



# “Study of Physicochemical, Phytochemical and Antioxidant Properties of Vamshayava(*Bambusa arundinacea* (Ritz) Willd[Seeds])

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## Introduction:-

“A Physician without knowledge of Nighaṅṭu, a scholar without the knowledge of Vyākaraṇa (grammar) and a soldier without Āyudha (weapon) are nothing but stupid in this world” is said by Narhari Pandit in his Raj Nighantu. In nighantus herbs with synonyms, different Gunakarmas, habitat, etc are mentioned. This adds to the knowledge of Vaidya and helps him in selecting appropriate medicine as per the patient’s condition. Thus **Nighantu** plays a very important role in the study of Ayurveda.

The traditional use of various plants is mentioned in Ayurvedic texts. **Vansha** (Bamboo) is one of them. Popularly known as “**Poor man’s timber**”. Bamboo is globally recognized as an important asset in eradication of poverty, economic and environmental development and thus called “**Green Gold of forest**”. [4] It can be said as **Kalpataru** (a tree in heaven that can give fabulous yields). Ayurvedic texts like Charak Samhita describes the use of various parts like Vamsha-patra, vamsha karir, vamshalochan, vamshatwak, vamshamula are used in day to day life, **Vamshayava** is among them.

**Ahara** stands first in the **Trayopastambha (three pillars of life)** as mentioned in Charak Samhita. Ahara or Diet should comprise of vitamins, minerals, carbohydrates, fats, proteins, antioxidants, etc. Along with ancient Vaidyas, some other medicine practitioners knew the importance of a proper diet. As said by Hippocrates “Let food be thy medicine and medicine be thy food”. This shows the importance of food in preventing and curing a disease. So consuming food with complete nutrition is utmost important. Antioxidants are an important constituent among diet. **Antioxidants** are substances that protect your cells against free radicals, which play a role in heart disease, cancer and other diseases thus helping the body to build **good immunity** system. Thus the study of antioxidants in the food we eat is essential. The use of food with good antioxidant value if consumed in a diet will help to develop good immune system.

## NEED OF STUDY

Antioxidants are the substances that inhibit oxidation. Cells in the human body may function poorly or die if oxidation occurs. To prevent free radical damage, body has a defence system of antioxidants. Antioxidants are the molecules which can safely interact with free radicals and terminate the chain reaction before vital molecules are damaged. Due to globalization, unhealthy lifestyle, stress, tensions, leads to disease formation. The leading health problems we face like heart disease, cancer, dementia, etc increase the level of oxidative damage and inflammation Use of antioxidants slower signs of aging, helps in detoxification, protect against the heart disease, stroke and reduces risk of cancer. The diet rich in antioxidants helps in counteracting the damage done by smoking, stress, poor diet, etc. due to this the study of antioxidants and their use in diet becomes essential.

Ayurveda has always focused on consumption of healthy diet. The antioxidants works as rasayana to the body. Diet is one of the three pillars. Acharya Charak emphasis on

त्रयं रूपं उपस्तंभारु इत्याहाररु स्वप्नोर्ब्रह्मचर्यमिति च चसू 11/35 [3]

आहार संभवं वस्तु रोगश्चाहार संभवः ।

हिताहित विशेषात्तु विशेषो सुखदुःखयोरुद्यच्च च सू 28/45 [4]

importance of having proper and improper food. The health and disease are due to this proper or improper food consumed by an individual.

Vamsha is used in Ayurvedic practice since ancient times. In Ancient text of Ayurveda, commonly used Sitopaladi Churna contains Vanshalochana in it. Skin of Bamboo is included in Paramagad by Acharya Charak [15].Likely, its shoots are mentioned as Karir.Vanshayava as mentioned by Acharya Charak is said to have Balya properties. While in Bhavprakash Nighantu it is said to have Bruhan, Vrushya and Balya properties. To study the nutritional status of Vanshayava and of its properties becomes essential since it can be used as healthy food in diet.

## REVIEW OF LITERATURE

### Drug Details

Drug name	Latin name	Family	Rasa	Vipaka	Virya
Vanshayava	Bambusa arundinacea (Ritz)Willd	Graminae	Kashaya	Madhur	Sheet

शीत कषायो मधुरस्तु रूक्षो

मेह कृमी श्लेष्म विषापहश्च |

पुष्टिं च वीर्यं च बलं च दत्ते

पित्तापहो वेणुयवः प्रशस्तः || रा.नि. शाल्यदि वर्ग,72 [5]

तद्यवास्तु सरा रूक्षाः कषायाः कटुपाकिनः |

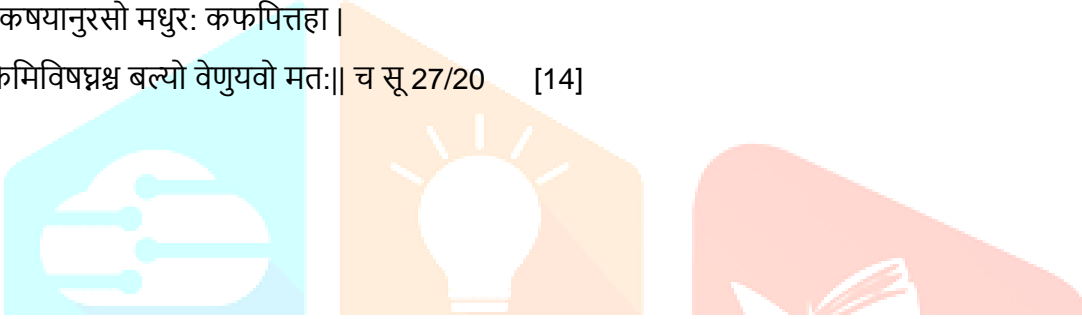
वातपित्तकरा उष्णा बद्धमुत्राः कफापहाः || भा प्र, गुडुच्यादि वर्ग,156 [12]

यवा वंशभवा रूक्षाः कषायाः कटुपाकिनः|

बद्धमुत्राः कफघ्नाश्च वातपित्तकराः सराः|| भा प्र, धान्यवर्ग, 82 [13]

रूक्षाः कषयानुरसो मधुरः कफपित्तहा |

मेदः क्रिमिविषघ्नश्च बल्यो वेणुयवो मतः|| च सू 27/20 [14]



### Drug Description

### ETYMOLOGICAL DERIVATION OF VAMSHA

Etymologically it has been explained as“वनति संभज्यते वितन्यते” i.e.which

Increases the family or“वनति शब्दं करोति “that which produces sound.

**BOTANICALNAME-** *Bambusa arundinacea* (Ritz)Willd[Seeds].

### BOTANICAL DISCRIPTION OF VAMSHA

#### CLASSIFICATION OF VAMSHA AND VAMSHAYAVA ACCORDING TO AYURVEDA:-

- 1) Cause effect relationship-Karyadravya
- 2) Living/Nonliving-Chetenadravya
- 3) Constitution-Parthiva
- 4) Origin-Audbhid
- 5) Usage-Aushadhidravya
- 6) Morphology-Vruksha
- 7) Lifespan-Deerghayu
- 8) Rasa-Vamsha-Madhur,Kashaya,

**Vamshayava-kashaya**

9) **Virya-Vamsha-Sheet**

**Vamshayava-ushna**

10) **Vipak-Vamsha-madhur**

**Vamshayava-katu**

11) **Action-Vamsha-Sara,chedan,sheet,**

**Vamshayava-Sara,ushna,**

12) **Actionondoshas-Vamsha-kapha-pittashamak**

**Vamshayava-Vata-Pittakara**

13) **Rogaghnata-Vamsha-Kushta,vrana,bastishodhan**

**Vamshayava-kaphahara,badhamutra**

**GANA:**

**Vamsha is mentioned in different Ganas by different Samhitas**

**Name of texts**

Charak samhita

Sushruta samhita

Ashtanga Hriday

**Raspanchak:**

**Raspanchak of Vamsha**

Rasa - Madhur,Kashaya

Virya - Sheeta

Vipaka - Katu

Guna - Laghu, ruksha

**Ganas**

Kashaya skandha dravya

Padmakadi Gana

**Raspanchak of Vamshayava**

Rasa - Madhur,Kashaya

Virya- ushna

Vipaka-Katu

Guna -Laghu, ruksha

## Vamshayava



### PHARMACOTHERAPEUTIC ACTIONS:-

#### Action of Vamshayava

Vishaghna, Shothaghna, Kusthaghna, Pramehaghna, Vrushya, Mutrabadha, Krimighna, Stambhana, Stanyashodhan.

#### Action of Vamshayava on dosha –

- 1) Vata - Provocates vata by ruksha guna and kashaya rasa
- 2) Pitta - Alleviates pitta by kashaya rasa & laghu guna.
- 3) Kapha- Alleviates kapha by tikta, kashaya rasa, katu vipaka & laghu, ruksha guna.

#### Action of Vamshayava on dhatus –

- 1) Mansa -kledanashan
- 2) Meda -kleda nashan
- 3) Shukra -balya

#### Action of Vamshayava on malas –

- 1) Purish -grahi
- 2) Mutra –mutrabadha

## MATERIAL & METHODS

### METHODOLOGY

#### 1] Type of Study Design

- Analytical Study
- Experimental Study

#### 2]Place Of Study

Phytochemical and Physicochemical studies of Vanshayava were carried out by Shri B.M. Kankanwadi Ayurved Mahavidyalaya.Total Antioxidant Study was carried out by Nikhil Analytical Laboratory,Sangli.

#### 3]Duration of study

- 10 months approximately

### METHOD :-

#### 1] STANDARDIZATION

Vamsha is a most important drug used by Ayurveda practitioners since Vedic era to till date.In ancient time, the drugs were collected by Aacharyas by their own; hence there is much clarity about purity. Standardization is required prior to its use in human beings to ensure its authentication, quality & purity.

#### 2] Drug collection

- Vanshayava was collected from surrounding parts of Kodoli and Panhala.

#### 2] Authentication and Standardization -

Standardization of Vanshayava

Vanshayava seed powder has been used in the clinical trial, it will demand to authenticate it & prepare their powder & subject it to standardization as per guidelines.Considering standardization of Vanshayava,it was planned in the following manner;

1. Authentication of Vamshavaya.

2. Sensory evaluation
3. According to Ayurvedic guidelines
4. According to pharmacopoeia
  - a) Botanical
  - b) Physico-chemical
  - c) Phytochemical

All above parameters considered as base & selected for further preparation for selection or standardization of Vanshayava. It was subject to TLC as a permanent fingerprint & maintained in standard for the preparation.

## 1. Authentication of Vamshavaya

**Table no 6.-Authentification report**

Name	Code	Latin Name	Part used	Family
Vanshayava	CRF/Auth/2020/01.	Bambusa Arundinaceae Willd.	seed	Graminae

## Standardization according to Ayurvedic principles

Charakacharya had given description about guideline for standardization of drug in 8 th adhyaya of Vimana Sthana. Standardization according to guidelines given by Charaka Samhita as follows,

### 1) बाह्य स्वरूप(Nature of external features)

a) Vansha is an evergreen tree. Sessile with long sheathing base with alternate or simple, ligulate or parallel venation. Flower founds in bunch, firstly bright orange then turns to red.

### 2) गुण (Properties)

Vanshayava should be laghu, ruksha;

Rasa – kashaya, tikta

Vipaka – katu

Veerya – sheet

### 3) कार्य (Therapeutic action)

Bamboo seed

Vishaghna, pramehaghna, vrushya, mutrabadh, krimighna, stambhana, stanyashodhan.

### 4) देश (Habitat)

Large tracts of natural bamboo forest occur in tropical Asian countries including India, Myanmar, Thailand and China. In India Bamboo is majorly seen in eastern states of India like Arunachal Pradesh, Assam, Nagaland etc. Bamboo seeds are mainly grown in some south India, Maharashtra, Konkan, etc

### 5) द्रव्य संग्रहण काल (Time of collection)

Bamboo Seeds are Collected in mid september or in Vasant Ritu from January to March.

### 6) संस्कार (Process)

Bark of trees is used to process the powder.

### 7) संग्रहण विधि (Preservation)

Bamboo Seed was collected & sun dried on dry surfaces & used for the preparation of powder.

### 8) मात्रा (Dosage)

Bamboo is used as pathya in Prameha, and as stanyashodhak

### 9) (Indication)

Bamboo seed is indicated in various diseases like Prameha, Vishaghna, Vrushya, Medoghna.

### 10) (Person to whom it is administered)

For the present study, Ashoka & Kashthadaru extraction



was screened for the antibacterial action.

### 11) दोषघ्नता (Action on doshas )

Bamboo seed is Kapha-PittaGhana due to Kashaya rasa and Madhur Vipak.

## 3] PHYSICAL AND CHEMICAL ANALYSIS

Physical and Chemical Analysis of the drug will be done by the below method.

### A] PHYSICAL ANALYSIS

#### a) Organoleptic evaluation

Organoleptic characters means “Testing with the help of Sense Organs”.

Shape & Size for eyes.

Surface & Texture with skin.

Odour with Nose.

Fracture with eyes, ears & skin.

Taste with tongue.



#### b) Morphological study

##### 1. Macroscopic evaluation

##### 2. Microscopic evaluation

## **B] CHEMICAL ANALYSIS**

### **a) PHYSICOCHEMICAL ANALYSIS**

- 1) Moisture Content :**
- 2) Total Ash Value :**
- 3) Extractive Value**
  - Alcohol extract:**
  - Water extract :**
- 4) Specific gravity/Bulk Density:**
- 5) Water soluble ash values:**
- 6) Acid insoluble ash value:**
- 7) pH**
- 8) Foreign Matter**
- 9) Volatile matter:**
- 10) TLC (Thin Layer Chromatography):**

### **b) PHYTOCHEMICAL ANALYSIS**

- 1) Alkaloid:**
- 2) Glycosides:**
- 3) Steroids:**
- 4) Tannins :**
- 5) Proteins :**
- 6) Fatty Oil Estimation / Crude Fat Content**
- 7) Carbohydrates:**
- 8) Flavonoids:**

### **c) ANTIOXIDANT STUDY**

- 1) Total Antioxidant Capacity:**

An aqueous solution of 0.5 ml of sample solution (0.2,0.4,0.6,0.8,1 mg/ml) is combined with 5 ml reagent solution (0.6 M sulfuric acid, 28 mM sodium phosphate and 4 mM ammonium molybdate).

The tubes capped and incubated in a boiling water bath at 95°C for 90 min. After the samples had cooled to room temperature, the absorbance of the aqueous solution of each was measured at 695 nm against blank in Spectronic 20 visible spectrophotometer.

A typical blank solution contained 5 ml of reagent solution and the appropriate volume of the same solvent (methanol) used for the sample and it was incubated under the same conditions.

For samples antioxidant capacity is expressed as equivalents of ascorbic acid.  
[11]

## MATERIALS /INSTRUMENTS

1. Digital pH meter
2. Muffle furnace
3. Hot air oven
4. Electronic Balance Machine
5. Crucible Petri dish
6. Relevant Chemical and Glasses
7. TLC Chamber
8. UV Chamber
9. Spectrophotometer.

## OBSERVATIONS AND RESULTS

The present chapter contains observations & results found throughout study work i.e. they are divided in following three parts:

1. Phytochemical study
2. Physicochemical study
3. Antioxidant study:

This includes macroscopic, microscopic characters, sensory evaluations and organoleptic characters of

**Botanical name:** Bambusa arundinacea (Retz.) Willd.

**Family:** Gramineae

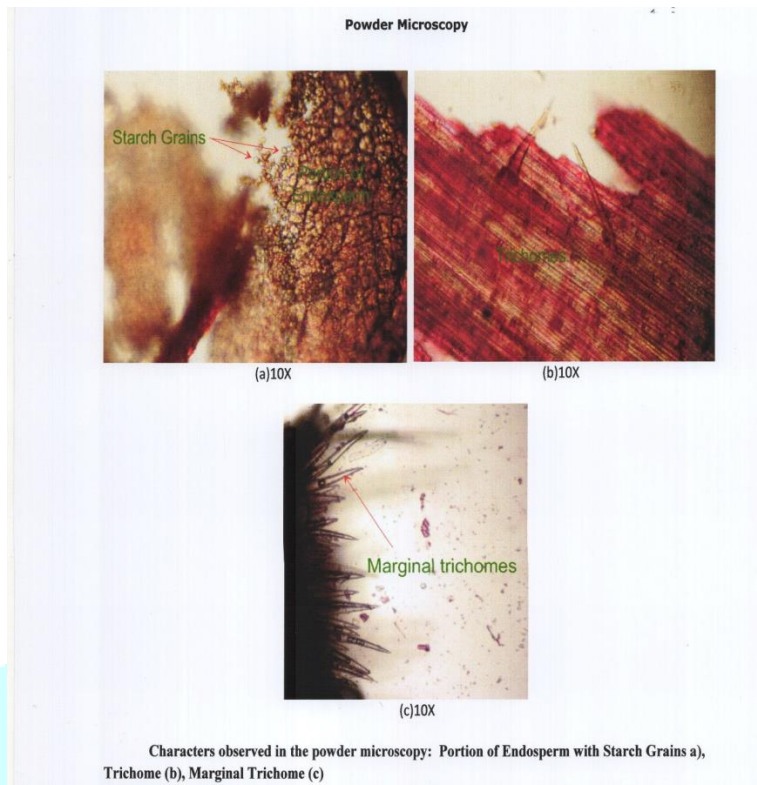
**Part used:** seed

### **Macroscopic evaluation of seed:**

The fruit of bambusa is known as caryopsis. It consists of a basal bowl shaped stalk called rachilla which bears two perianth lobes called lemma and palea. Enclosed within the lemma and palea occurs elliptically oblong, smooth, brown grain. There is a longitudinal groove on one side of the grain.

### **Microscopic evaluation:**

Small pieces of epidermal cells of the perianth members of the grains are seen in the powder. In surface view the perianth members are composed of long, narrow thick walled fibers compactly arranged. On the surface are also seen diffusely distributed pairs of silica cells and cork cells. Silica cells are white and transparent and cork cells are darkly stained. There are also triangular, thick walled conical trichomes with pointed ends. There are thick long pointed trichomes seen in the powder. Their trichomes have short, curved echinate spines. Starch grains are abundant in the powder. The starch grains are spherical or squarish. They are simple type. Along the margins of lemma and palea there are long dense trichomes which are directed towards the tip. These trichomes have thick, smooth walls similar types of trichomes are also seen along the margin of the rachilla. The trichomes are thick walled and lignified. Long, narrow, thick walled pointed fibres are abundant in the powder. They have thick lignified walls and narrow lumen. Brachy sclereids are abundant in the powder. These sclereids are polygonal or rectangular. There are also elongated cylindrical scleroids. The scleroids have very thick lignified walls with numerous canals like simple pits. The lumen is very wide.



### Sensory evaluation:-

#### Sample-Bamboo Seed Powder

1. Odor - characteristic
2. Taste - Astringent.
3. Color - brown
4. Touch/external surface –hard & rough.

#### Table no 7.-Organoleptic evaluation of Vanshayava:

Sr. No.	Test	Observation
1	Color	Yellowish Brown
2	Odour	Odourless
3	Taste	Not Specific
4	Touch	Hard, rough

**Table no 8.-Phytochemical Study**

Sr No	Tests	Water	Alcohol
1.	Alkaloid	Negative	Negative
2.	Glycoside Cardiac Glycosides Anthraquinone Glycosides Saponin Glycosides	Negative Negative Positive	Positive Negative Negative
3.	Steroids	Negative	Negative
4.	Tannins	Positive	Negative
5.	Proteins	Negative	Negative
6.	Carbohydrates	Positive	Positive
7.	Flavonoids	Positive	Negative

**8. Crude Fat**

The Bambusa Arundinacea Willd seeds shows presence of 0.80 % of Crude Fat in it.

**Table no 9. Physicochemical Study Report**

Sr.no.	Parameters	Bambusa arundinacea (Retz.) Willd
1.	Moisture Content	9.037 %
2.	Total Ash Value	3.195 %
3.	Alcohol Extract Value	1.277 %
4.	Water Extract Value	3.038 %
5.	Specific Gravity	0.6196 g/cm <sup>3</sup>
6	Water Soluble Ash Value	0.563 %
7	Acid inSoluble Ash Value	1.447%
8	pH	6.10%

9	Foreign Matter	1.994 %
10	Volatile Matter	0.09%

## TLC



**Table no 10. Antioxidant study report**

Sr No	Parameter	Unit	Value
1	Antioxidant Activity (as Ascorbic Acid )	mg/100g	03.34

## DISCUSSION

### Discussion on selection of topic:

Vamsha is a main drug used in Ayurvedic treatment for many disease conditions. Almost all the parts of Vamsha are used in practice, but the study of Vamshayava and its use in clinical practice is very less. To study its properties and uses becomes essential. So that it can be used in medicines or as constituent of diet.

Phytochemical and Physicochemical studies show acid insoluble ash values were 1.944%. It is done to rule out the presence of excess / foreign particles (i.e. other than drug part) i.e. sand or silica etc. which may not be absorbed in acid media in the body and may give rise to complications.

Alcohol and water soluble extracts in that water yield is maximum in Vamshayava. The alcohol extract value is 1.277 % and water extract value is 3.038 %. Then extraction procedure was carried out by using solvents like ethanol. The pH(5% solution) is slightly alkaline, its value is 6.10.

Qualitative analysis of the plants extracts was done by some instrumental techniques i.e. T.L.C. by this test in observation, it showed presence of various compounds that were detected by their RF values. The results of the present project are found to be very encouraging in case of Antioxidant study. The value of Antioxidant study carried out by Total antioxidant is 03.34 mg/100g as compared to antioxidant capacity of Ascorbic Acid.

As API standards are not available for Bamboo seed, the results given are of the submitted sample.

## CONCLUSION

The objective of the present study was to investigate the presence of various phytochemical in Bambusa arundinacea (Retz) Wild plant as a whole as well as study of the seeds.

This conclusion was drawn from following reports of physicochemical and phytochemical tests.

Macroscopic examination reveals that the seeds of Bambusa Arundinacea show that the yellowish brown seeds of Bambusa Arundinacea are without any specific odour.



Powder microscopy shows cork cells with silica, starch grains compactly arranged fibres and silica crystals. It also shows of Vamshayava shows portion of endosperm with starch grains with trichome and marginal trichome. The physicochemical tests performed on Vanshayava show slightly basic pH with 9.037 %water content.

Phytochemical screening shows presence of carbohydrates in both water and alcohol bases. It also shows traces of Flavonoids, tannins and some glycosides. TLC of alcohol extract shows RF values of short wave between 0.11 to 0.85 and long wave range from 0.12 to 0.51. The Antioxidant study was carried out by 'The total Antioxidant Capacity' method. The value of Vamshayava is 3.34mg/100g as compared to Ascorbic Acid.

From the above we can draw a conclusion that Vamshayava (bamboo seeds) are yellowish brown seeds with slightly basic pH and 9.037 water content. As per its TLC reports the market sample is pure enough to consume. After studying its antioxidant properties we draw a conclusion that since Vamshayava is natural antioxidant it causes no harm to the body organs even after consumption. It can be considered as an appropriate content for healthy diet and can be consumed to maintain healthy life.

## REFERENCES

- [1] Acharya Charak, Dr. Brahmanand Tripathi, Charak Samhita, Sutrasthan, Arthedashamahamuliya Adhyay , shlok no.26 ,Varanasi, Chaukhamba Surbharti Prakashan,2005,Pg no 565.
- [2] Maharshi Sushrata, Kaviraj Ambikadatta Shastri, Shruta Samhita, Dravyavisheshvidnyaniya Adhyaya, Shloka no 9, Varanasi, Chaukhamba Sanskrit Sansthan,2010, Pg no.199
- [3] Acharya Charak, Dr. Brahmanand Tripathi, Charak Samhita, Sutrasthan, Tistraishaniya Adhyay, shlok no.35, Varanasi, Chaukhamba Surbharti Prakashan, 2005,Pg no.238.

- [4] Sangeetha R, Diea YKT, Chaitra C, Malvi PG and Shinomol GK, The Amazing Bamboo: A Review on its Medicinal and Pharmacological Potential (Review Article), Department of Biotechnology, Dayananda Sagar College of Engineering, (Affiliated to Visvesvaraya Technological University, Belgaum), Bangalore -560078. Volume 2, Issue 1 - 2015 © Shinomol GK 2015, [www.opensciencepublications.com](http://www.opensciencepublications.com)
- [5] Jimmy DO, Priyanka P (2015) Antihypertensive Activity Of Bamboo Shoot: A Review. Asian Journal of Pharmacological And Clinical Research 8: 46-47.
- [6]. Government of India, Ministry of Health And Family Welfare, Department of AYUSH, The Ayurvedic Pharmacopeia of India, First Edition ,Volume - VI, Part - I, Delhi, The Controller of Publication Civil Lines, 2004, Pg no 242-249
- [7]. Government of India, Ministry of Health And Family Welfare, Department of AYUSH, The Ayurvedic Pharmacopeia of India, First Edition ,Volume - VI, Part - I, Delhi, The Controller of Publication Civil Lines, 2004, Pg no 251,291
- [8]. Government of India, Ministry of Health And Family Welfare, Department of AYUSH, The Ayurvedic Pharmacopeia of India, First Edition ,Volume - IV, Part - I, Delhi, The Controller of Publication Civil Lines, 2004, Pg no 155-165.
- [9]. Government of India, Ministry of Health And Family Welfare, Department of AYUSH, The Ayurvedic Pharmacopeia of India, First Edition ,Volume - IV, Part - I, Delhi, The Controller of Publication Civil Lines, 2004, Pg no 177.
- [10]. Vinod D. Rangari , Pharmacognosy And Phytochemistry, Third Edition( January 2012), Nashik, Career Publication, 2012, Pg no-66-76.
- [11]. Aparadh V. T., Naik V. V., Karadge B.A., Antioxidative properties (tpc, dpph, frap, metal chelating ability, reducing power and tac) within some cleome species, Annali di botanica ann. bot. (roma), 07 May 2012, 49-56, <http://annalidibotanica.uniroma1.it>
- [12] Bhavmishra, Dr K.C.Chunekar, Bhavprakash Nighantu, Guduchadi Varga, shlok no.156, Varanasi, Chaukhamba Bharati Academy, 2015, pg no.362.

[13]. Bhavmishra, Dr K.C.Chunekar, Bhavprakash Nighantu, Dhanyadi Varga, shlok no.82, Varanasi, Chaukhamba Bharati Academy, 2015, pg no.646.

[14]. Acharya Charak, Dr. Brahmanand Tripathi, Charak Samhita, Sutrasthan, Annapanvidhi Adhyay, shlok no.20, Varanasi, Chaukhamba Surbharti Prakashan, 2005,Pg no.503.

[15 ]. Acharya Charak, Dr. Brahmanand Tripathi, Charak Samhita, Chikitsasthana,Vishachikitsa Adhyay, shlok no.212, Varanasi, Chaukhamba Surbharti Prakashan, 2005,Pg no.795.

