related to stress, depression, etc. According to that point of view the present study deals with preparation of herbal candy as an immune booster therapy for many nerve related problem. Candy is fast and effective system for medication. Brahmi, Shankhpuspi, Nagkesar, Nagarmotha, Ashwagandha, Amla, Hirda, Behada, Tamrind, Date palm all herbs used in Indian system of medicine for treating various health problems. Also gives high level of nutritional value. The results of physico-chemical evaluation and stability study were revealed.

**KEYWORD:** *Bacopa monnieri* (L.) wettest, Nervine tonic, Antispasmodic, Candy.

## INTRODUCTION

Nervines are herbs that strengthen the functional activity of the nervous system. They may be stimulants or sedatives and can be used to correct excesses or deficiencies of nervous function. They have a strong action on the mind and are useful in promoting mental health and clarity as well as aiding in the treatment of psychological imbalances and mental diseases.<sup>[1]</sup>

*Bacopa monnieri* (Linn.) widely used Ayurvedic herbs as neural tonics to enhance intelligence and memory (improve neurocognitive functions) among all age groups. It is nootropic herbs, researchers have explored their neuroprotective efficacy in experimentally induced neuro-preclinical models and potential as neuromodulators against environmental neurotoxins. This herb showed significant antioxidative properties, anti-inflammatory potency, neuron regenerative ability, antianxiety and antidepressive properties, AChE inhibitory potential, and ability to reduce accumulation of amyloid plaques. It is rather difficult to conclusively state their efficacy as neurotherapeutic.<sup>[2]</sup>

Most nervines are also antispasmodics; herbs that relieve spasms of the voluntary or involuntary muscles and thereby relieve cramps, stop tremors and convulsions. They may also serve as broncho-dilators, stopping spasms in the bronchial tubes, thus proving effective for respiratory afflictions. Aromatic

nervines are often also carminative and stomachic herbs, herbs that dispel intestinal gas and cramping. The basis for this can be seen in light of Ayurvedic physiology. Vata, the Dosha that governs the nervous system, accumulates in the colon, from which it invades the tissue-elements of the body. Most diseases of the nervous system are diseases of Vata. Hence, in treating nervous disorders, we must first consider Vata. Most nerve pain, lumbago, sciatica, paralysis and degenerative nervous disorders are Vata diseases. Yet many emotional or nervous disorders may be caused by the other Doshas, as those due to anger which would be a Pitta condition. Or Vata may be blocked or aggravated by the other Doshas, in which case an apparent Vata disorder would be due to an underlying excess of Pitta or Kapha.

Vata-emotions, like fear and anxiety, weaken the kidneys and adrenals. They damage the nerves and cause insomnia, mental instability, nerve pain, cramping and numbness, which may lead eventually to the wasting away of nerve tissue. Most nervines, particularly those which are aromatic, move Vata, and so help remove the obstructed Vata or life-energy behind these disorders. A few herbs are not only aromatic, but possess tamasic, heavy or dulling properties. Yet where there is a deficiency of nerve tissues, often due to poor nutrition, nutritive herbs are needed—ashwagandha or liquorice (see tonics). Excessive use of aromatic nervines may further weaken the nerves by their drying action; they may also be over-stimulating.

Pitta-type emotions, anger, envy, hatred and so on, heat up the blood, the liver and the heart, creating internal fire. Thereby they can cause hypertension, insomnia, irritability and other mental and nervous imbalances.<sup>[3]</sup>

## HERBAL CANDY

Candy is a semisolid pharmaceutical preparation .candy is delicate, delicious, treat that we all love. Herbal products have lesser side effects than synthetic one. It is a popular product consumed by children, young and elderly alike. The major ingredient is sugar make it instant source of energy, mostly blended with variety of flavours and multi-medicinal herbs.<sup>[4]</sup>



Fig 1 : Classification Of Candy

**Advantages :**

1. Herbal candies are safe medication.
2. It has good efficacy with low side effects.
3. It promotes efficient delivery system.
4. It provide unit dosage form.
5. Herbal candies enhances patient compliance.

**Ideal properties :**

1. It should have safe dosage regimen.
2. All ingredient should have compatibility to each other.
3. It should have proper stability profile.
4. It should be uniform in weight and drug content.<sup>[5]</sup>

**PLANT PROFILE****1) Brahmi**

- **Biological Source :** It is obtained from the fresh and dried whole plant of *Bacopa monnieri* (L.) Wettst.
- **Family :**Plantaginaceae
- **Synonyms :** water hyssop, brahmi , thyme-leaved gratiola herb of grace ,indian pennywort.
- **Chemical constituent :**Bacoside , Bacopaside , Bacopasaponin, Cucurbitacin.<sup>[6]</sup>

**Fig. 1 :Brahmi**

Brahmi is the most important nervine herb . It helps to remove toxins from body. It improve memory and enhances the ability of concentration while reducing the blockage present in nervous system. Brahmi help us to give up on bad habits and addictions.

**Uses :**

1. Antidepreant
2. Anxiolytic effect
3. Anti - inflammatory
4. Anti - oxidant
5. Prevent neuro generative diseases
6. Improve cognition function
7. Hepatoprotective<sup>[7]</sup>

## 2) Shankpushpi

- **Biological Source:** It is obtained from the fresh and dried whole herb of *Convolvulus pluricaulis*.
- **Family :**Convolvulaceae
- **Synonyms :**Sankhaphuli, Shankhini
- **Chemical constituent :**Shankhapushpine, Convolamine, Scopoletin, Ceryl alcohol,  $\beta$ - sitosterol.<sup>[8]</sup>



**Fig. 2: Shankpushpi**

It is medicinally used for a brain tonic, nervine tonic. The entire aerial plant is used and reported to be tasteless to somewhat bitter while being traditionally used in the form of a decoction with cumin and milk .The plant itself called as Aloe weed in English .

### Uses :

1. Anti- convulsion
2. Anxiolytic effect
3. Sedation
4. Anti- stress
5. Anti – depressive .<sup>[9]</sup>

## 3) Nagarmotha Herb

- **Biological Source:** It is obtained from the dried rhizomes of *Cyprus rotundus* .
- **Family :**Cyperaceae
- **Synonyms:** Nut grass,Nut sedge.
- **Chemical constituent :**  $\alpha$  cyperone, rotundus, Valencene, luteolin, Mustakone



**Fig. 3 :Nagarmotha**

*Cyperus rotundus* is a perennial plant, that may reach a height of up to 140 cm (55 in). The names "nut grass" and "nut sedge" – shared with the related species *Cyperus esculentus* – are derived from its tubers, that somewhat resemble nuts, although botanically they have nothing to do with nuts.

**Uses :**

1. Used in treatment of fevers
2. Used in digestive system disorders
3. Used in nausea
4. Anti- inflammation
5. pain reliever
6. Used for muscle relaxation.<sup>[10]</sup>

**4) Nagkesar Herb**

- **Biological Source:** It is obtained from the flower of *Mesua ferrea Linn.*
- **Family :** Calophyllaceae
- **Synonyms:** Mesuaferrea, Cobras Saffron, Ceylon Ironwood, Indian Rose Chestnut. Mesua, Nagkesara, Nagapuspa, Gajakesara
- **Chemical constituent :** mesuabixanthone-A & B Mesuferrol-A & -B, (-) epicatechin, 7-dihydroxy- & hydroxy-1- methoxyxanthone.<sup>[7]</sup>



**Fig. 4 : Nagkesar Herb**

It is an evergreen tree of medium to large size with short trunk and usually buttressed at the base. The tree mostly cultivated in avenues and in gardens because they are attractive especially its flowers when young. *Mesuaferrea Linn* present in moist or semi-evergreen forest. They need deep fertile and well drained soil has neutral pH. Stiff clay and low lying conditions are unsuitable <sup>[11]</sup>.

**Uses :**

1. Anti-diabetic
2. Hepatoprotective
3. Anti - oxidant.<sup>[12]</sup>

**5) Ashwagandha**

- **Biological Source:** It is obtained from the dried root and stem of plant *Withania somnifera*.
- **Family :** Solanaceae
- **Synonyms :** Winter cherry, Asgandh
- **Chemical constituent :** Withanine, somniferine, sonine, sitoindoside VII & VIII, withanolides



**Fig. 5: Ashwagandha**

Ashwagandha is a best rejuvenative herb, particularly for muscles, marrow and semen. It is used in all conditions of weakness and tissue deficiency in children, the elderly those suffers from chronic disease , insomnia,nervous exhaustion. It is good food for weak pregnant women; helps to stabilize fetus .Ashwagandha used for calm, deep and dreamless sleep. <sup>[13]</sup>

**Uses :**

1. Anti-stress activity
2. Used as aphrodisiac.
3. Immunomodulation
4. Sedative and Hypnotic activity. <sup>[14]</sup>

**1) Triphalachurna**

**I. Amla**

- **Biological Source:** It consists of dried, as well as fresh fruits of the plant *Emblica officinalis Gaerth* (*Phyllanthusemblica Linn.*)
- **Family :**Euphorbiaceae
- **Synonyms :**Emblica, Indian gooseberry, Alma
- **Chemical constituent:** Ascorbic acid ,phyllemblin,tannins.



**Fig. 6 : Amla**

The tree is small to medium sized, growing to a height of 1-6 m (3+1/2–26 ft). The bark has specks. The branchlets are typically deciduous, 10–20 Cm (4–8 inches) long, and finely pubescent (not glabrous). Simple, subsessile, light green leaves that resemble pinnates are tightly clustered along branchlets. The blossoms have a yellow-green tint. The fruit is almost spherical, smooth, rigid, and pale greenish-yellow in appearance. It has six vertical furrows or stripes. The fruit can reach a diameter of up to 26 mm (1 in).



**Uses:**

1. Source of Vitamin C
2. Used as laxative
3. Used as diuretics
4. Used for treatment of asthma
5. Used for treatment bronchitis

**II. Hirda**

- **Biological Source:** It consists of dried, ripe, fully matured fruits of *Terminalia chebula Retzr.*
- **Family :** Combretaceae
- **Synonyms:** Myrobalan, chebulicmyrobalan, harde, haritaki.
- **Chemical constituent:** Tannins, chebulagic chebulinic, ellagic and gallic acid.

**Fig. 7: Hirda**

It is found growing at an altitude of 1800 m. Fruits are collected from wild grown forest plants. It is a tree, 15 to 25 m in height, and 1.5 to 2.5 m in diameter. The tree is rounded, crowned with spreading branches and oxate leaves. It has yellowish–white flowers in the terminal spike.

**Uses:**

- a. Used as astringent
- b. Laxative
- c. Used as stomachic and tonic
- d. Used as anthelmintic.

**III. Behada**

- **Biological Source:** It consists of dried, ripe, fruits of *Terminalia belerica Linn.*
- **Family :** Combretaceae
- **Synonyms :** Beleric Myrobalan, Baheda, Bibhitak
- **Chemical constituent:** Gallic acid, ellagic acid, phyllembin, ethyl gallate, galloyl glucose.

**Fig. 8: Behada**

Fruit is drupe, 20-26 mm 3000 ft. elevation in length and 14-22 mm in diameter, ovoid and grey in Surface is velvety, irregularly wrinkled showing five longitudinal ridges. Upper end of the fruit a depressed while the lower projecting end shows round scar of pedicel up to 5 mm in diameter. A fruit very hard and when broken exhibits a yellow to dark yellow internal surface with projecting, threads and representing the vascular bundles.

**Uses:**

- 1) Used as an Astringent.
- 2) Used in the treatment of dyspepsia.
- 3) Used in the treatment of diarrhoea.<sup>[15]</sup>

**6) Tamrind**

- **Biological Source:** It consists of dried ,fresh pod like fruits of *Tamrindus indica*.
- **Family :** Leguminous
- **Synonyms:** Imli, chinch, tamarindo.
- **Chemical constituent:** Tartaric acid, Lupanone, Lupeol, Caffiec acid ,Ferulicacid, Chloramphenicol



**Fig. 9 : Tamrind**

The fruit is an indehiscent legume, sometimes called a pod, 12 to 15 cm (4+½ to 6 in) in length, with a hard, brown shell.<sup>(1)</sup>

The fruit has a fleshy, juicy, acidic pulp. It is mature when the flesh is coloured brown or reddish brown. The tamarinds of Asia have longer pods (containing six to 12 seeds), whereas African and West Indian varieties have shorter pods (containing one to six seeds). The seeds are somewhat flattened, and a glossy brown. The fruit is sweet and sour in taste.

**Uses:**

1. Used to treat wounds.
2. Used to treat diarrhoea.
3. Used in treatment of peptic ulcer
4. Anti-oxidant
5. Good source of magnesium
6. Used as nutraceutical



## 2) Date Palm

- **Biological Source :** It consists of dried, freshediable fruits of *Phoenix dactylifera*.
- **Family :** Arecaceae
- **Synonyms :**Khajur
- **Chemical constituent:** Pantothenic acid, Vitamin B6, Carbohydrates.



**Fig. 10: Date palm**

Dates have a long shelf life, and many varieties, including the common degletnoor, are often sold dried and processed. The dried fruit is more than 50 percent sugar by weight and contains about 2 percent each of protein, fat, and mineral matter. Other types of dates, such as the medjool, are eaten as fresh produce and gradually shrink and wrinkle.

### Uses :

1. Used as a Nutraceutical .
2. Used as Blood purifier
3. Immunomodulation.<sup>(2)</sup>

## AIM AND OBJECTIVE

### AIM:

To study the pharmacognostical parameters of plant *Bacopa monnieri* (L.) Wettst, Also Formulate and Evaluate the polyherbal candy for Multi-medicinal purpose.

### OBJECTIVE:

1. **Cognitive Ability:** To improve cognitive abilities like attention, Memory, Logic and Reasoning, Auditory and Visual processing. Brahmi and Ashwagandha mostly used to enhance cognitory function.
2. **Anti- Anxiety:** Now-a-days there is lots of people facing the problem and they got anxiety because of many social and psychological factors. Brahmi and Nagkesar used to relive problems related to anxiety.
3. **Depression and Stress:** It is a common and serious medical illness that negatively affects how you feel, the way you think and how you act .Nervine herbs helps to relieve depression and stress associated with work, emotion, anger.
4. **Convulsions:** A convulsion is a medical condition where the body muscle and relax rapidly and repeatedly, result in uncontrolled shaking of the body. Most of the Nervine herbs act as anti-

convulsant.

5. **Cancer:** A disease in which some of the body's cells grows uncontrolly and spread to the other parts of the body. Nagkesar is medically used for treatment of cancer disease.
6. **Anorexia:** Tamrind , Date palm, Triphala act as a good appetizer. Used for the treatment of Anorexia. Also used as a digestive aid.
7. **Dental Care:** Triphala content used for the oral health . The Vitamin C used to give strength to gums and teeth.
8. **Vitamin supplements and Nutritional Benefits:** Brahmi contains calcium and vitamin C. Nagarmotha provides iron and copper supplement. Triphala is enriched with vitamin C. Tamrind and Date palm provides vitamin B and C complex.

## PLAN OF WORK

Sr. No.	Title
1	Introduction
2	Plant Profile
3	Literature Survey
4	Aim & Objective
5	Experimental <ul style="list-style-type: none"> <li>• Authentication</li> <li>• Material &amp; Method</li> <li>• Pharmacognostical Study               <ol style="list-style-type: none"> <li>a. Macroscopic Study</li> <li>b. Microscopic Study</li> </ol> </li> </ul>
6	Preparation and Evaluation of Herbal Candy
7	Result
8	References

## EXPERIMENTAL

### AUTHENTICATION OF PLANT

Dr. A. Benniamin, Scientist "F" & Head of Office, Western Regional Centre Pune, Botanical Survey of India, did the authentication of plant by comparing morphological features.

The plant herbarium sheet has been deposited at Western Regional Centre, Koregaon Park, Pune, the Ref No: BSI/WRC/Tech./2024/JVD – 46. Dated 2<sup>nd</sup> May 2024.

### Herbarium of *Bacopa monnieri*

- **Genus** – Bacopa
- **Species** – *B. monnieri* ( L ) Wettst
- **Family** – Plantaginaceae
- **Locality** – Ahmednagar District
- **Local Name** – Brahmi
- **Collected by** – Miss. Phad Shreya H.
- **Identified by** – Dr. A. Benniamin



भारत सरकार/ Government of India  
पर्यावरण, वन एवं जल वायु परिवर्तन मंत्रालय  
Ministry of Environment, Forests & Climate Change  
भारतीय वनस्पति सर्वेक्षण/ Botanical Survey of India  
पश्चिमी क्षेत्रीय केंद्र/ Western Regional Centre  
७-कोरेगांव पार्क, पुणे-४११००१/7 Koregaon Park, Pune-411001  
Tel. 020-29707072, 020-29707078 (Direct) Fax: 020-29707039. e-mail [bsiwrcpune@gmail.com](mailto:bsiwrcpune@gmail.com)



भारतीय वनस्पति सर्वेक्षण  
BOTANICAL SURVEY OF INDIA

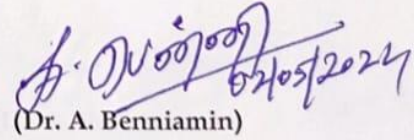
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दिनांक/Date: 02/05/2024

### प्रमाणपत्र/ Certificate

यह प्रमाणित किया जाता है कि/ This is to certify that Ms. Shreya Haushiram Phad (Ashwin College of Pharmacy, Manchi Hill, Ahmednagar) के द्वारा प्रस्तुत किये गये नमूना/ नमूने, हमारे विशेषज्ञ द्वारा निम्नलिखित अनुसार पहचाने गये हैं।/ the specimen/specimens submitted by aforesaid is identified by our expert as:

नमूना नंबर Specimen No.	वनस्पति का नाम Plant Name	कुल Family
01	<i>Bacopa monnieri</i> (L.) Wettst.	Plantaginaceae

  
(Dr. A. Benniamin)

वैज्ञानिक 'एफ'/ Scientist 'F' & Head of Office  
Botanical Survey of India,  
Western Regional Centre Pune (M.H.) 411001

### Plant Material

**Collection :** The plant of *Bacopa monnieri* which contain in family Plantaginaceae was collected from the Pratapur area, Sangamner, Ahmednagar and the authentication did by Western Regional Centre, Koregaon Park, Pune, Letter No : BSI/WRC/Tech./2024/JVD – 46.

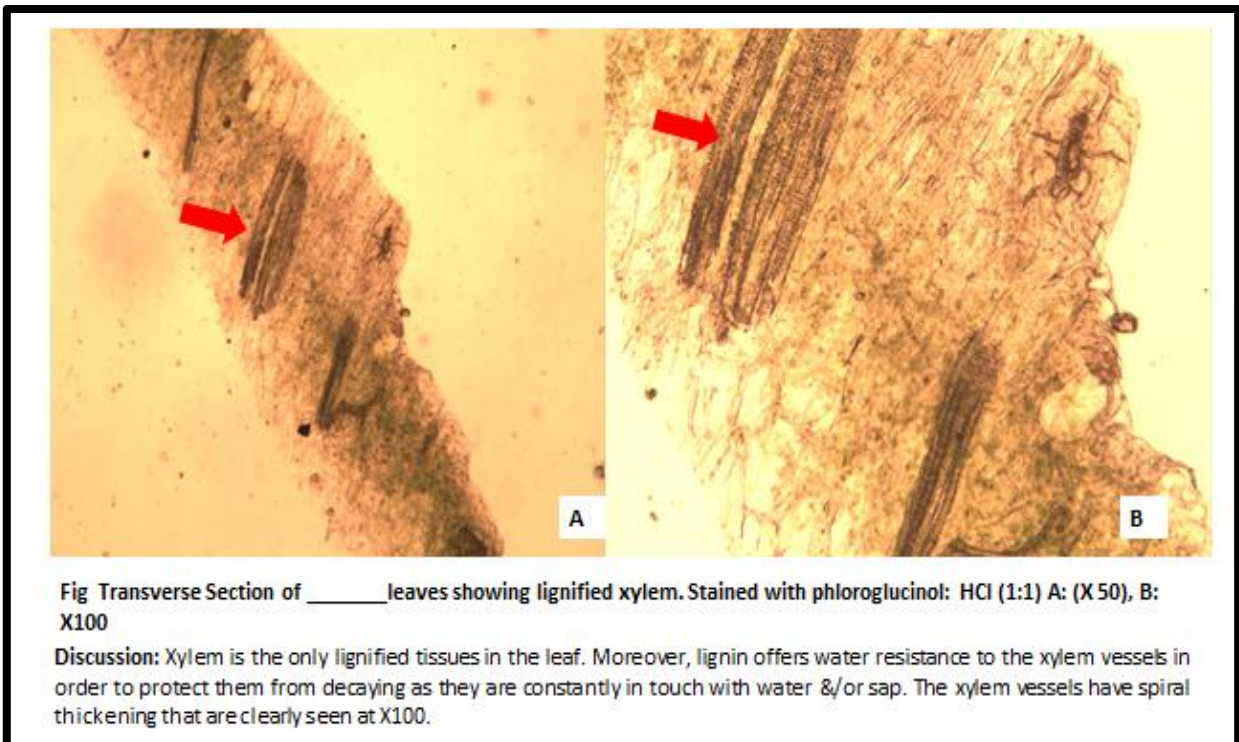
**Pharmacognostical Study**

**a. Macroscopic Study :**

- **Colour :** Bright green
- **Colour of leaf at upper side :** Dark green
- **Colour of leaf at lower at lower side :** Light green
- **Leaf apex :** Rounded
- **Shape of leaf :** Spatulate to obovate
- **Arrangement of leaf :** Opposite
- **Leaf margin :** Entire
- **Shape :** Simple
- **Taste :** Bitter
- **Surface :** Smooth
- **Odour :** Characteristic
- **Flower :** Purple colour, 5 petals
- **Fruit :** Round shape

**b. Microscopic Study :**

**T.S. of Leaves :<sup>(3)</sup>**





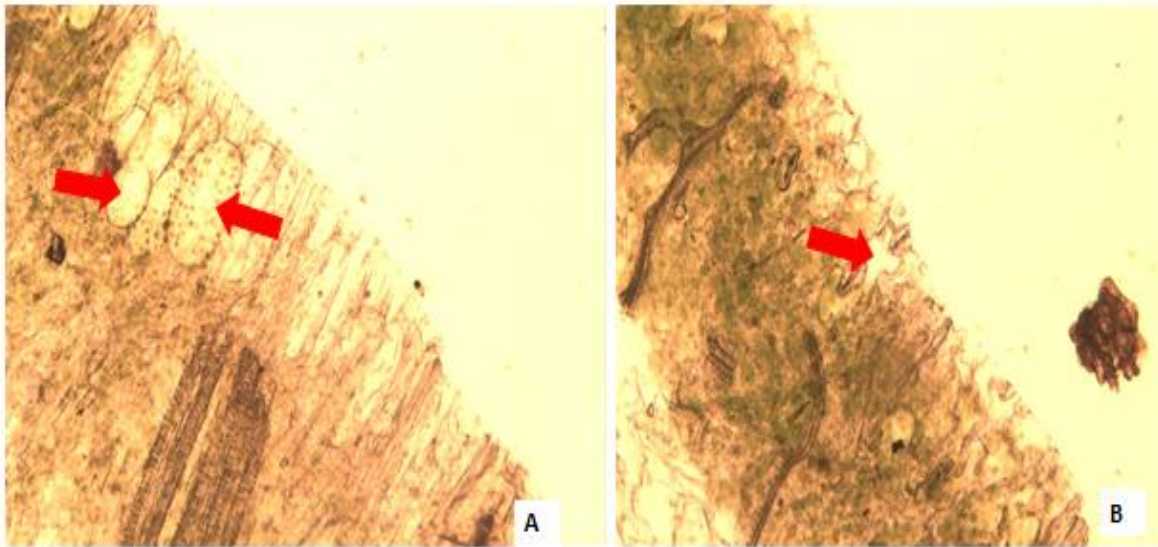


Fig Transverse Section of \_\_\_\_\_ leaves A: bulliform cells on adaxial surface (X100). B: Sub-stomatal chamber (X100)

**Discussion:** Bulliform cells are present near the epidermis. These cells are responsible for governing the transpiration of the leaf. Bulliform cells are one of the survival technique adapted by the plant that offers draught resistance. Sub-stomatal chamber offers temporary storage of respiratory gases when the stomata are in closed conditions.

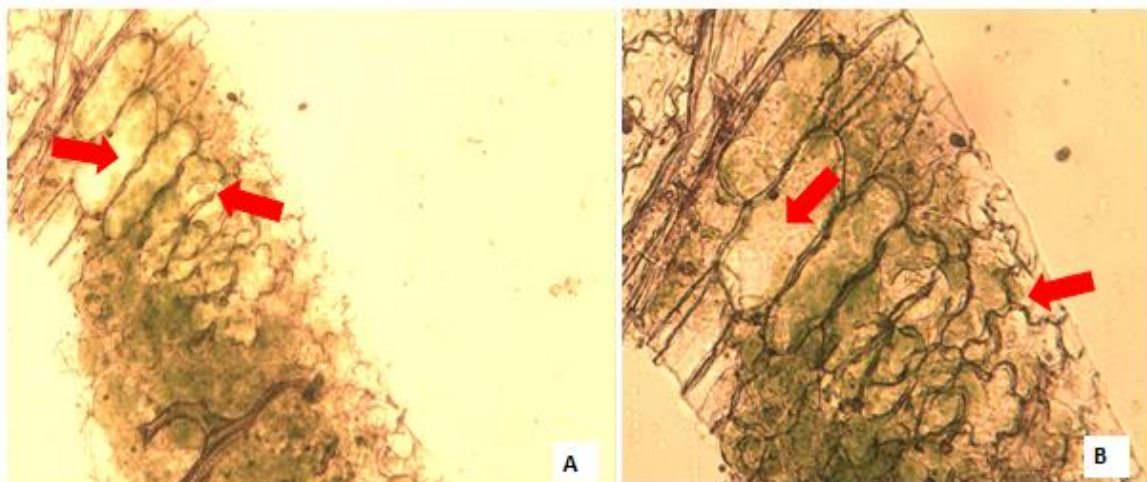
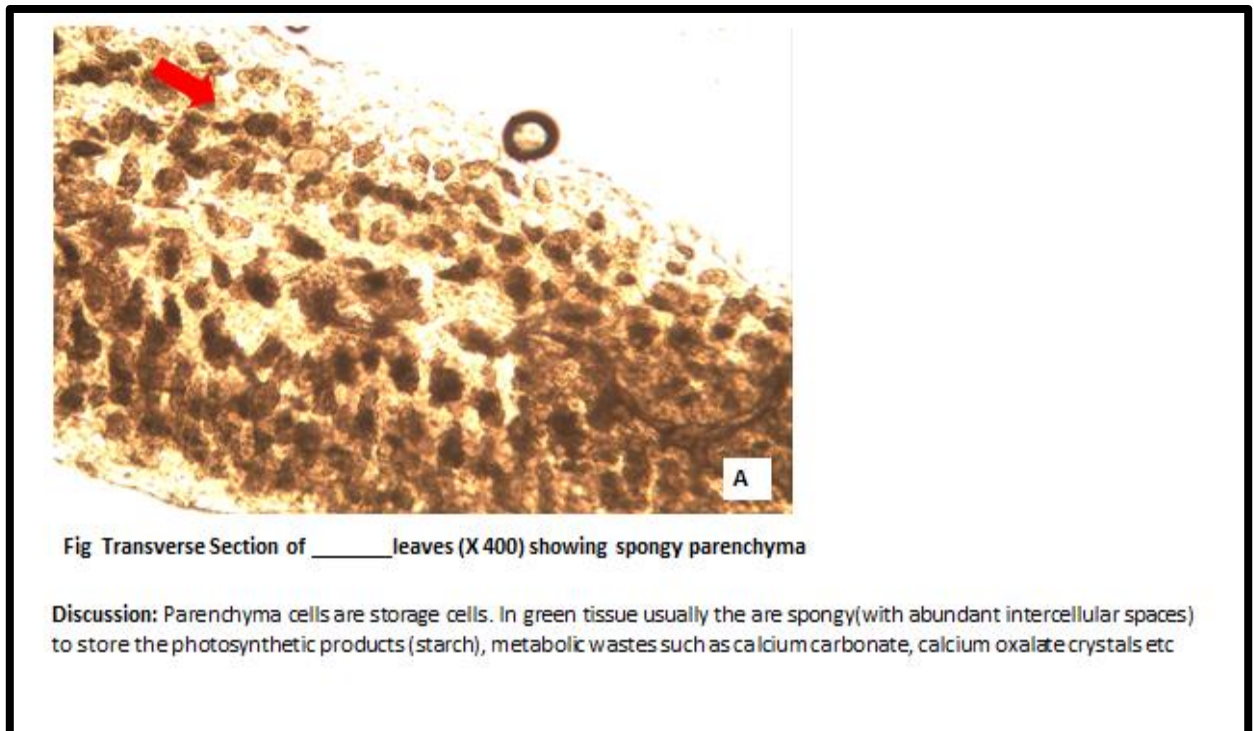
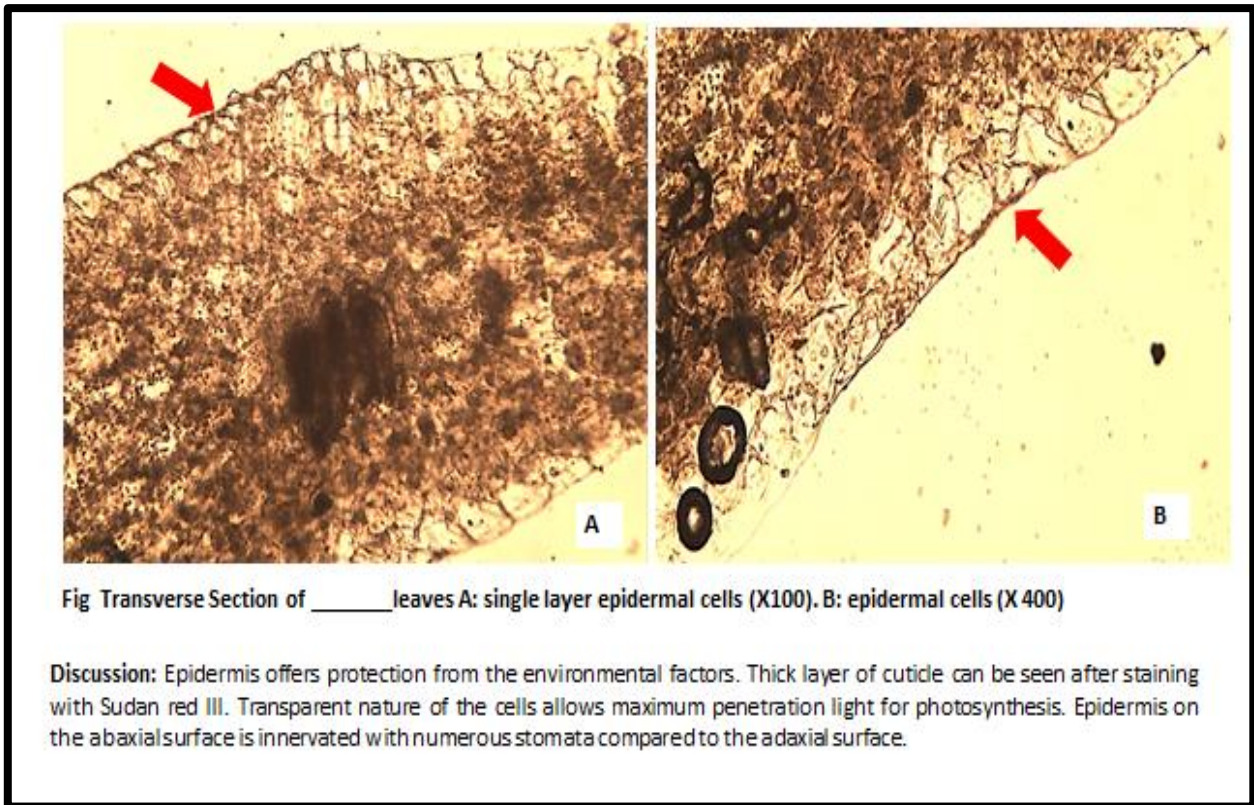


Fig Transverse Section of \_\_\_\_\_ leaves A: palisade cells near adaxial surface (X100). B: Palisade cells and wavy epidermal cells (X400)

**Discussion:** Columnar Palisade cells are type of parenchyma cells which are compactly arranged without any intercellular spaces and are present beneath the transparent epidermal cells. Palisade cells have abundant chloroplast for effective photosynthesis. The leaf anatomy suggest the dorsi-ventral nature of the leaf (palisade cells are present only at one side)





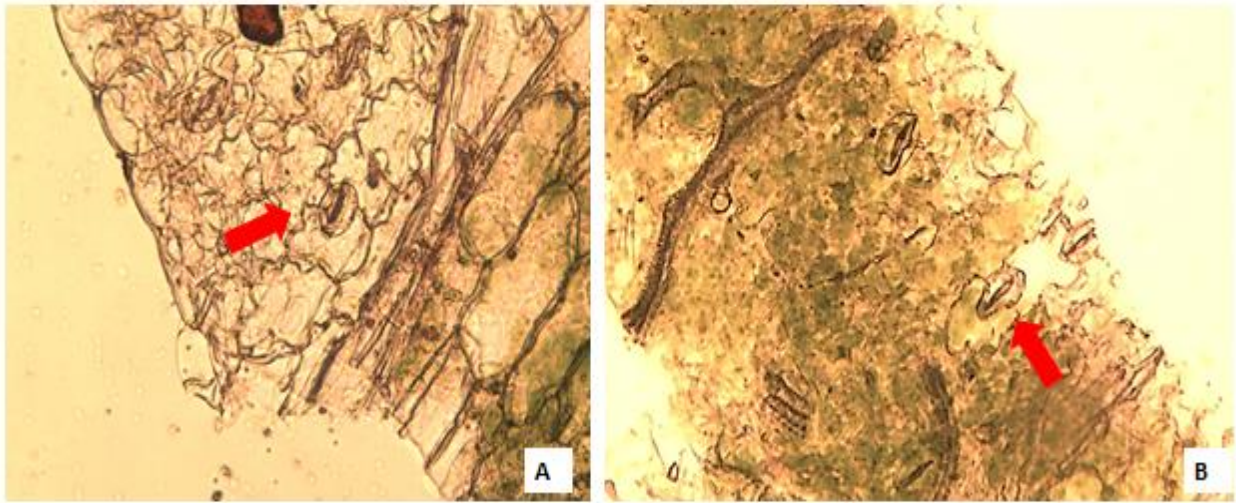


Fig Transverse Section of \_\_\_\_\_ leaves A: Anisocytic Stomata(X 400) A: Anisocytic Stomata(X 100)

**Discussion:** The cellular structure of stomata present on the leaves indicates its anisocytic or cruciferous type. The stoma is surrounded by two renin form guard cells. The guard cells are further surrounded by three subsidiary cells of which one is distinctly smaller than the other two cells.

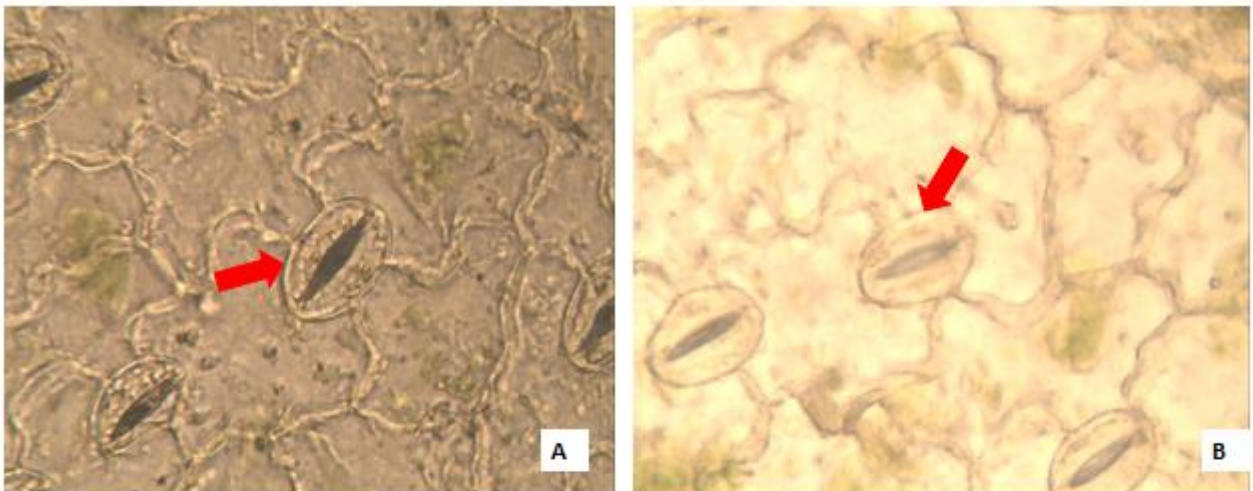


Fig Surface preparation of \_\_\_\_\_ leaves A & B: Anisocytic Stomata(X 400)

**Discussion:** The cellular structure of stomata present on the leaves indicates its anisocytic or cruciferous type. The stoma is surrounded by two renin form guard cells. The guard cells are further surrounded by three subsidiary cells of which one is distinctly smaller than the other two cells.

T.s. of Stem :

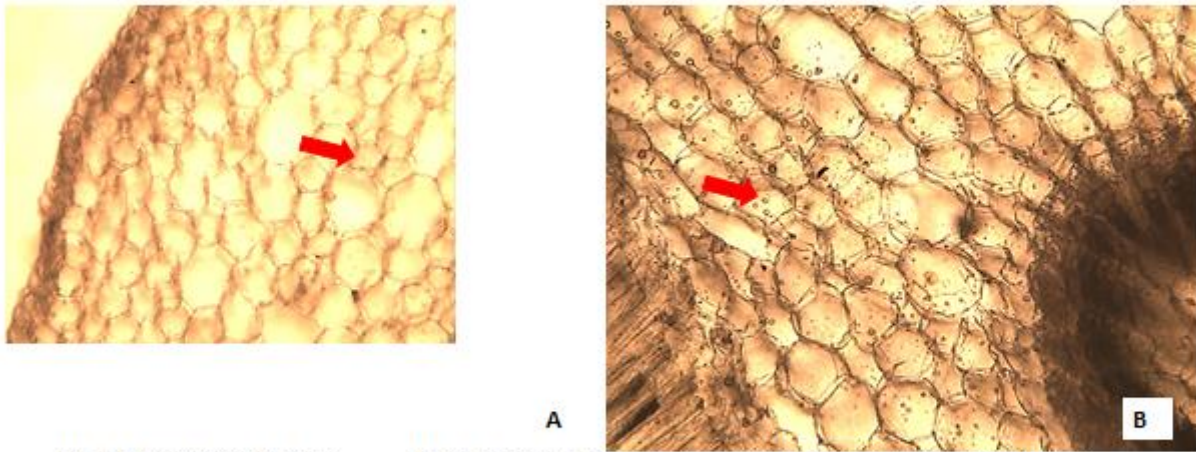


Fig A Transverse Section of \_\_\_\_\_ Stem showing spongy parenchyma. (X 100); B: Transverse Section of \_\_\_\_\_ Stem showing abundant starch granules. (X 100);

**Discussion:** Spongy parenchyma is a store house of starch and calcium oxalate crystals in every young and green tissue. The stems of succulent plants like \_\_\_\_\_ mostly comprises of abundant number of spongy parenchyma in order to store photosynthetic product (starch).

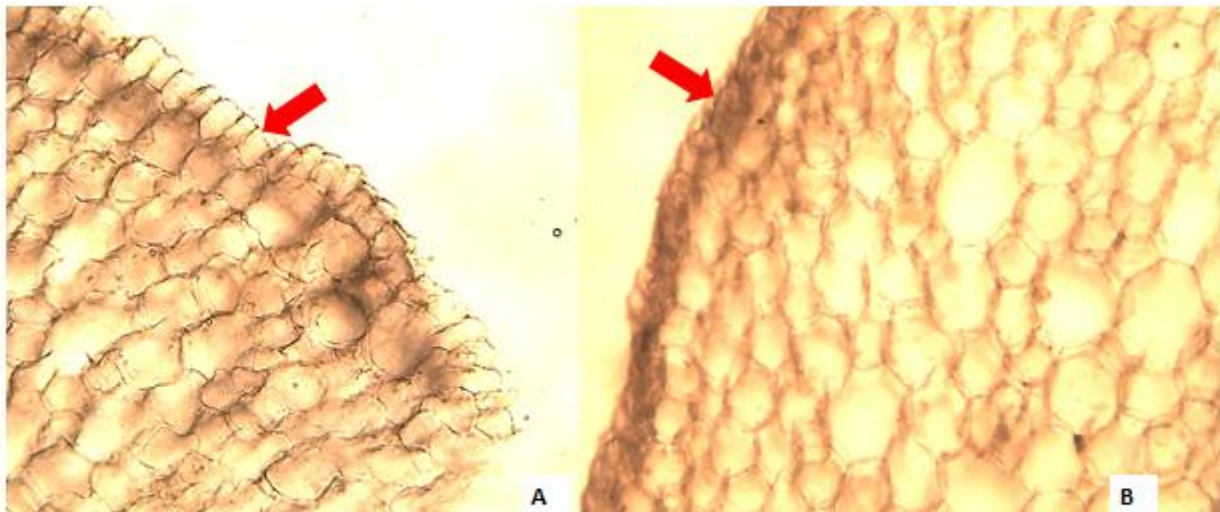


Fig Transverse Section of \_\_\_\_\_ Stem A: single layer of epidermis at periphery. B: Stained with Sudan red III highlighting epidermis (X 100)

**Discussion:** Epidermis majorly comprises of circularised cells. Cuticle is a lipophilic substance and hence gets stained with lipophilic dye Sudan red III. The chief function of epidermis is to form a barrier between environment and internal tissues. It prevents the entry and exit of water across its membrane.



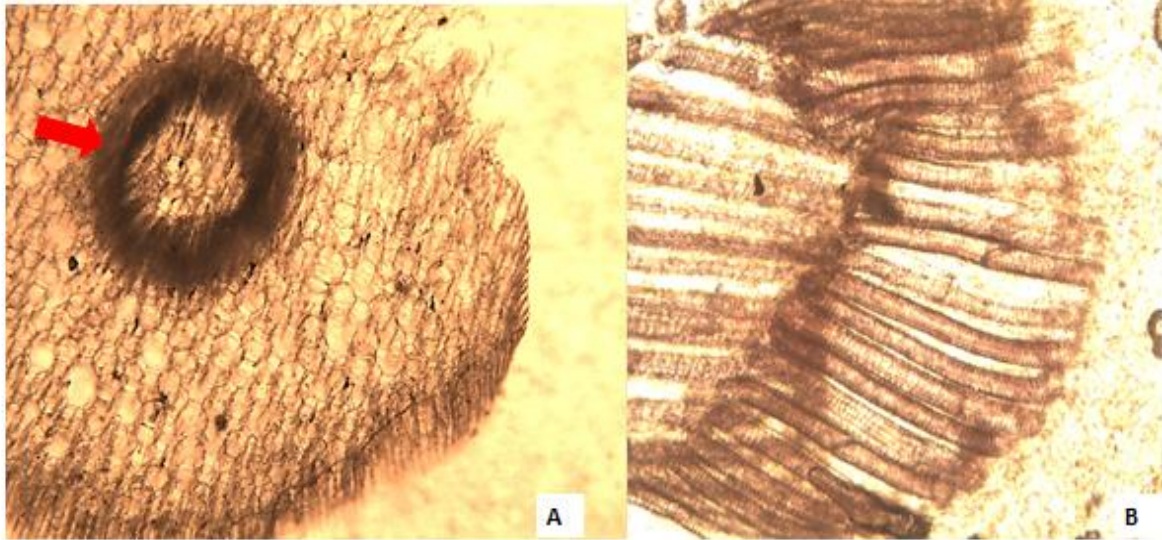


Fig Transverse Section of \_\_\_\_\_ Stem showing ring of lignified xylem. Stained with phloroglucinol: HCl (1:1) A: (X 50), B: X100

**Discussion:** The core of the stem is made of lignified tissues in order to provide rigidity to the stem. Moreover, lignin offers water resistance to the xylem vessels in order to protect them from decaying as they are constantly in touch with water &/or sap. Absence of intervacular cambium is the reason for absence of secondary growth in this plant.

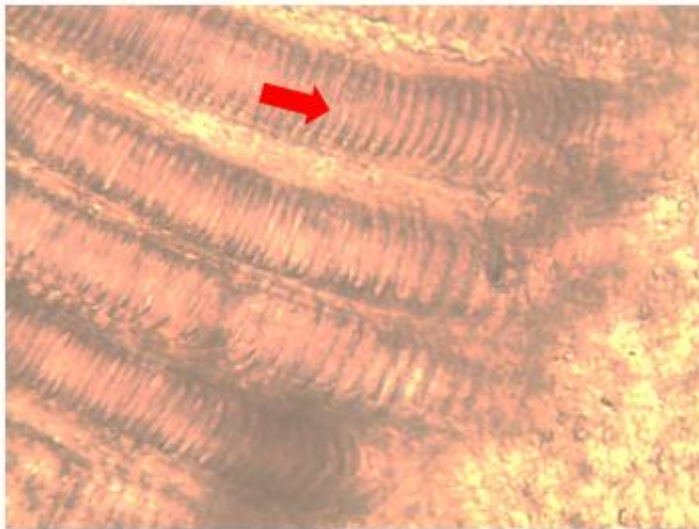
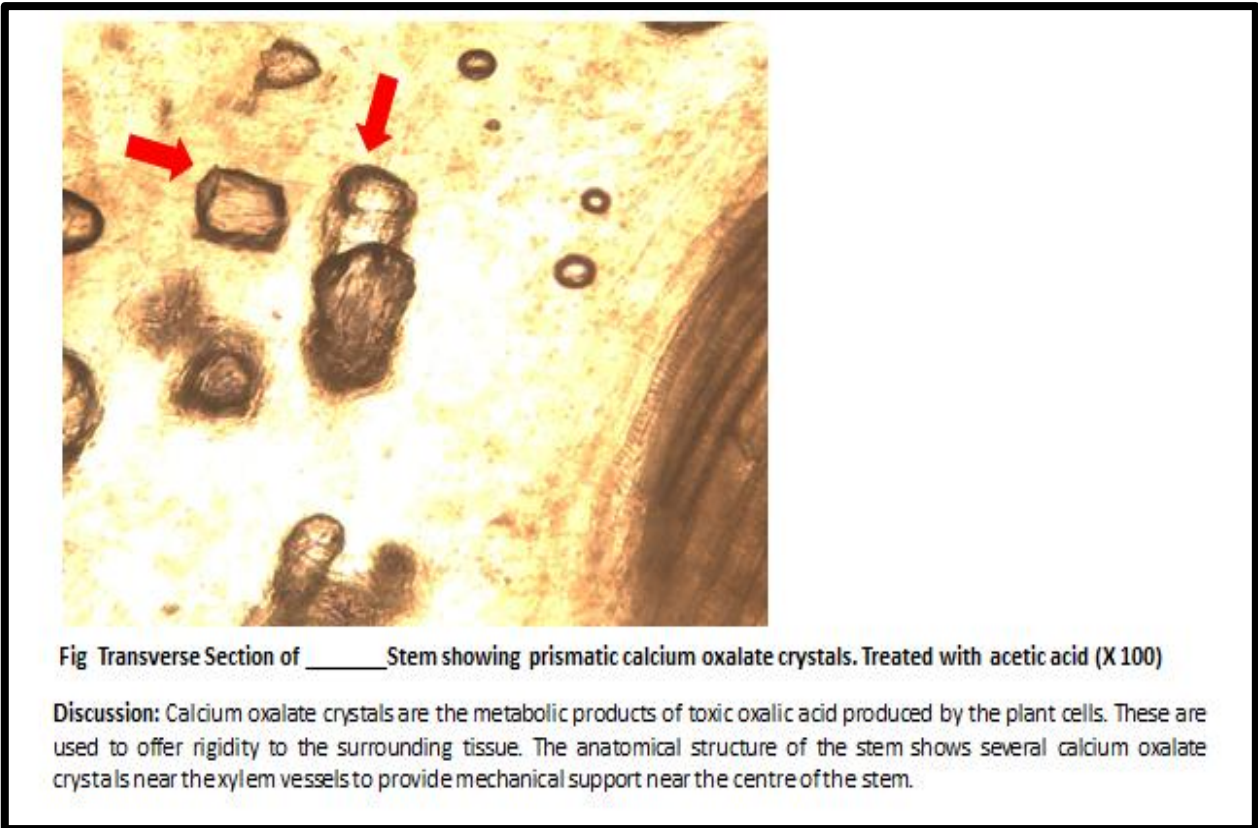


Fig Transverse Section of \_\_\_\_\_ Stem showing spiral thickening of lignified xylem. Stained with phloroglucinol: HCl (1:1) (X 400)

**Discussion:** Thickening provide rigidity to the xylem vessels and hence the plant can carry the sap upwards. Thickenings on the xylem are the indicators of the size of the plant. Usually xylems in green plant parts and bushes or shrubs have spiral or annular thickening.



- (3)
- **Stomatal Index** :It can be defined as the average number of stomata per square mm of the epidermis of the leaf.

**Procedure :-**

1. Clear the piece of leaf (middle part) by boiling with chloral hydrate solution or alternatively with chlorinated soda. Peel out upper and lower epidermis separately by means of forceps. Keep it on slide and mount in glycerine water.
2. Arrange a camera lucida and drawing board for making the drawing to scale.
3. Draw a square of 1 mm by means of stage micrometer.
4. Place the slide with cleared leaf (epidermis) on the stage. Trace the epidermal cell and stomata on the paper.
5. Count the number of stomata present in the area of 1 sq. mm. Include the cell if at least half of its area lies within the square.
6. Record the result for each of the ten fields and calculate the average number of stomata per sq. mm.
7. Calculate the stomatal index using the formula.<sup>[16]</sup>

**Formula :**

$$I = \frac{S}{EC+S} \times 100$$

Where, I = Stomatal index

S = Number of stomata per unit area

E = Number of epidermal cells in the same unit area



**Observations:**

	<b>Stomata</b>	<b>Epidermis</b>
1 <sup>st</sup> square	12	40
2 <sup>nd</sup> square	6	28
3 <sup>rd</sup> square	12	38
4 <sup>th</sup> square	15	26
<b>Average</b>	<b>11.25</b>	<b>33</b>

**Calculations:**

**Stomatal Number:** No of stomata per 1 mm square of area between midrib & margin.

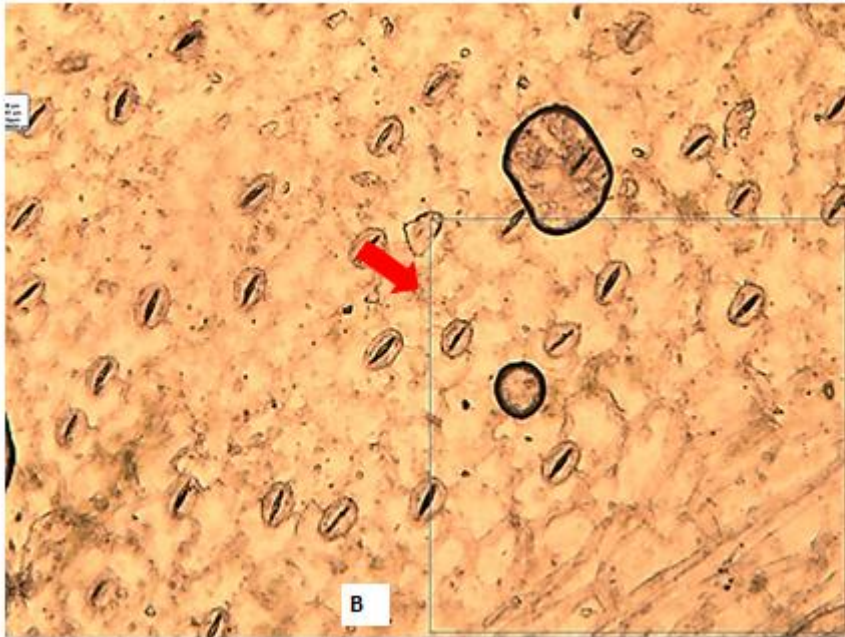
Since we have counted in 0.5 X 0.5 mm, its area is 0.25 mm<sup>2</sup>. Hence we need to multiply the average by 4

So, the 11.25 X 4 = 45

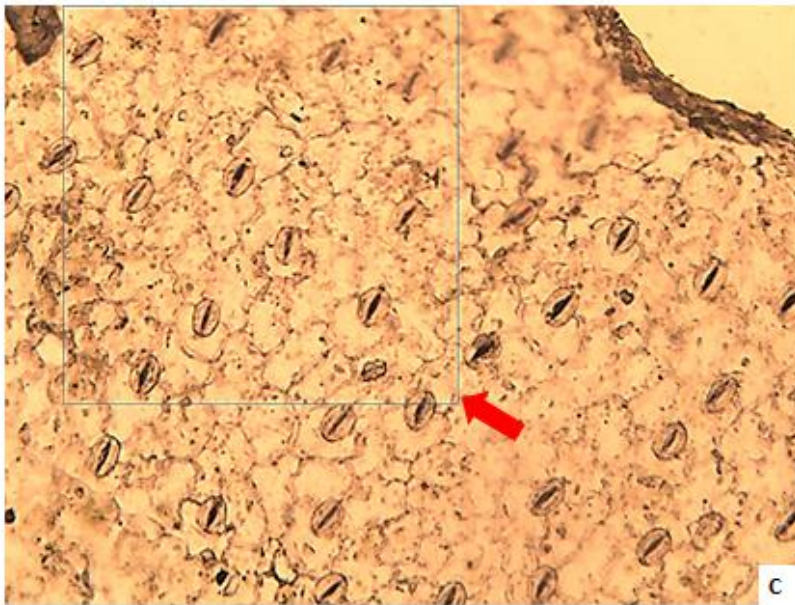
**Stomatal Index:** No. of stomata and epidermal cells per 1 mm square of area between midrib & margin.

$$I = \{S/(S+EC)\} \times 100; \{11.25 / (11.25 + 33)\} = 25^{[17]}$$





In a 0.5 X 0.5 mm square  
6 stomata & 28 epidermal  
cells are present



In a 0.5 X 0.5 mm square  
12 stomata & 38 epidermal  
cells are present





- **Vein Islet Number:** It is the small area of the green tissue surrounded by the veinlets.

**Definition:** It is the average number of vein-islet per square mm of a leaf surface. It is determined by counting the number of vein-islet in an area of 4 sq. mm of the central part of the leaf between the midrib and the margin.

**Procedure:**

1. Clear the piece of the leaf by boiling in chloral hydrate solution for about 30 min.
2. Arrange camera lucida and drawing board for making to scale.
3. Place stage micrometer on the microscope and using 16 mm objective, draw a line equivalent to 1 mm as seen through the microscope.
4. Construct a square on this line.
5. Move the paper so that the square is seen in the eyepiece, in the centre of the field.
6. Place the slide with the cleaned leaf (epidermis on the stage).
7. Count the number of vein-islets in the sq. mm. Where the islets are intersected by the sides of square, include those on two adjacent sides and exclude those islets on the other sides.
8. Find the average number of vein-islets from the 4 adjoining squares, to get the value for one sq. mm.<sup>[16]</sup>

**Observation:**

**Vein islets number (Avg. of 4) = 6**<sup>[17]</sup>

- **Vein termination number :**

**Definition:** It is defined as the number of veinlet termination per sq. mm of the leaf surface, midway between midrib of the leaf and its margin.


**Procedure:**

1. Clear the piece of the leaf by boiling in chloral hydrate solution for about 30 min.
2. Arrange camera lucida and drawing board for making to scale.
3. Place stage micrometer on the microscope and using 16 mm objective, draw a line equivalent to 1 mm as seen through the microscope.

4. Construct a square on this line.
5. Move the paper so that the square is seen in the eyepiece, in the centre of the field.
6. Place the slide with the cleaned leaf (epidermis on the stage).
7. Count the number of vein termination in the sq. mm. Where the islets are intersected by the sides of square, include those on two adjacent sides and exclude those islets on the other sides.
8. Find the average number of vein termination from the 4 adjoining squares, to get the value for one sq. mm.<sup>[16]</sup>

### Observations:


Vein termination number (Avg. of 4) = 4<sup>[17]</sup>



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P.E. Society, Pune

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Date:

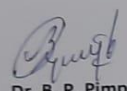
5<sup>th</sup> April, 2024

**TO WHOMSOEVER IT MAY CONCERN**

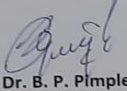
This is to state that the sample of Herbal Drug submitted by Ms. Shreya Phad of Ashvin College of Pharmacy, Manchi Hill on 22<sup>nd</sup> Feb, 2024 have been analysed in the laboratory of Department of Pharmacognosy.

The results of analytical parameters performed are as under:

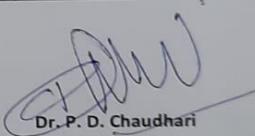
Parameters	Herbal Drug
Transverse Section of stem	Detailed analysis and images sent through link on G drive
Transverse Section of leaves	
Stomatal Index (Avg. of 4)	31.33
Vein islet Number (Avg. of 4)	6
Vein Termination number (Avg. of 4)	4




Dr. B. P. Pimple  
Analysed By



Dr. B. P. Pimple  
Head, Dept. of Pharmacognosy



Dr. P. D. Chaudhari  
Principal



**STRIVING TOWARDS EXCELLENCE FOREVER**

**MATERIAL AND METHODS :**

• **Selection of Herbs :**

**Table 1:- Herb selected for the preparation of herbal candy**

Sr. No.	Ingredients	Biological Name	Family
1	Brahmi	<i>Bacopa monnieri (L) Wettst</i>	Plantaginaceae
2	Shankpushpi	<i>Convolvulus pluricaulis</i>	Convolvulaceae
3	Nagarmotha	<i>Cyperus rotundus</i>	Cyperaceae
4	Nagkesar	<i>Mesua ferrea Linn</i>	Calophyllaaceae
5	Ashwagandha	<i>Withania somnifera</i>	Solanaceae
6	Triphala i. Amla ii. Hirda iii. Behara	<i>Phyllanthus emblica L.</i> <i>Terminalia chebula</i> <i>Terminalia belerica L.</i>	Euphorbiaceae Deciduous Combretaceae

• **Materials :**

**Table 2:- Formula**

Sr. No.	Ingredients	Quantity	
		Taken (2gm)	For 100gm
1	Brahmi	0.05 gm	2.5 gm
2	Shankpushpi	0.03 gm	1.5 gm
3	Nagarmotha	0.02 gm	1.0 gm
4	Nagkesar	0.2 gm	10 gm
5	Ashwagandha	0.2 gm	10 gm
6	Triphala	0.2 gm	10 gm
7	Jaggery	0.5 gm	25 gm
8	Tamarind	0.5 gm	25 gm
9	Dates	0.3 gm	15 gm

• **Procedure for making candy :**

**1. Preparation of jelly :-**

1. Weighed accurately 0.5 gm of tamarind and 0.3 gm of dates.
2. Put them into luke warm water for 30 min, then allowed soak into the water.
3. Grinded it until the smooth paste formed.
4. Strain the paste.
5. Put the paste in the container and heated it until the water contents get evaporated until the paste changes its colour.
6. Added of jaggery in it and stirred it, thick like jelly is formed.

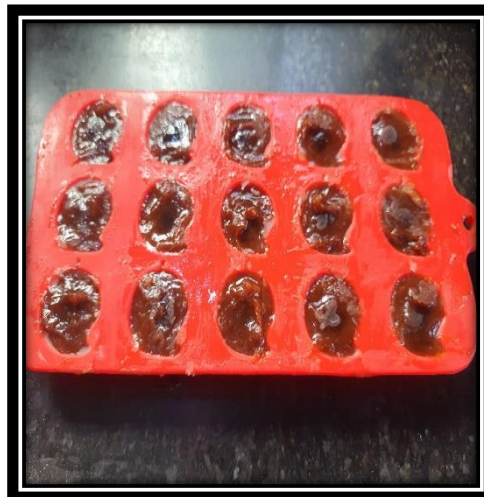
**2. Preparation of candy :-**

- a. Weighed all powders and jaggery accurately.
- b. Put jaggery in container and make the consistency.
- c. All powders were added one by one with the help of spatula with constant stirring.
- d. Filled the half mould with jelly and put prepared candy in it.

- e. Again poured the jelly until the shape of mould is completed.
- f. Set it on room temperature.



**Fig. 11: Prepared Candy**



**Fig. 12: Moulding Process**



**Fig. 13: Packaging**



Fig. 14: Labelling

### Evaluations of Herbal Candy

#### Physico-chemical evaluation

- Colour:** The jelly candy is brown in colour.
- Odour:** It possesses characteristic Odour.
- Consistency:** It has hard core inside and soft consistency from outside.
- Taste:** It has sweet taste firstly then it gives sour and little bit bitter taste latter on.
- pH:** It is measured on electric pH meter with the help of glass electrode. The instrument operate under the guidance of SOP's.
- Texture:** It has jelly like texture.

Table 1 :- Evaluation of Stability Study

#### Short time stability testing

Time	Temperature	Physico-chemical Parameters			
		Colour (Brown )	Odour (Characteristic)	Texture (Smooth)	Stability
1 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
2 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
3 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
4 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable

#### Accelerated stability testing

Plan of next work.

### RESULT

Table 1:- Physico-chemical evaluation

Sr. No.	Parameters	Observation
1	Colour	Brown
2	Odour	Characteristic



3	Consistency	Soft
4	Taste	Sour and Sweet
5	pH	2.8
6	Texture	Jelly like

**Table 2:- Evaluation of Stability Study**

Time	Temperature	Physico-chemical Parameters			
		Colour (Brown )	Odour (Characteristic)	Texture (Smooth)	Stability
1 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
2 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
3 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable
4 Week	25°C	No Change	No Change	No Change	Stable
	35°C	No Change	No Change	No Change	Stable

## CONCLUSION

From the above study it is concluded that, the *Bacopa monnieri* (L.) Wettst is most important nervine herb. It is used in Ayurvedic Medicine. It is act as a brain tonic, sedative, anti-spasmodic, as an alternative diuretics and as a Astringent.

Now-a-days there is lots of “Disease and Disorder” approaching related to nervous system. According to that point of view we formulate & evaluate the polyherbal candy in which main API was brahmi and other ingredient as Shankpushpi, Nagkeshar, Nagarmotha, Ashwagandha, Amla, Hirda, Behada, Tamrind, Date palm.

They all have there own therapeutic benefits like Nervine, Appetizer, Diuretics, Astringent ,etc. also they are used in resolve many diseases related to nervous system ( like insomnia, convulsions, memory enhancer, improve cognitary functions), digestive system (provide nutritional benefits), respiratory system (cough, difficult in breathing, sore throat, laryngitis, bronchitis ) and solve the heart related issues .

This polyherbal candy formulation beneficial in stress and depression. Act as an appetizer for children give nutritional benefit and keep them healthy. Easy and acceptable medication.

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**Links:**

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2. <https://www.britannica.com/plant/date-palm>
3. [https://drive.google.com/drive/folders/1\\_T9EIUicgF8SXXN4Da6poF818xJsZB6jP?usp=drive\\_link](https://drive.google.com/drive/folders/1_T9EIUicgF8SXXN4Da6poF818xJsZB6jP?usp=drive_link)