



The Effect Of Bhavna And Application Of Panchabhautik Effect On *Triphaladi Yoga*

*Shashi Prakash Gupta*¹, *Manjusha R.*², *C.R. Harisha*³, *Shukla V.J.*⁴

1.M.S. Scholar, Department of Shalaky Tantra,

2.Professor and Head, Department of Shalaky Tantra,

3.Professor, Department of Pharmacognosy,

4.Professor, Department of Pharmaceutical Chemistry Lab, Institute for Postgraduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India.

Corresponding author:

Shashi Prakash Gupta

M.S. Scholar, Department of Shalaky Tantra

IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India.

E.Mail: shashiprakash.5887@gmail.com

ABSTRACT

Triphalaadi yoga is a combination of eleven dried herbs i.e. *Haritaki*, *Bibhitaki*, *Amalaki*, *Yastimadhu*, *Gokshura*, *Guduchi*, *Haridra*, *Daruharidra*, *Shunthi*, *Tulsi* and *Punarnava* in powder form which is administered as a *rasayana* therapy in patients of CVS. These eleven drugs chosen for this study is an *Anubhoota yoga* from the *Shalaky Tantra* Department of I.P.G.T& R.A, Jamnagar and has the solid backing of previous researches for their most important individual activities. The body is made up of *Panchamahabhuta* so the plants from which *Ayurvedic* drugs are extracted. In the present study author try to evaluate how the composition of *Panchamahabhuta* changes before and after the *Bhavna* of the drug with the help of the pharmacognostical parameters like acicular crystals of *Punarnava* which are rarely found after the *Bhavna* of the drug and also evaluate the differences in the pharmaceutical profile before and after *Bhavna* like loss on drying, ash value, acid insoluble ash, water soluble extract, methanol soluble extract, pH and HPTLC.

Keywords: CVS, Pharmacognosy, *Panchamahabhuta*, *Triphaladi yoga*.

INTRODUCTION

Computer has become common in today society and is causing some serious health hazards, among which Computer Vision Syndrome (CVS) is one. CVS is defined as a complex of ocular or visual problems which are experienced during and related to computer use. Computers are now an integral part of our day. This advancement of science has brought about a vast change in our lives that we wonder what life would have been without it. With all its benefits come certain health related issues, awareness of which is minimal. One of the bi-products - CVS. It is a complex of eye and vision problems related to near work which are experienced during computer use¹. The symptoms of CVS are related to *Vata-pitta pradhana Tri-dosa* vitiation at *Chakshurendriya* leading to the *Sthanasamshraya* (lodged) in *Netra* (eyes).

It includes *Dushya – Rasa, Rakta, Mamsa, Medha, Srotas – Rasavaha Srotas, Srotodruti Prakara – Sanga*². *Triphalaadi yoga* is a combination of eleven dried herbs i.e. *Haritaki*, *Bibhitaki*, *Amalaki*, *Yastimadhu*,

Gokshura, Guduchi, Haridra, Daruharidra, Shunthi, Tulsi and Punarnava in powder form which is administered as a *Rasayana* therapy in patients of CVS. *Bhavana* (trituration) is an important *Samskara* (process) mentioned in classics by which even a small dose of a drug may be made very potent to produce a very high result. *Triphaladi yoga* is a combination of above 11 dried herbs which was triturated seven times with decoction of the same compound and made into dried powder. It leads to particle size reduction of molecules by repeated movement and pressure of pestle. *Bhavana* with organic juices improves the bioavailability of the drugs thereby enhances their rate of absorption³. There is also change in the *Panchabhautik* composition of individual drugs after *Bhavna* which helps to break the etiopathogenesis of disease. *Triphaladi yoga* consist of *Rasayana* drugs which have already proven activities like adaptogenic properties of *Guduchi, Haritaki, Amalaki*⁴ anti cataract activity of *Haritaki, Amalaki, Bibhitaki (Triphala)*⁵, anti advanced glycated end products activity of *Shunti*⁶, antioxidants activity of *Haridra, Amalaki, Yashtimadhu, Tulsi, Bibhitaki, Guduchi, Sunthi*⁷, adaptogenic, immunomodulatory and anti inflammatory properties of *Punarnava*⁸. immunomodulatory and anti inflammatory properties of *Gokshura*⁹, adaptogenic, anti inflammatory, anti cataract effect of *Haridra*¹⁰ and anti inflammatory activity of *Daruharida*¹¹.

MATERIALS AND METHODS

Collection of the drug

Ingredients of *Triphaladi* compound viz. fruits of *Haritaki (Terminalia chebula Retz)*, *Bibhitaki (Terminalia bellerica Roxb)*, *Amalaki (Embllica officinalis Gaertn)*, roots and rhizomes of *Yastimadhu (Glycyrriza glabra Linn)*, fruits of *Gokshura (Tribulus terrestris Linn)*, stem of *Guduchi (Tinospora cordifolia Meirs)*, rhizome of *Haridra (Curcuma longa Linn)*, *Daruharidra (Berberis aristata DC)*, Rhizome of *Shunthi (Zingiber officinale Rosc)*, whole plant of *Punarnava (Boerhavia diffusa Linn)* were procured from the institutional pharmacy and leaves of *Tulasi (Ocimum sanctum Linn)* were collected from local area of Jamnagar, India. (Table 1)

Their characteristics were confirmed by correlating their morphological and microscopical features with relevant literature.

Preparation of the drug

Equal quantities of the obtained fruits, stems, roots/rhizomes, leaves, whole plant were shade dried and made into fine powder separately with the help of mechanical grinder, sieved through 85# and mixed together mechanically to get homogenous mixture.

Preparation of *Triphaladi yoga* with seven *Bhavana*

The prepared powder of *Triphaladi yoga* was triturated with decoction of the same compound seven times in end runner. In each *Bhavana* sufficient amount of decoction made from *Triphaladi yoga* was added to the powder of *Triphaladi yoga* as it is very well soaked and then triturated for 6-8 hours daily till the *Bhavana*

given to the powder was completely absorbed. On completing the seventh *Bhavana*, the obtained powder was dried and filtered through 120# sieve mesh.

Pharmacognostical evaluation organoleptic evaluation

Various characters like colour, odour, taste and touch are recorded by using sensory organs¹². Powder microscopy of the finished product was done without stain and after staining with Phloroglucinol+HCl. Micro photographs were taken under Carl- Zeiss Trinocular microscope attached with camera¹³. By Powder microscopy observed the characters, determined the chemical nature of the cell wall along with the form and chemical nature of the content of the cells.

Physicochemical analysis

In physicochemical analysis loss on drying, ash value, water soluble extract, alcohol soluble extract etc. were assessed.

Preliminary tests were carried out on methanolic extract of test drugs for the presence or absence of phytoconstituents like alkaloids, tannin and phenolic compounds, flavonoids, saponin and anthraquinone glycosides¹⁴.

High performance thin layer chromatography (HPTLC)

HPTLC was performed as per the guideline provided by API. Methanolic extract of drug sample was used for the spotting. HPTLC was performed using Toluene+ Ethyl acetate+ Formic acid (6:3:1) solvent system and observed under visible light. The colour and Rf values of resolved spots were noted¹⁵.

OBSERVATION RESULTS

Pharmacognostical evaluation organoleptic evaluation

Results of various parameters such as colour, odour, taste, touch and texture of the finished products (powder) are shown in Table 2, Plate A.

Powder microscopy without Bhavana:

Scleroids of Amalaki, silica deposition of Amalaki, simple starch grains of Shunthi, fibres of Shunthi, acicular crystal of Punarnava, cork cells of Punarnava, trichome of tulsi, oil globule of Tulsi, stone cells of Daruharidra, scleroids of Daruharidra, fibres of Daruharidra, yellow content of Haridra, scalariform vessels of Haridra, border pitted vessel of Guduchi, sclerenchyma tissue of Guduchi, rhomboidal crystal of Yashtimadhu, crystal fibre of Yashtimadhu, pitted vessels of Yashtimadhu, stone cells of Haritaki, tannin content of Haritaki, trichome of Gokshura, stratified fibres of Gokshura, scleroids of Vibhataki, trachome of Vibhataki. Lignified scleroid of Vibhataki, lignified scleroid of Yashtimadhu, lignified stone cells of Gokshura, lignified crystal fibres of Yashtimadhu, lignified stratified fibres of Gokshura, lignified scleroid with cork of Guduchi. Plate B(1-30)

Powder microscopy with Seven Bhavana:

Diagnostic powder characteristics of with 7 Bhavana are disturbed scalariform vessels of Haridra, parenchyma cells of Haridra become light yellow colour, oil globule of Tulsi stretched and open, scleroids

of Daruharidra with disturbed walls, stone cells with wide lumen of Daruharidra, disturbed pitted vessels of Daruharidra, walls of stone cells of Yashtimadhu become smooth and formed the lumen, crystals are not found in the fibres of Yashtimadhu, crystals of Yashtimadhu are rarely observed, group of pitted scleroids with wide lumen of Vibhataki, smooth walled trachome of Vibhataki, pitted stone cells of Vibhataki with wide lumen and disturbed walls, rarely found acicular crystals of Punarnava, trichome of Gokshura, disturbed stratified fibres of Gokshura, starch grains of Shunthi, stone cells of Haritaki with yellow content with more constriction, disturbed sclerenchyma cells of Guduchi, disturbed cork cells of Guduchi, border pitted vessels of Guduchi completely disturbed, silica deposition of Amalaki, group of scleroids of Amalaki. Lignified stone cells of Yashtimadhu, lignified scleroids of Daruharidra, lignified stratified fibres of Gokshura, lignified scleroids of Vibhataki, lignified scleroids of Haritaki, lignified border pitted vessel of Guduchi. Plate C(1-27)

Physicochemical analysis:

Results of physicochemical analysis ie. loss on drying, ash value, water soluble extract, alcohol soluble extract, ash value etc are shown in Table 3.

High performance thin layer chromatography (HPTLC):

The colour and R_f values of resolved spots of HPTLC were noted. (Table-4) (Plate no. D)

Table 1: Ingredients of Triphaladi yoga:

Sr. No	Name of ingredients	Botanical name	Proportion
1	Haritaki	<i>Terminalia chebula</i> Retz	1part
2	Bibhitaki	<i>Terminalia belerica</i> Roxb	1part
3	Amalaki	<i>Emblica officinalis</i> Gaertn	1part
4	Yastimadhu	<i>Glycyrriza glabra</i> Linn	1part
5	Gokshura	<i>Tribulus terrestris</i> Linn	1part
6	Guduchi	<i>Tinospora cordifolia</i> Meirs	1part
7	Haridra	<i>Curcuma longa</i> Linn	1part
8	Daruharidra	<i>Berberis aristata</i> DC	1part
9	Shunthi	<i>Zingiber officinale</i> Rosc	1part
10	Punarnava	<i>Boerhavia diffusa</i> Linn	1part
11	Tulasi	<i>Ocimum sanctum</i> Linn	1part

Table 2: Organoleptic characters of Triphaladi yoga:

Sr. No	Various parameters	Results	
		<i>Triphaladi yoga</i> without seven Bhavana	<i>Triphaladi yoga</i> powder with seven Bhavana
1.	Colour	Yellowish brown	Dark greenish brown
2.	Odour	Irritative	Strong irritative
3.	Taste	Sweetish followed by astringent	Sour pungent followed by astringent sweet
4.	Touch	Fine coarse	Fine
5.	Texture	Soft	Soft

Table 3: Physico-chemical parameters:

Sr. No	Various parameters	Results	
		<i>Triphaladi yoga without seven Bhavana</i>	<i>Triphaladi yoga powder with seven Bhavana</i>
1.	pH	5.0	6.0
2.	Loss on drying	7.95%	6.8%
3.	Ash value	7.65%	4.05%
4.	Acid insoluble ash	0.4%	1%
5.	Water soluble extractive value	24.3%	21.2%
6.	Methanol soluble extractive value	21.4%	15.9%

HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC)

Table 4: R_f values obtained by HPTLC

Sample	Visualize under short UV (254 nm)		Visualize under short UV (366 nm)	
	No. of spots	Rf value	No. of spots	Rf value
<i>Triphaladi yoga powder with seven Bhavana</i>	6	0.03, 0.17, 0.23, 0.43, 0.56, 0.72	10	0.03, 0.08, 0.17, 0.23, 0.29, 0.43, 0.50, 0.56, 0.71, 0.87
<i>Triphaladi yoga without seven Bhavana</i>	9	0.03, 0.07, 0.15, 0.23, 0.31, 0.37, 0.54, 0.69, 0.77	14	0.03, 0.07, 0.15, 0.23, 0.30, 0.36, 0.39, 0.42, 0.49, 0.54, 0.69, 0.86, 0.90, 0.93

Plate A TRIPHALADI YOGA POWDER

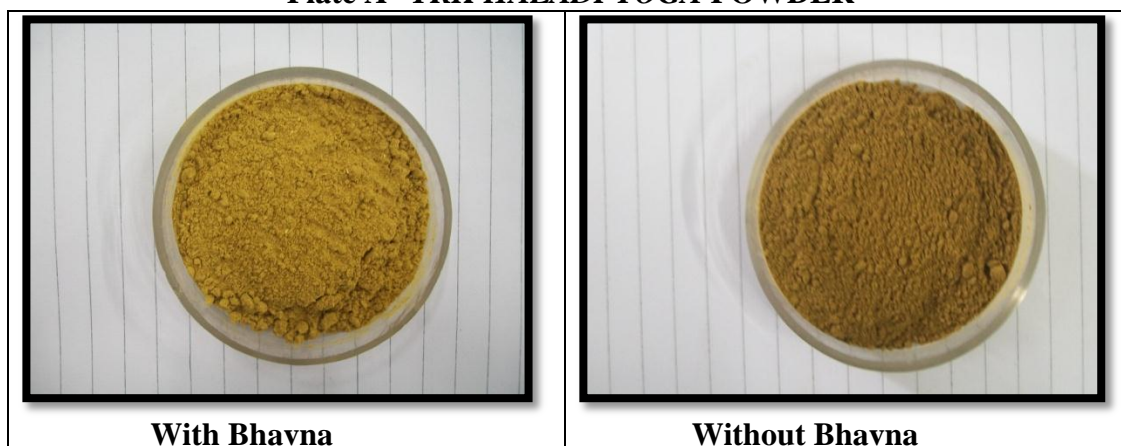
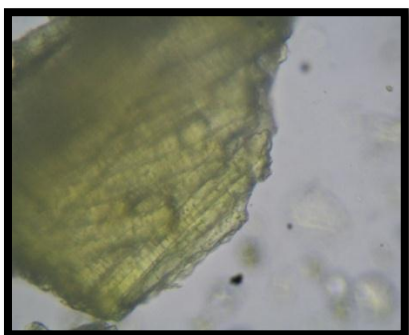
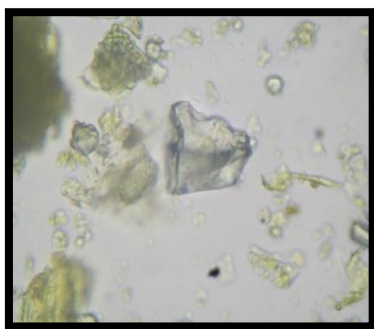


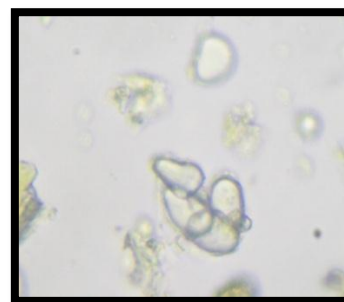
Plate B Powder characters without Bhavna:



1.Scleroids of Amalaki



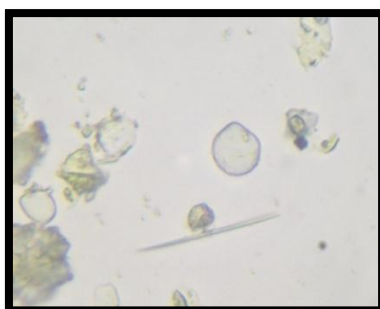
2.Silica deposition of Amalaki



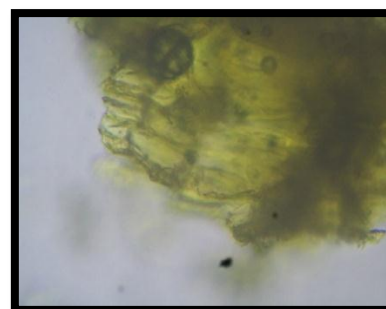
3.Simple starch grains of Shunthi



4.Fibres of Shunthi



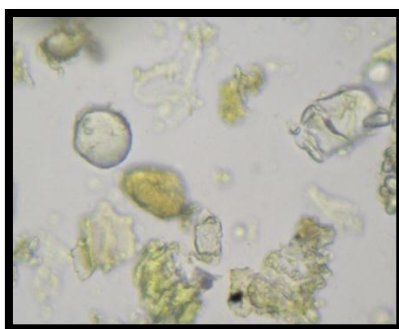
5.Acicular crystal of Punarnava



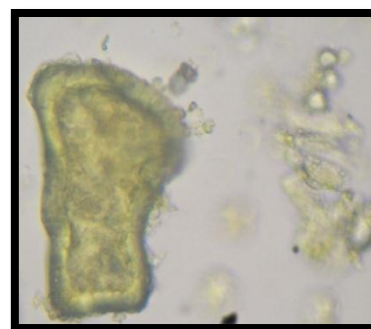
6.Cork cells of Punarnava



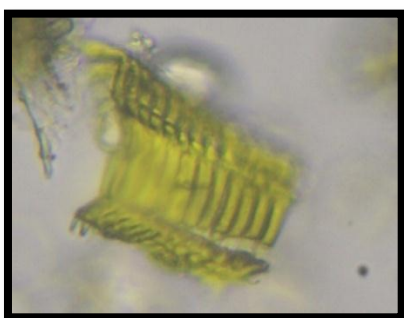
7.Trichome of Tulsi



8.Oil globule of Tulsi



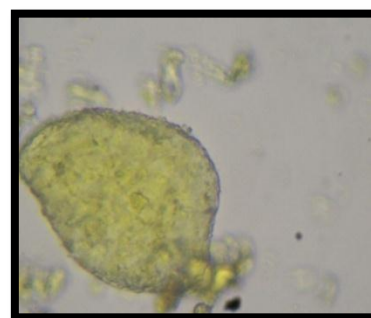
9.Stone cells of Daruharidra



10.Scalariform vessels of Haridra



11.Fibres of Daruharidra



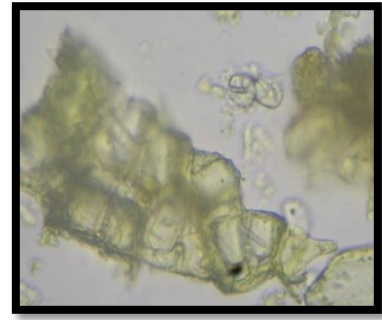
12.Yellow content of Haridra



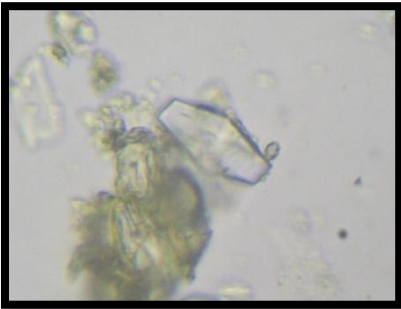
13.Scleroids of Daruharidra



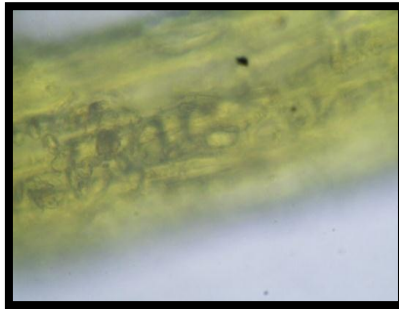
14.Border pitted vessels of Guduchi



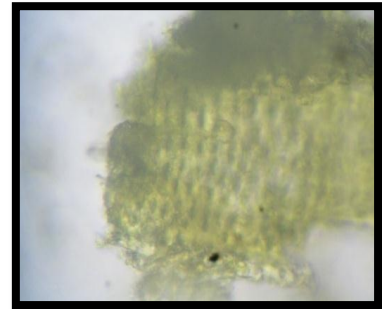
15.Sclerenchyma cells of Guduchi



16.Rhomboidal crystal of Yashtimadhu



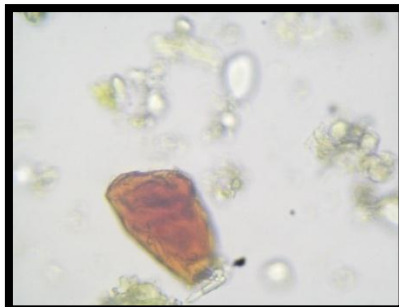
17.Crystal fibre of Yashtimadhu



18.Pitted vessels of Yashtimadhu



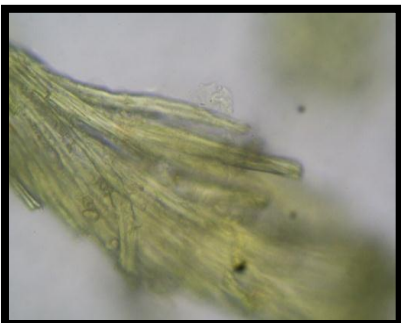
19.Stone cells of Haritaki



20.Tannin content of haritaki



21.Trichome of Gokshura



22.Stratified fibres of Gokshura



23.Scleroids of Vibhataki



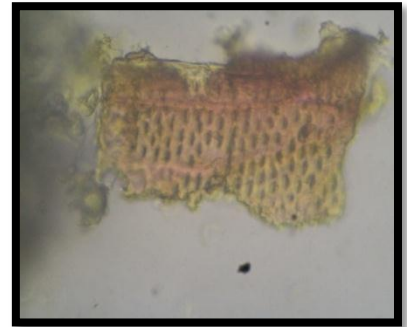
24.Trichome of Vibhataki



25.Lignified scleroid of Vibhataki



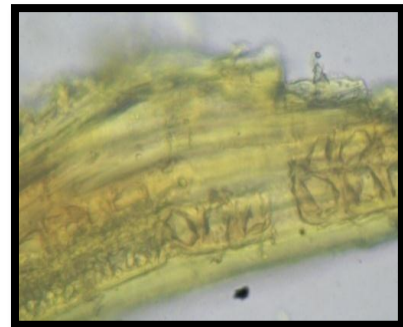
26.Lignified scleroid of Yashtimadhu



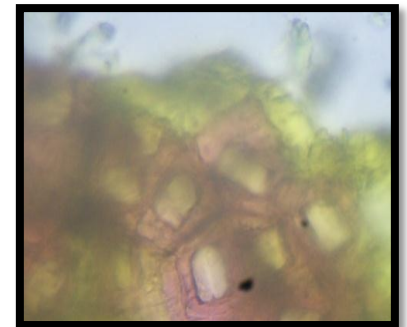
27.Lignified pitted vessels of Yashtimadhu



28.Lignified stone cells of Gokshura



29.Lignified stratified fibre of Gokshura

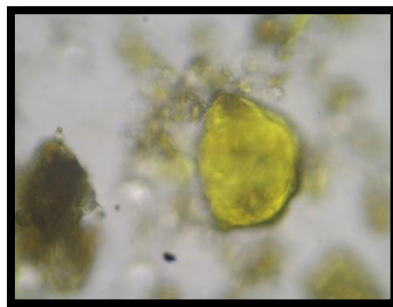


30.Lignified sclerenchyma cells of Guduchi

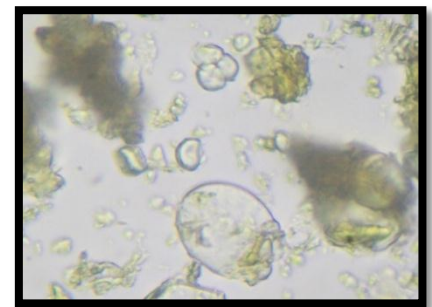
Plate C Powder characters with Bhavna:



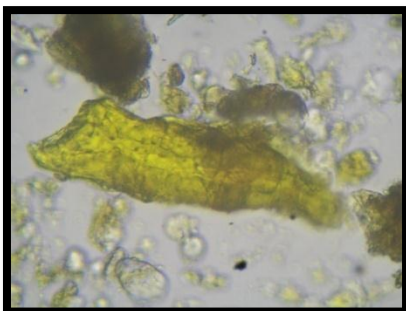
1.Disturbed scalariform vessels of Haridra



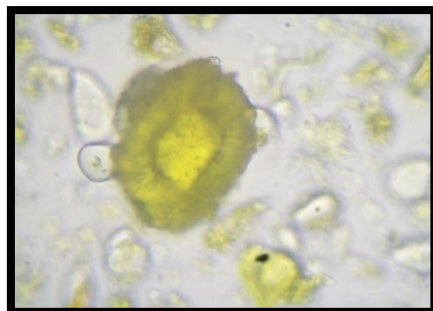
2.Parenchyma cells of Haridra become light yellow in colour



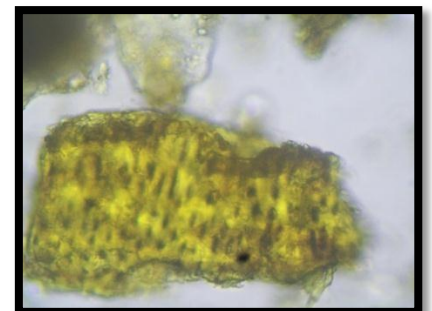
3.Oil globule of Tulsi stretched and open



4.Scleroid of Daruharidra with

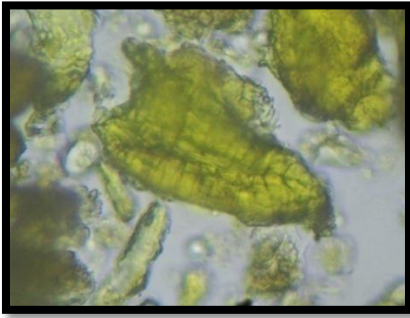


5.Stone cells with wide lumen of



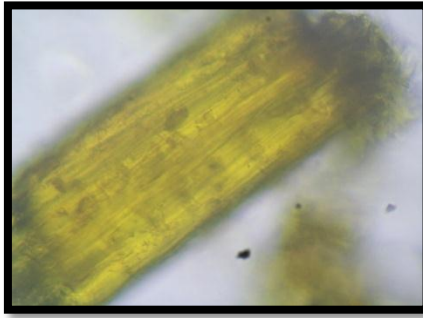
6.Dsturbed pitted vessels of

disturbed walls



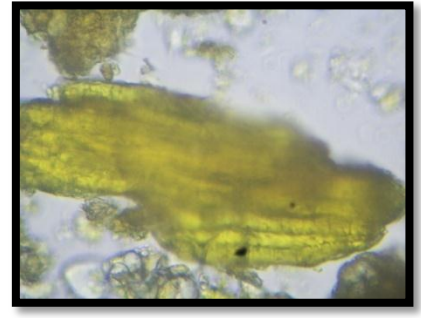
7.Stone cells of Yashtimadhu-wall become smooth and formed the lumen

Daruharidra

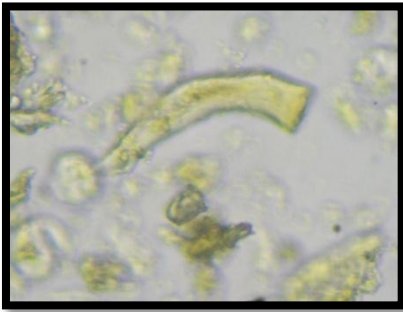


8.Crystals are not found in the fibres of Yashtimadhu

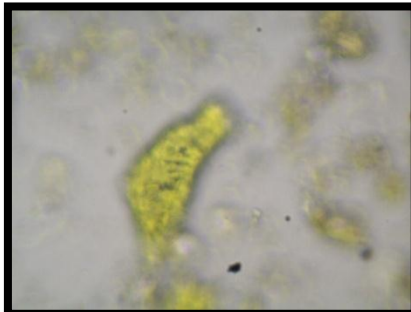
Daruharidra



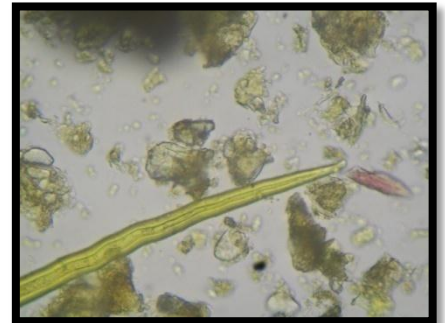
9.Group of scleroids with wide lumen of Vibhataki



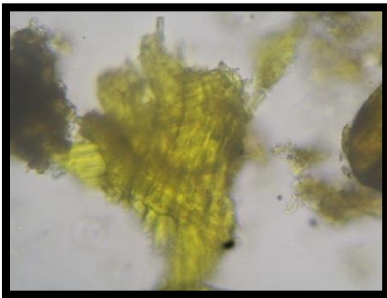
10.Smooth walled trichome of Vibhataki



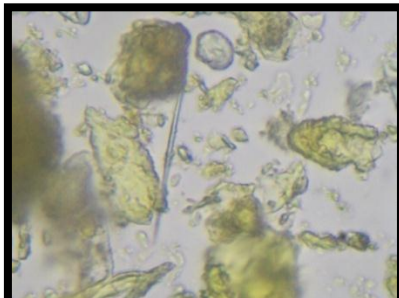
11.Pitted stone cells of Vibhataki with disturbed walls



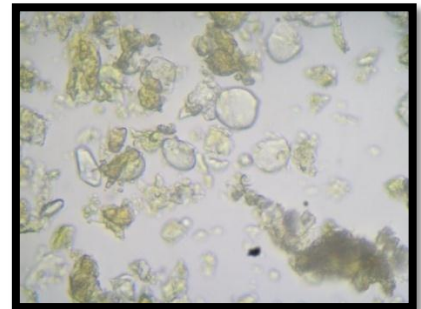
12.Trichome of Gokshura



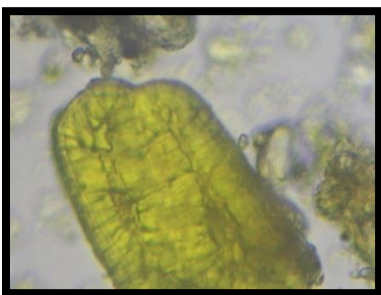
13.Disturbed stratified fibres of Gokshura



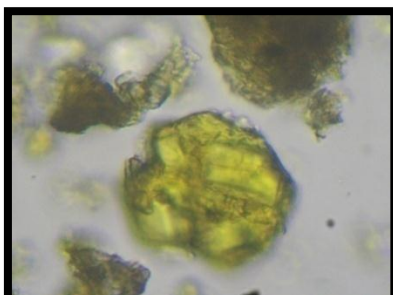
14.Rarely observed acicular crystals of Punarnava



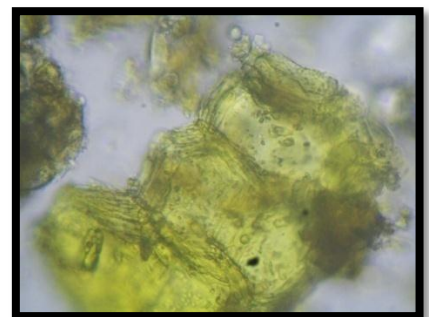
15.Starch grains of Shunthi



16.Stone cells of Haritaki with yellow content with more



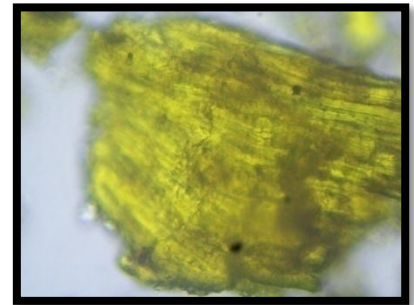
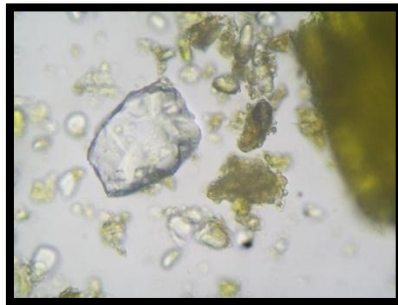
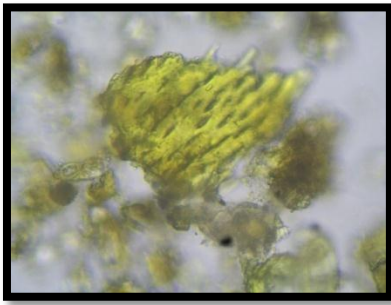
17.Disturbed sclerenchyma cells of Guduchi



18.Disturbed cork cells of

constriction

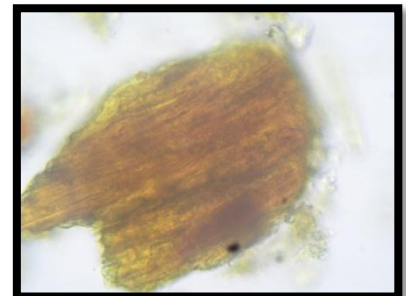
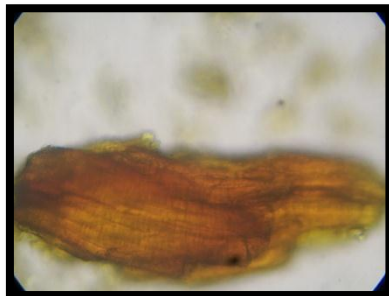
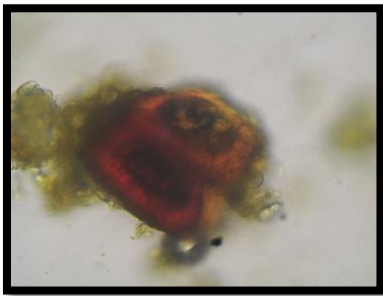
Guduchi



19.Border pitted vessels of Guduchi completely disturbed

20.Silica deposition of Amalaki

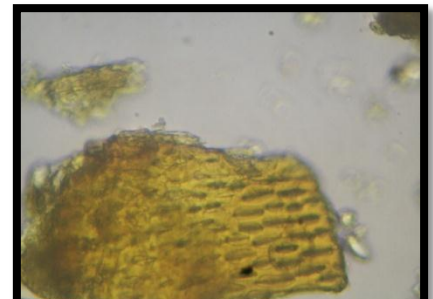
21.Group of scleroids of Amalaki



22.Lignified stone cells of Yashtimadhu

23.Lignified scleroids of Daruharidra

24.Lignified stratified fibres of Gokshura

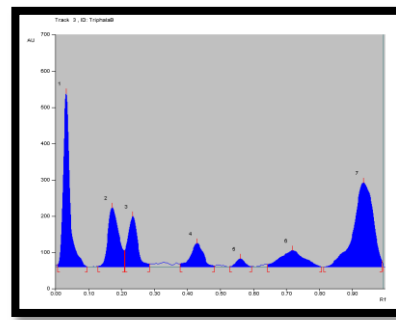
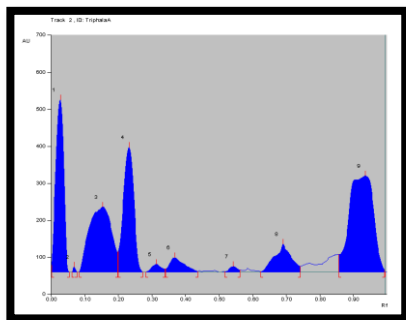


25.Lignified scleroids of Vibhataki

26.Lignified scleroids of Haritaki

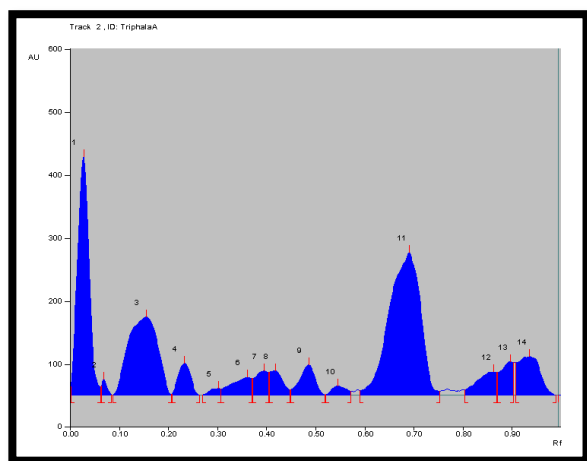
27.Lignified border pitted vessel of Guduchi

Plate D HPTLC of methanolic extract of *Triphaladi yoga* compound

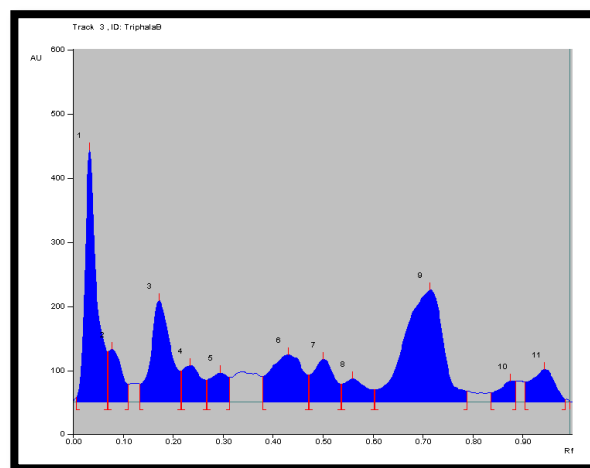


Densitogram at 254nm without bhavna

Densitogram at 254nm with bhavna



Densitogram at 366nm without bhavna



Densitogram at 366nm with bhavna

DISCUSSION:

There was a slight color and taste variation between *Triphaladi yoga* without *Bhavana* and with *Bhavana*. The colour of *Triphaladi yoga* without *Bhavana* was golden yellow while the same of *Triphaladi yoga* with seven *Bhavana* was dark greenish. The colour change owes to prolong trituration of the compound. As it is well-known that during trituration, mild heat is generated due to friction which darkens the grinding matter. *Triphaladi yoga* with seven *Bhavana* possesses *Kashaya* (astringent), *Madhura* (sweet) and *Tikta* (bitter) *Rasa* (taste). Bitter taste is increased and sweet taste is also noted in *Triphaladi yoga* with seven *Bhavana* in comparison to *Triphaladi yoga* without *Bhavana*. The alteration in *Rasa* is might be due to the effect of elimination process carried out during *Bhavana Samskara* of the drugs. The more water soluble components like that of *Yastimadhu* are increased in the compound by seven times trituration which is also responsible for the sweet taste. Touch and texture of the *Triphaladi yoga* with seven *Bhavana* are very fine and soft compared to *Triphaladi yoga* without *Bhavana* might be due to breakdown of the hard cellular structures and the exposed cellular contents by prolonged trituration of the drugs. Disturbed scalariform vessels of *Haridra*, oil globule of *Tulsi* stretched and open, scleroids of *Daruharidra* with disturbed walls, stone cells with wide lumen of *Daruharidra*, disturbed pitted vessels of *Daruharidra*, walls of stone cells of *Yashtimadhu* become smooth and formed the lumen, crystals are not found in the fibres of *Yashtimadhu*, group of pitted scleroids with wide lumen of *Vibhataki*, smooth walled trachome of *Vibhataki*, pitted stone cells of *Vibhataki* with wide lumen and disturbed walls, rarely found acinar crystals of *Punarnava*, disturbed stratified fibres of *Gokshura*, stone cells of *Haritaki* with yellow content with more constriction, disturbed sclerenchyma cells of *Guduchi*, disturbed cork cells of *Guduchi*, border pitted vessels of *Guduchi* completely disturbed, The main interaction of *Panchamahabhuta* are Pitted stone cells with wide lumen, fibers with wide lumen indicates that characters may be influenced by *Vayu* and *Akash*. The specific cells and characters were loosely arranged with the influence may be *Jala*. The clumping and dissolving nature of

acicular crystals because of addition of *Amalaki* indicating influence of *Agni* ultimately integrate the potency of the formulation¹⁶. All these changes in the powder after *Bhavna* indicate the increase of *Vayu* and *Akash Mahabhuta* in the drug, diminished crystals indicate decrease in the *Prithvi mahabhuta*, presence of fibres indicates of *Jala mahabhuta*. As we know the CVS is due to *Sanga* of *Doshas* in the *Srotas*, *Vayu*, *Akash mahabhuta* helps to remove the *Avrodha* of *Srotas* and clear the pathway for the *Dhatu* to reach their respective places. *Jala mahabhuta* increase the

Rasdhātu in the eye which is needed for proper nourishment of eye and tear secretion. Destroyed crystals help in the decrease of irritation produced in the eye.

A considerable difference was found in the values of some of the physicochemical parameters of *Triphaladi yoga* with seven *Bhavana*. There was not much difference found in the values of pH, Loss on drying and ash value. After *Bhavna*, water soluble extract and methanol soluble extract values were found to be decreased. The surface area of particles increased after tituration and molecular distribution is large after *Bhavna* and thus absorption is increased. In HPTLC profile of the methanolic extract of the drug 6 spots at Rf 0.03, 0.17, 0.23, 0.43, 0.56, 0.72 were observed in 254nm UV light spectrum while 10 spots at Rf 0.03, 0.08, 0.17, 0.23, 0.29, 0.43, 0.50, 0.56, 0.71, 0.87 were observed in 366nm UV light spectrum. The explanation behind this may be due to seven times tituration the particles become fine and distribution become large so the less number of peaks were found after *Bhavna*.

CONCLUSION:

While preparation of *Triphaladi yoga* with and without *Bhavna* pharmacognostical evaluation proved without presence of all the ingredients in *Yoga* showed that genuinity of the finished product. The physiochemical aspects of some characters show variation due to the *Bhavna* effect. The generated results will be taken into consideration for further research work.

REFERENCES:

1. www.sankarnetralaya.org/patient-care-cvc.html
2. *Sivbalaji et al: Ayurvedic Approach on Computer Vision Syndrome IAMJ: Volume 1; Issue 3; May – June 2013*
3. Madhulika Priya, Critical review on importance of bhavana in rasoushadh , IAMJ., July - August-2014; 2(4).
4. Rege NN, Thatte UM, Dahanukar SA. Adaptogenic properties of six Rasayana herbs used in Ayurvedic medicine. *Phytother Res.*, 1999; 13(4): 275-91.
5. [http://dx.doi.org/10.1002/\(SICI\)1099-1573\(199906\)13:4<275::AID-PTR510>3.3.CO;2-J](http://dx.doi.org/10.1002/(SICI)1099-1573(199906)13:4<275::AID-PTR510>3.3.CO;2-J).
6. Suresh Kumar Gupta, V. Kalaiselvan, Sushma Srivastava, Shyam S. Agrawal, Rohit Saxena. Evaluation of anticataract potential of Triphala in selenite induced cataract: In vitro and in vivo studies. *J Ayurveda Integr Med.*, 2010; 1(4): 280-286. <http://dx.doi.org/10.4103/0975-9476.74425>.
7. Megha Saraswat, Palla Suryanarayana and Geereddy Bhanuprakash Reddy. Antiglycating potential of *Zingiber officinalis* and delay of diabetic cataract in rats. *Mol Vis.*, 2010; 16: 1525-1537.
8. Devasagayam TP, Tilak JC, Bolor KK, Sane KS, Ghaskadbi SS, Lele RD. Free radicals and antioxidants in Human Health: Current status and future prospects. *J Assoc Physicians India.*, 2004; 52: 794-803.

9. 9.Agrawal B, Das S, Pandey A. *Boerhaavia diffusa* Linn.: A review on its phytochemical and pharmacological profile. Asian J Appl Sci., 2011; 4: 663-84. <http://dx.doi.org/10.3923/ajaps.2011.663.684>.
10. 10.Saurabh Chhatre, Tanuja Nesari, Gauresh Somani, Divya Kanchan, Sadhana Sathaye. Phytopharmacological overview of *Tribulus terrestris*. Pharmacogn Rev., 2014; 8(15): 45-51. <http://dx.doi.org/10.4103/0973-7847.125530>.
11. 11.Seher Cimen Ozgen, Dikmen Dokmeci, Meryem Akpolat, Cetin Hakan Karadag1, Ozgur Gunduz, Hakan Erbaş et al. The Protective Effect of Curcumin on Ionizing Radiation induced Cataractogenesis in Rats. Balkan Med J., 2012; 29: 358-63. Bharat B. Aggarwal, Sahdeo Prasad, Simone Reuter.
12. Identification of Novel Antiinflammatory Agents from Ayurvedic Medicine for Prevention of Chronic Diseases: "Reverse Pharmacology" and "Bedside to Bench" Approach. Curr Drug Targets., 2011; 12(11): 1595-1653. <http://dx.doi.org/10.2174/138945011798109464>.
13. Wallis TE. Text book of Pharmacognosy. 5th ed. New Delhi: CBS Publishers & Distributors., 2002; 123- 32: 210-5.
14. Trease GE, Evans WC. Pharmacognosy. 12th ed. Eastbourne, U.K: Bailliere Tindall., 1983; 95-99: 512-47.
15. Anonymous. The Ayurvedic Pharmacopoeia of India. part 2, vol 2, Appendices 1st ed. New Delhi: Govt. of India Publication., 2008; 233-5.
16. Gopinathan G *et al.* / Detailed Comparative Pharmacognostical Evaluation of Different Combinations Formulation of Triphala