Journal of Current Pharma Research
(An Official Publication of Human Journals)
An International Peer Reviewed Journal For Pharmacy, Medical & Biological Science
DOI: 10.25166 CODEN: JCPRD6 NLM ID: 101744065
ISSN: Print: 2230-7834 Online: 2230-7842
SJIF Impact Factor: 6.913

Human Journals
Research Article
July 2023 Vol.:18, Issue:2

Pharmacognostical Evaluation of Different Market Samples of *Varuna* (*Crataeva Nurvala*) Stem Bark

Journal of Current Pharma Research
(An Official Publication of Human Journals)
An International Peer Reviewed Journal For Pharmacy, Medical & Biological Science
DOI: 10.25166 CODEN: JCPRD6 NLM ID: 101744065

[1]Monika Barya, *[2]Harisha Chinnappa Rudrappa, [3]Rohit Johari

[1] P.G. Scholar, [2]Pharmacognosy Laboratory, [3] Associate Professor,
Post Graduate Department of Dravyaguna Vigyan, Dayanand Ayurvedic College, Jalandhar (Punjab), India.

Submitted: 03 July 2023
Accepted: 22 July 2023
Published: 25 July 2023

Keywords: *Ayurveda*, *Varuna* (*Crataeva nurvala*), stem bark, Pharmacognostical study.

ABSTRACT

Ayurveda is a healing science, more than 5000 years ago in India. It plays a great role on prevention and maintenance of health by giving attention on diet, lifestyle and the use of different herbs. In *Ayurveda*, there are many herbs for treatment of different diseases of body. *Varuna* is best among all the *dravyas* useful for kidney disorders. It is also indicated in different diseases like Urolithiasis, Diuretic, Anti-inflammatory, Anti-oxidative stress, Hypertension etc. *Varuna* is a medium-sized deciduous tree, having trifoliate leaves, greyish black bark with presence of lenticels, fruit is ovoid berries with many seeds. This plant grows all over generally grows near banks of streams or rivers and slightly moist areas. When drugs taken from markets then sometimes it is adultrated with other parts or other drugs to get profit or sometimes due to lack of quantity. **Aims and Objectives:** the present study deals with macroscopic, microscopic and histochemical study of different market samples of *Varuna twak* (stem bark of *Crataeva nurvala*). **Material and Methods:** in this involves market sample stem bark section for microscopical and histochemical evaluation. **Result:** Diagnoses of different market samples having rhomboidal crystals different type of stone cells, fibers and brown contentin different samples. **Conclusion:** The generated information will be helpful to observe the differences in four market samples of different regions and rule out the best among them.

INTRODUCTION

Ayurveda is the Indian traditional system of medicine. It is called as **"healing science"** as it plays a great role in prevention and maintenance of health. There are many herbs in *Ayurveda* which we are using to treat different diseases. In *Ayurveda*, not only treat disease but remove the disorder from their root cause. Thousands of herbs have been used in *Ayurveda* based on an active ingredient derived from different parts of plants like bark, roots, leaves and flowers. *Varuna* is the herb mentioned in our classical text books by different *Acharyas*. This plant has various synonyms in *Ayurveda* like *trinpatra, bilvapatra, Ashmarighna, Swetadruma, Shakadruma, Gandhavriksha, Setuvriksha, Sadhuvriksha,Tiktashaka, Swetapushpa, Chalapaha*[1,2]. This plant has *Asmari bedana, Krimi nashaka, Mutrotsarga, Agni deepana, Pittajanaka and Medohara karmas* given in *nighantus*. The bark of the tree is an important drug part useful for problems affecting the urinary system. Different phytoconstituent present in bark like Lupeol, Quercetin, Catechin, Kaempferol, β –sitosterol etc[3]. These phytoconstituents helps in various pharmacological activities in-vivo, and in-vitro as well as clinical point of view like antihepatotoxicity, antitumor, anti-inflammatory, diuretic, antimicrobial, antiarthritic, antihyperglycemic, antioxidant, cytotoxic, hypertension, antiedemic, and antiperoxidant activities. Different formulations of *Varuna* plant is used in classical text like *Varunadi kwatha, Brihat Varunadi kwatha, Varunadi kashaya, Varunadi gana* and *Varunadya loha.*

Material and Methodology

Collection of raw drugs:

Varuna (*Crataeva nurvala*) stem bark samples were collected from four geographical zones of the country i.e., North India, South India, East India, and West India.

Table No. 1-: Collection of different market samples of *Varuna* (*Crataeva nurvala*) stem bark

S.No	Samples Code	Geographical zones	City	Material amount
1.	Sample 1 (VMS)	West region	Mumbai	1kg
2.	Sample 2 (VBS)	South region	Bangaluru	1kg
3.	Sample 3 (VKS)	East region	Kolkata	1kg
4.	Sample 4 (VAS)	North region	Amritsar	1kg

VMS- *Varuna* Mumbai Sample **VBS-** *Varuna* Bangalore Sample

VKS- *Varuna* Kolkata Sample **VAS-** *Varuna* Amritsar Sample

	
VMS (Sample 1)	**VBS (Sample 2)**
	
VKS (Sample 3)	**VAS (Sample 4)**

Figure-1: Measuring of four different market samples

Identification and Authentication of Varuna (Crataeva nurvala):

Varuna (Crataeva nurvala) was authenticated in the Pharmacognosy Laboratory, Institute for Teaching and Research in Ayurveda, Jamnagar.

Pharmacognostical analysis:

Macroscopic & Microscopic Evaluation: [4,5]

Thin sections of stem bark were taken and treated with phloroglucinol, hydrochloric acid, and iodine for identification of various contents. The micro photographs were taken under Carl Zeiss Trinocular microscope attached to the camera. Powder microscopy of samples were carried out with stain and without stain and photomicrograph were also taken.

Organoleptic characters of the powder [6]

Organoleptic characters, i.e. colour, odour, taste and texture were recorded. Microscopic studies of the raw powder with and without stain to find out the lignified materials along with other cellular constituents were done and photomicrographs were taken.

Histochemical evaluation: [7]

To detect various constituents of raw drug, sections of stem bark were treated with various reagents such as $Fecl_3$ solution for tannin cells, iodine for starch grains, Sudan III for Oil globule and Phloroglucinol + Conc. HCl for Ca Ox - crystals etc.

Observation and result:

Identification & Authentication

Raw drug samples Stem barks collected from Mumbai, Bangalore, kolkata and Amritsar. Pharmacognostical Raw drug authentification was done in the pharmacognosy lab. ITRA. Gujarat Ayurved University, Jamnagar. Voucher specimen No. ITRA. Phm. / 6374 /6372/ 6375 /6373 / 2022-23, respectively.

Pharmacognostical study-:Morphology

Table No. 2: Morphological Characteristics of four market samples of *Varuna twak* (stem bark of *Crataeva nurvala*)

S.No.	Characteristics	Sample 1 (VMS)	Sample 2 (VBS)	Sample 3 (VKS)	Sample 4 (VAS)
1.	Thickness	2-2.5 cm.	1-1.5 cm	0.5-1cm	1-1.5 cm
2.	Colour	Greyish brown in colour	greyish to Greyish brown in colour	greyish to slate grey	greyish to Greyish brown in colour

3.	**Surface**	Shows small rounded slightly raised lenticels and a number of very shallow fissures.	shows several small rounded to oblong slightly raised lenticels and a number of very shallow fissures.	smooth soft separable thin skin with some white patches without any lenticels	several small rounded to oblong slightly raised lenticels and a number of very shallow fissures
4.	**The outermost part of the bark**	A thin brittle, not easily separable from the rest of the bark	thin brittle, easily separable from the rest of the bark		Thin brittle, easily separable from the rest of the bark
5.	**Innermost bark**	mostly cells with pores	leathery and can be peeled off	inner tissue is light brown colour and minutely granular structure, Fracture short fibers	leathery and can be peeled off
6.	**Inner surface**	smooth and cream in colour	smooth and cream white in colour		smooth and cream white in colour

Microphotographs of Sample 1 (VMS)

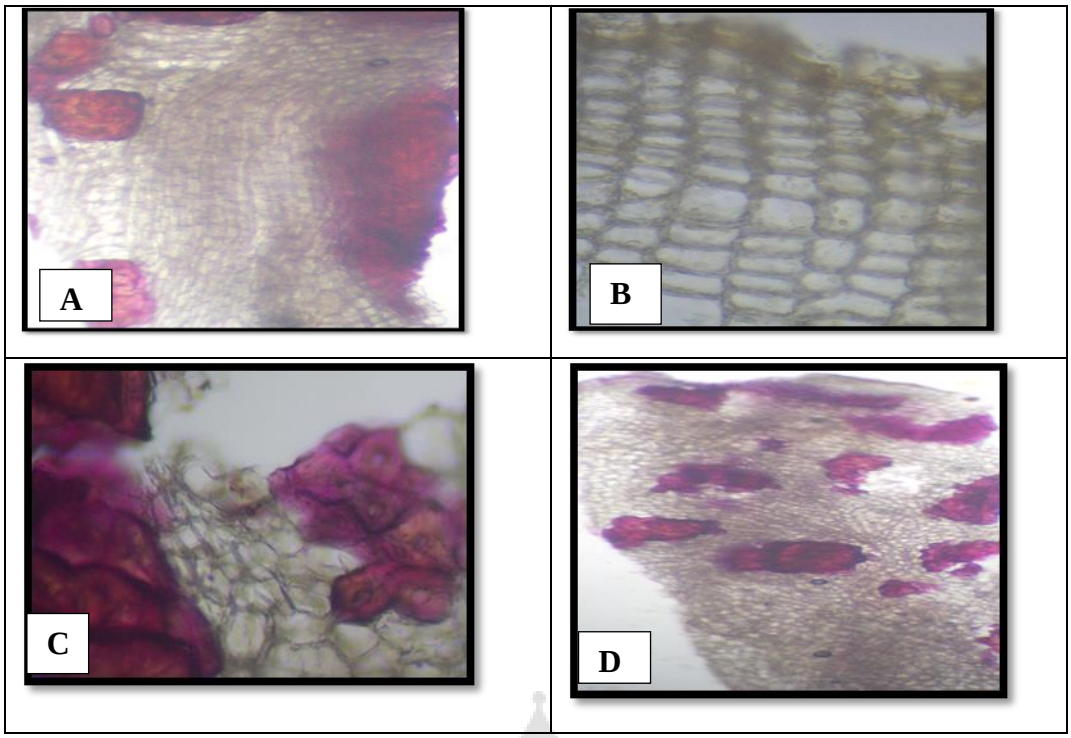

Figure-2: A-T.S. with abundant Group of stone cells, **B**- T.S. with Multilayered cork, **C**-T.S. with angular & irregularly shaped stone cells, **D**-Stained T.S. with cork and cortex

Powder Microscopic characters of Sample 1 (VMS)

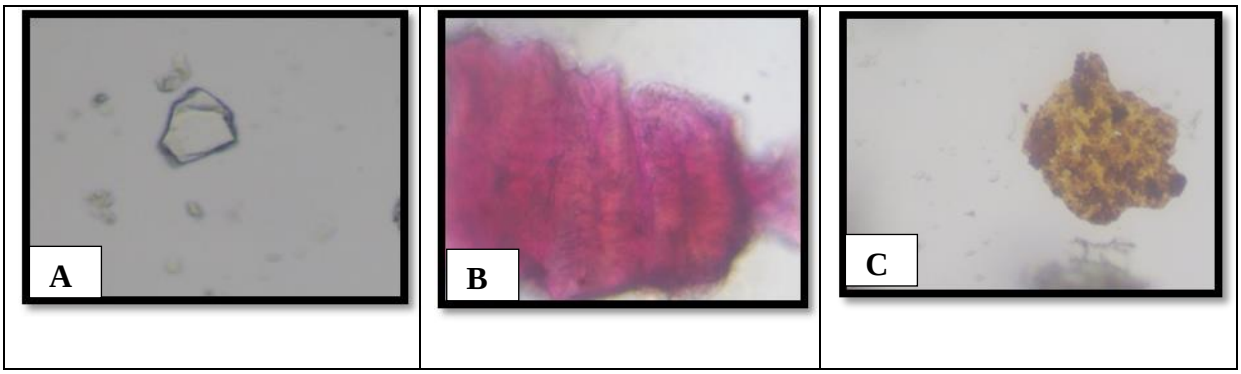

Figure-3 : A-Prismatic crystal, **B**-Uneven shaped stone cells , **C**-Brown contEnt

Microphotographs of Sample 2 (VBS)

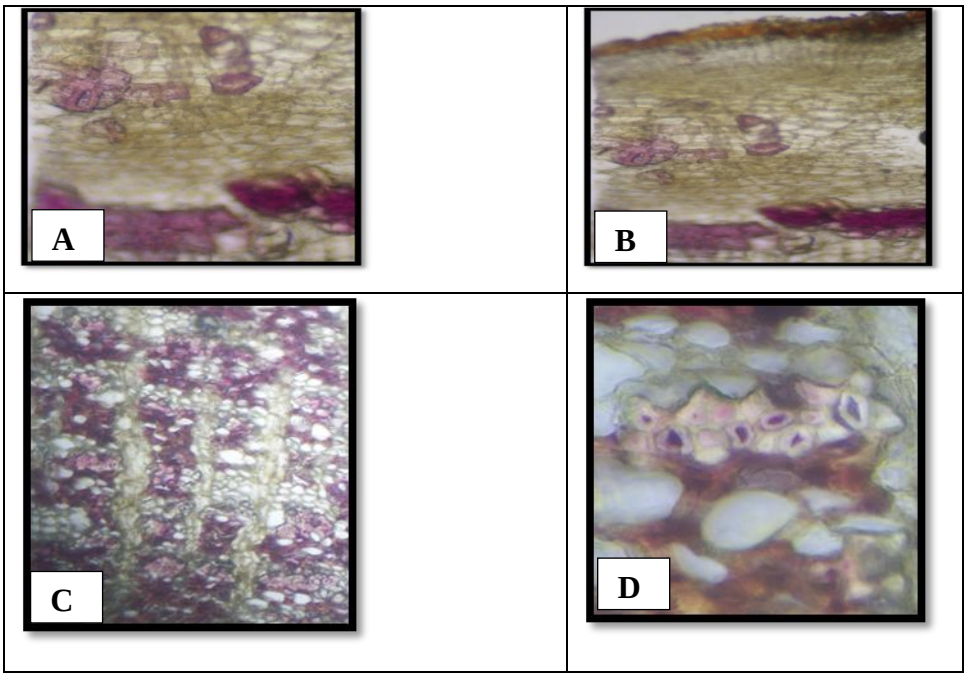

Figure-4 : A-Cortical region with pitted and agulared stone cells, **B**-Cork cells with brown contant with lignified elements , **C**-T.S. with 2-3 serriate medullary rays, **D**-T.S. Secondary phloem and pericyclic fibres

Powder Microscopic characters of Sample 2 (VBS)

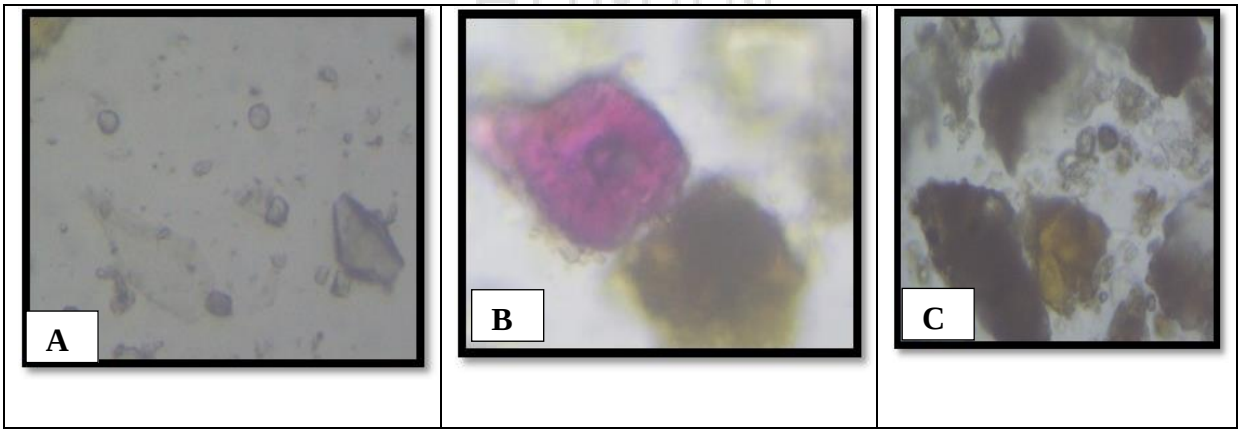

Figure-5 : A-Rhomboidal crystal, **B**-Pitted stone cells , **C**-Brown content

Microphotographs of Sample 3 (VKS)

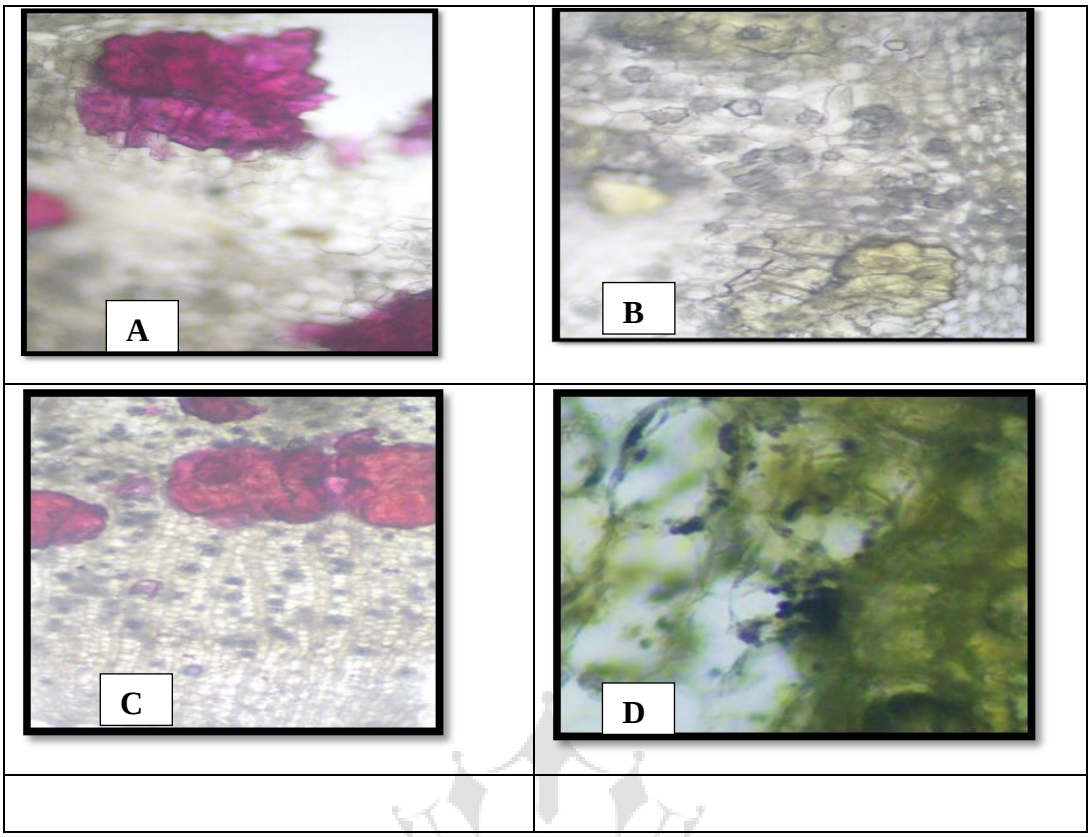

Figure-6 : A-Large group of lignifed stone cells in cortex, **B**-T.S. with Rosette and cluster crystals, **C**-T.S. with stone cells uniseriate medullary rays, **D**-Iodine stained T.S. with starch grains

Powder microscopic characters of Sample 3 (VKS)

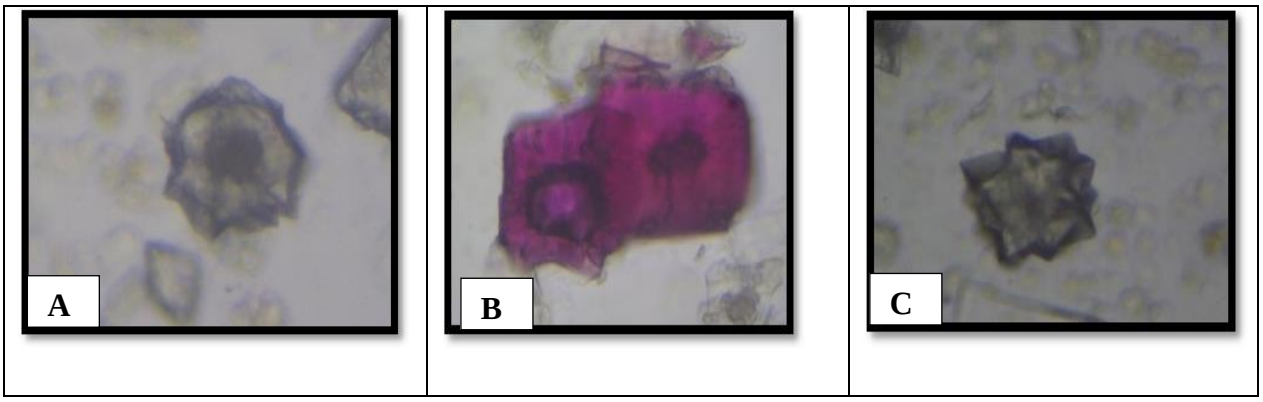

Figure-7 : A-Rosette crystal, **B**-Rounded stone cells , **C**-Cluster crystal

AMRITSAR SAMPLE

Microphotographs of Sample 4 (VAS)

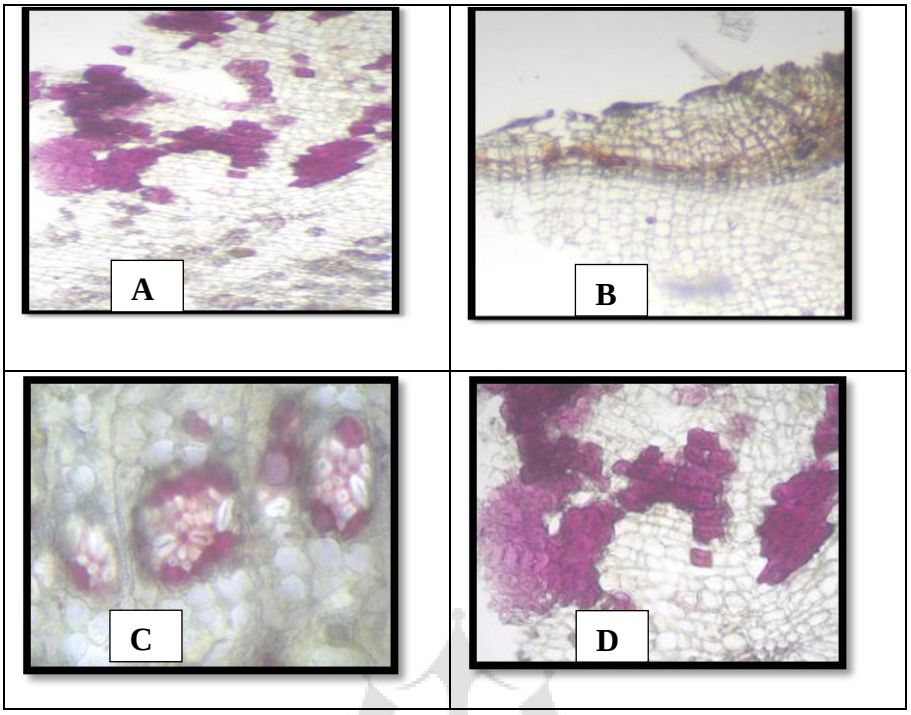

Figure-8: A-T.S. with stone cells layer and secondary components, **B**-T.S. with outer and inner cork with brown content, **C**-Lignified pericyclic fibres & Uni to Tri serrate medullary rays, **D**-T.S. with Group of stone cells

Powder Microscopic characters of Sample 4 (VAS)

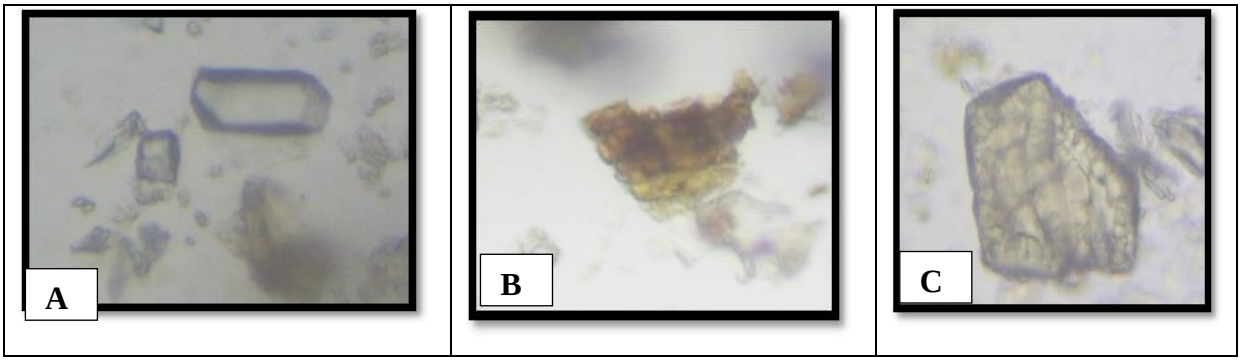

Figure-9: A-Rhomboidal crystal, **B**-Cork with brown content, **C**-Pitted stone cells

MICROSCOPIC CHARACTERISTICS OF POWDER DRUG:-

Table No.-3: Organoleptic characters of powder microscopy

Characters	**Observation of VMS**	**Observation of VBS**	**Observation of VKS**	**Observation of VAS**
Colour	Creamish grey	Whitish cream	Creamish brown	Creamish yellow
Odour	characteristic	Woody smell	Slightly irritant	Characteristic
Taste	Astringent	Astringent bitter end with Ajmoda taste	Slightly bitter	Astringent slightly bitter
Touch	Fine coarse	Fine coarse	Fine coarse	Fine coarse

Table No.-4: Comparative Microscopic characters

S.No	**Characteristics**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**
1.	Rhomboidal crystals	+	+++	--	+++
2.	Stone cells	+++	++	++	+++
3.	Brown content	++	++	++	++
4.	Prismatic crystals	-	--	+	--
5.	Rosette crystals	--	--	+++	--
6.	Cluster crystals	--	--	+++	--
7.	Starch grains	+++	+	++	++
8.	Crystal fibers	+	+++	--	++
9.	Cork cells with brown content	+	+++	--	++
10.	Lignified cork	--	--	++	--
11.	Simple fibers	++	++	++	++

Table No.-5: Histochemical Evaluation

S. No	Reagent	Observation	Characteristics	Sample 1	Sample 2	Sample 3	Sample 4
1.	Phloroglucinol +Conc. HCl	Red	Lignified cells	++	++	++	++
2.	Iodine	Blue	Starch grains	++	++	++	++
3.	Phloroglucinol +Conc. HCl	Dissolved	Ca Ox - crystals	+	++	++	+++
4.	$Fecl_3$ solution	Dark blue	Tannin cells	--	--	--	--
6.	Sudan III	Red	Oil globule	--	++	--	++

DISCUSSION:

Market samples are collected and authenticated in ITRA, Jamnagar. Among four samples, three samples are identified as *Varuna* and one sample unidentified as *Varuna*. Market samples of *Varuna* (Crataeva nurvala) showed that Sample 2 (VBS), Sample 4 (VAS) and Sample 1 (VMS) samples are similar morphological observations. Whereas Sample 3 (VKS) showed distinct different characters. Raw drug sample characters mainly depends on GCP, age, region. Sample 2 (VBS) showed moderate quantity of rhomboidal crystals different type of stone cells, fibers and brown content. Whereas Sample 4 (VAS) consists abundant quantity of rhomboidal crystals different type of stone cells, fibers and brown content. As compare to the Sample 2 (VBS) slightly similar characters are notified. Whereas Sample 1 (VMS) consists very less quantity of rhomboidal crystals different type of stone cells, brown content and large amount of fibers as compare to the Sample 4 (VAS) and Sample 2 (VBS), the bark sample may be collected from trunk of the tree, so hard, thick and pores in structure. The unidentified Sample 3 (VKS)consists abundant quantity of rosette, cluster and prismatic crystals different type of stone cells, brown content and large amount of fibers as compare to the Sample 4 (VAS) , Sample 1 (VMS) and Sample 2 (VBS). The bark sample smooth in outer surface, thin and hard in structure morphologically entirely different from other samples.

Cork multilayered with outer and inner cork in Sample 4 (VAS) and Sample 2 (VBS) and Sample 3 (VKS) consists brown content. Whereas the Sample 1 (VMS) cork is devoid off

brown content. Medullary rays are Uniserriate- Triserriate in all three samples where the Sample 3 (VKS) showed uniserrriate medullary rays.

Histochemical evaluation showed that the presence of lignin, starch grains, calcium oxalate crystals in all samples. Oil globules exhibited only in the Sample 4 (VAS) and Sample 2 (VBS). Tannin is absent in all four samples.

CONCLUSION

According to macro, micro and histological Pharmacognostical evaluation of different market samples of *Varuna* (Crataeva nurvala) stem bark. Sample 4 (VAS) And Sample 2 (VBS) shows best results in Pharmacognostical study. Sample 1 (VMS) shows same result as other two but in less amount. Sample 3 (VKS) remain unidentified and has been ruled out as a spurious drug among the four samples.

REFERENCES

1. *Kaiyadeva Nighantu* edited and translated by Prof. Priyavrata Sharma and Dr. Guru Prasad Sharma,Chaukhambha orientalia.
2. *Bhavprakash Nighantu* by Bhavamisra,Commentary by Prof. K.C.Chunekar,edited by Late Dr. G.S.Pandey,Chaukhambha Bharati Academy.
3. Hegde P.L., A Harini, A Textbook of Dravyaguna Vijnana , New Delhi, Chaukhambha Publications reprint 2020.
4. Trease and Evans, Pharmacognosy, 15 th Ed., W.B. Sunders Company Ltd. 1996 p.569,570.
5. Wallis TE, Textbook of Pharmacognosy, 5 th Ed., New Delhi: CBS Publishers & Distributors2002 p. 123-132, 210-215.
6. Anonymous, the Ayurvedic Pharmacopoeia of India, Part-II, Vol. 1, Appendix 3. Govt. of India, Ministry of Health & Dept. of ISM and H. New Delhi; Dept. Of AYUSH; 2007; 190-203.
7. Jesse W, Li H, VaderasJC. Drug discovery from natural products: End of an era or an endless frontier. Science2009;325:161-5.