



Pharmacognostical and Phytochemical Screening of *Punarnavadi Guggulu*

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ABSTRACT

BACKGROUND

Punarnavadi Guggulu is a combination of herbal drugs having a numerous number of references with different contents in ayurveda classics. But its qualitative data hadn't been explored thoroughly yet. It is indicated in *Twagdosha*, *Shotha*, *Udara*, *Panduroga*, *Sthaulya*, *Prasek* and *Udhwakapha Amaya*. It is also used gynecological disease, Pelvic Inflammatory Disease, Genito urinary tract infection and in disease where according to ayurveda *Pitta-Kapha Doshas* are vitiated.

AIM - To develop pharmacognostical and pharmaceutical profile of *Punarnavadi Guggulu*.

MATERIALS AND METHODS - Study included preparation of *Punarnavadi Guggulu* following all SOPs using raw drugs, which were previously authenticated. Later, *Punarnavadi Guggulu* was subjected to pharmacognostical, physicochemical and-HPTLC analysis as per standard protocols.

RESULT AND DISCUSSION - The pharmacognostical study revealed the presence of starch grains, starch cells, rhomboid crystals, tannin, lignified fibers, stone cells, epidermal cells, cork cells, border pitted vessel, Chollenchyma cell, crystalline material, etc.. Pharmaceutical analysis showed that the average weight 320.7 g, Maximum weight was 357 g, Minimum weight was 251 g, loss on drying value was 11.5% w/w, Ash value was 10.9% w/w, Acid in soluble extractive was 3.51 % w/w. Disintegration time was more than 1 hour, Water soluble extract was 30.24% w/w, Methanol soluble extract was 20.12% w/w, pH was 5. Methanolic extract of *Punarnavadi Guggulu* shows presence of carbohydrates, steroids, cardiac glycosides and alkaloids. HPTLC fingerprinting profile was revealed 9 spot in both 254 nm and 366 nm.

CONCLUSION - The present investigation will be helpful in assessing the pharmacognostical, phytochemical analysis and laying down pharmacopoeial standards for *Punarnavadi Guggulu*.

Key Words: HPTLC, Pelvic Inflammatory disease, Pharmacognostical study, Physicochemical, *Punarnavadi Guggulu*

INTRODUCTION

The science of ayurveda is based on *Tridosha Siddhanta*- three biological systems (*Tridoshas*) in a human body i.e. namely *Vata*, *Pitta*, *Kapha*. If

imbalance takes place in between or within them then manifestation of disease takes place. All gynaecological disorders are considered under *Yoni*



Vyapada in ayurveda. The illness based on the female genital tract is known by *Yoni Vyapada*.

*Punarnavadi Guggulu*¹ is referred in Bhaishajya Ratnavali in *Shothaadhikara*. It is indicated in *Twagdosha*, *Shotha*, *Udara*, *Panduroga*, *Sthaulya*, *Prasek* and *Udhwakapha Amaya*. *Paripluta Yonivyapad*² causes inflammation, tenderness and pain in genital organ, and discharge of abnormal color. Aggravated pitta associated with *Vata* reaches *Yoni* and can cause

Shopha in *Yoni*. It can be closely related with pelvic inflammatory disease. Pelvic Inflammatory Disease is a major health burden leading to such complications as chronic pelvic pain, ectopic pregnancy and infertility³.

The present communication deals with setting a standard pharmacognostical and pharmaceutical profile of *Punarnavadi Guggulu*. The properties and actions of the drugs are as shown in table 1.

Table 1 Pharmacokinetic action of the ingredients of *Punarnavadi Guggulu*

Drug	Latin Name	Part used	Ratio	Rasa	Guna	Veerya	Doshagh nata
<i>Punarnava</i>	<i>Boerhavia diffusa</i> Linn.	Whole plant	1.5 Part	<i>Katu-Tikta-Kashaya</i>	<i>Ruksha</i>	<i>Ushna</i>	<i>Kapha-Vata</i>
<i>Devadaru</i>	<i>Cedrus deodara</i> Roxb. Loud.	Stem	1.5 Part	<i>Tikta</i>	<i>Snigdha</i>	<i>Ushna</i>	<i>Kapha-Vata</i>
<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Fruit	1.5 Part	<i>Madhura, Amla, Katu, Tikta, Kashaya</i>	<i>Ruksha, Laghu</i>	<i>Ushna</i>	<i>Kapha-Vata</i>
<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd.	Stem	1.5 Part	<i>Katu, Tikta, Kashaya</i>	<i>Laghu</i>	<i>Ushna</i>	<i>Tridosha</i>
<i>Guggulu</i>	<i>Commiphora mukul</i> Engl.	Gum	6.5 Part	<i>Katu, Tikta, Kashaya</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Kapha-Vata</i>
<i>Gomutra</i>	-	-	1 litter	-	-	-	-

Most of the drugs of *Punarnavadi Guggulu* have *Katu, Tikta, Kashaya Rasa, Ushna Veerya* and *Kapha-Vata Shamaka*. Due to these properties it removes pelvic adhesion and reduces free fluid in pouch of Douglas.

MATERIALS AND METHODS

Collection and authentication of raw drugs

Punarnava, Devdaru, Haritaki, Guduchi, Guggulu were procured from the Pharmacy, Gujarat Ayurved University, Jamnagar. *Gomutra*

was collected from *Gaushala* of Jamnagar. Pharmacognostical authentication of all the raw drugs were done based on the morphological features, organoleptic characters and powder microscopy of individual drugs in the pharmacognosy laboratory of IPGT and RA, G.A.U Jamnagar. The API standards were used for authentication⁴.

Pharmacognostical analysis

Punarnavadi Guggulu was analysed pharmacognostically based on organoleptic



characters, i.e. colour, odour, taste and texture were recorded. Microscopic studies with and without stain to find out the lignified materials along with other cellular constituents was done. The micro photographs were taken under Carl Zeiss Trinocular microscope attached with camera⁵.

Pharmaceutical Analysis

Physicochemical parameters

Physicochemical study of *Punarnavadi Guggulu* was carried out by using various physicochemical parameters as mentioned in Ayurvedic Pharmacopeia of India, 2001⁶.

Qualitative tests⁷

Qualitative chemical tests were carried out for identifying various phytoconstituents present in methanolic fractions of *Punarnavadi Guggulu*.

HPTLC⁸

Instrumentation: A CAMAG HPTLC system (Muttentz, Switzerland) equipped with a sample applicator TLC auto sampler 4, twin trough plate development chamber, TLC Scanner 3, win CATS software version 1.4.4. and Hamilton (Reno, Nevada, USA) Syringe.

HPTLC method: 5µl of extract was loaded on E. Merck aluminium plate pre coated with silica gel 60 F₂₅₄ of 0.2 mm thickness and the plate was developed in Toluene: Ethyl acetate (9:1) in twin trough chamber previously saturated with solvent system. After development densitometric scan was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 and 366 nm under control of Win CATS Software (V 1.2.1. Camag) (Stahl, 1969). The plate was then dipped in sulphuric acid reagent and heated in a hot air oven at 105°C until the colour of the spots appeared and profile photo was documented under white light.

RESULTS AND DISCUSSION

Pharmacognostical

Organoleptic characters: The organoleptic characteristics were as shown in Table. 2

Microscopic characters

Powder microscopy of *Punarnavadi Guggulu* showed the striking characters of all individual 6 drugs. The data is shown in Figure 1.

Physical test of *Punarnavadi Guggulu* is given in Table 3.

Table 2 Organoleptic characters of *Punarnavadi Guggulu*

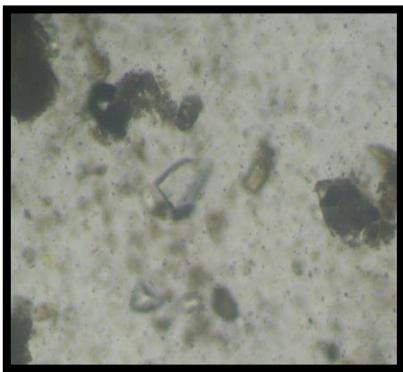
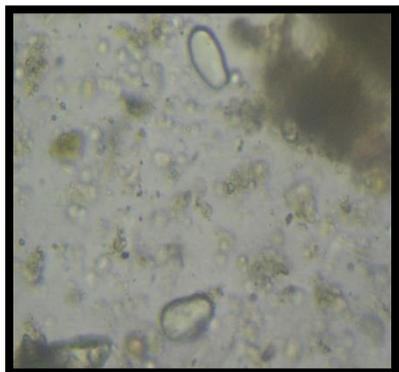
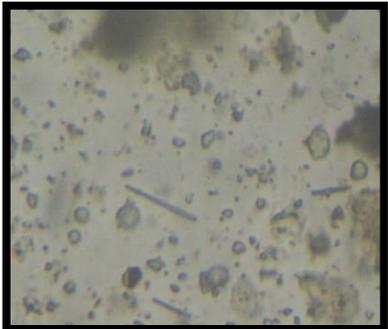
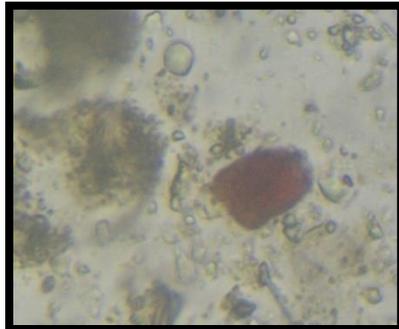
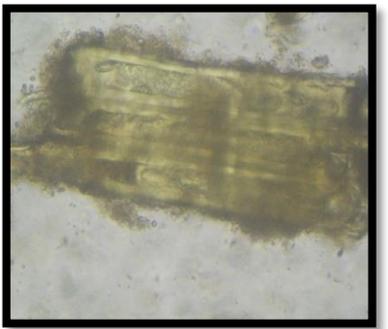
Drug name	Organoleptic characteristic			
	Colour	Odour	Taste	Touch
<i>Punarnavadi Guggulu</i>	Blackish brown	Cow's urine smell	Astringent	Hard

Table 3 Physical test of *Punarnavadi Guggulu*

Parameters	Results
Shape	Oval
Foreign matter (w/w)	NA
Maximum weight	357 mg
Minimum weight	251 mg
Average weight	320.7 mg
Tablet hardness	>5 kg/cm ²
Disintegration time	>1 hour



Physico-chemical test of *Punarnavadi Guggulu* is given in Table 4.

		
Powder of <i>Punarnavadi Guggulu</i>	Crystal and material of <i>Gomutra</i>	Starch grain of <i>Guduchi</i>
		
Acicular structure of <i>Punarnava</i>	Stone cell of <i>Devadaru</i>	Tannin content of <i>Haritaki</i>
		
Rhomboidal crystal of <i>Devadaru</i>	Steroid and stone cells of <i>Haritaki</i>	Pittet vessels of <i>Guduchi</i>
		
Fibers passing through medullary rays of <i>Devadaru</i>	Fibers of <i>Punarnava</i>	Cholenchyme muscles of <i>Guduchi</i>

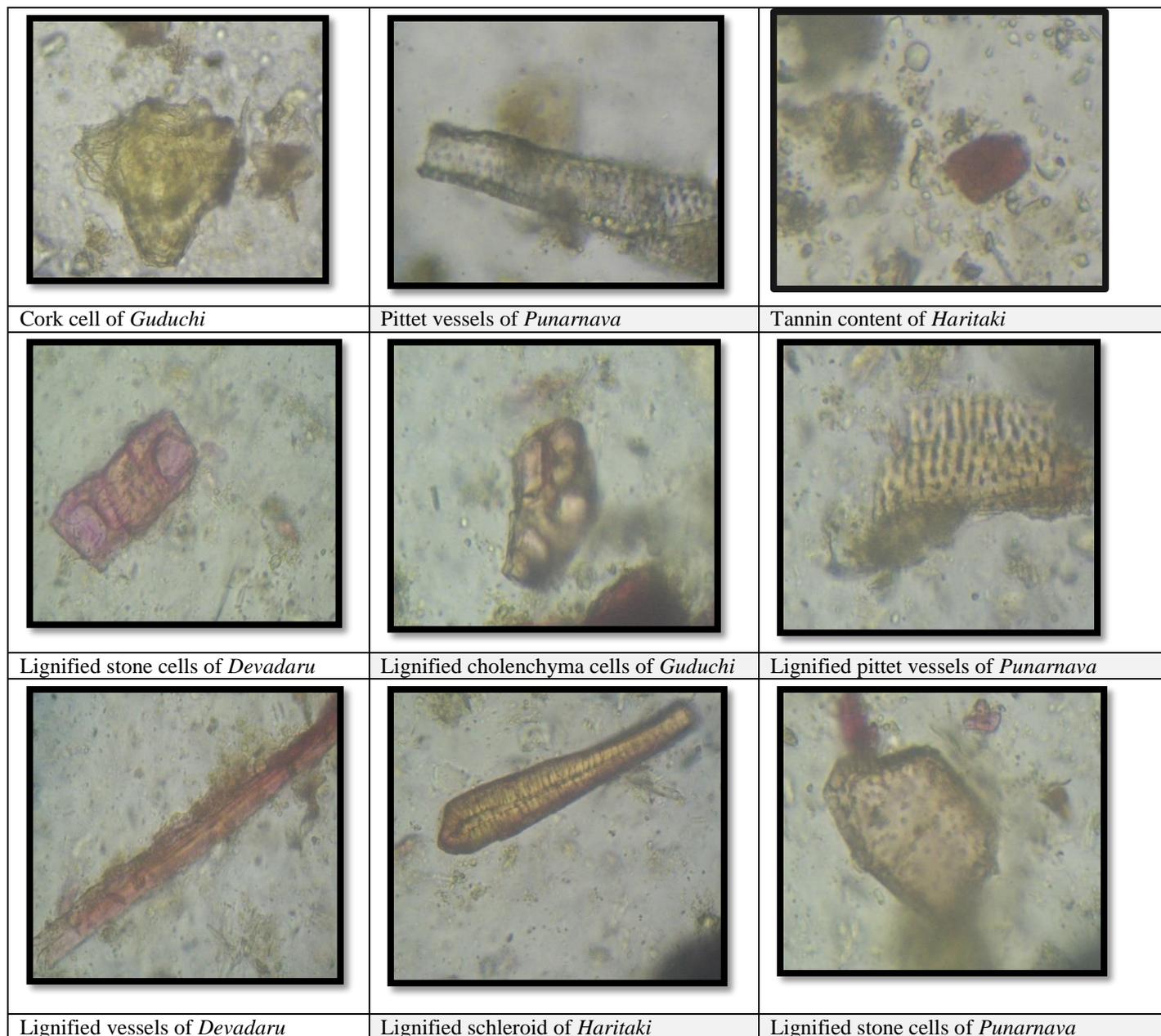


Figure 1 Pharmacognostical profile of *Punarnavadi Guggulu*

Qualitative Analysis: The results of qualitative test was performed on methanolic extract of *Punarnavadi Guggulu* was shown in Table 5.

The HPTLC profile of *Punarnavadi Guggulu* was shown in the Table 6 and Figure 2.

HPTLC Study

Table 4 Physico-chemical test of *Punarnavadi Guggulu*

Loss on Drying at 105°C (% w/w)	11.5% w/w
Ash value at 450°C (% w/w)	10.9% w/w
Acid insoluble ash	3.51 % w/w
Water extractive value (% w/w)	30.24 % w/w
Methanol extractive value (% w/w)	20.12 % w/w
pH(by pH paper)	5

Table 5 Qualitative test of *Punarnavadi Guggulu*

Sr. No.	Parameter	Test	Methanolic Extract
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1	Alkaloids	Dragendroff Test	+
2	Flavonoids	Lead Acetate Test	-
3	Phenols	Lead Acetate Test	+
4	Tannin	Lead Acetate Test	-
5	Sugar	Fehlings Test	-
6	Steroids	Salkowski Test	+
7	Saponin	Foam Test	-
8	Fats And Oils	Filter Paper Test	-
9	Cardiac Glycosides	Keller Killani Test	+
10	Protein	Biuret Test	-
11	Amino Acid	Ninhydrin Test	-
12	Carbohydrates	Molish Test	+

‘+’ shows present, ‘-’ Shows absent

Table 6 HPTLC profile of *Punarnavadi Guggulu*

Conditions	R _f values	<i>Punarnavadi Guggulu</i>
Short ultra violet (254 nm)	9	0.4,89.5,97.4,113.7,165.1,213.4,225.3, 232.6,109.3
Long ultra violet (366 nm)	9	1.8,56,19.1,7.9,1.3,0.3,8.7,24.9,20.4

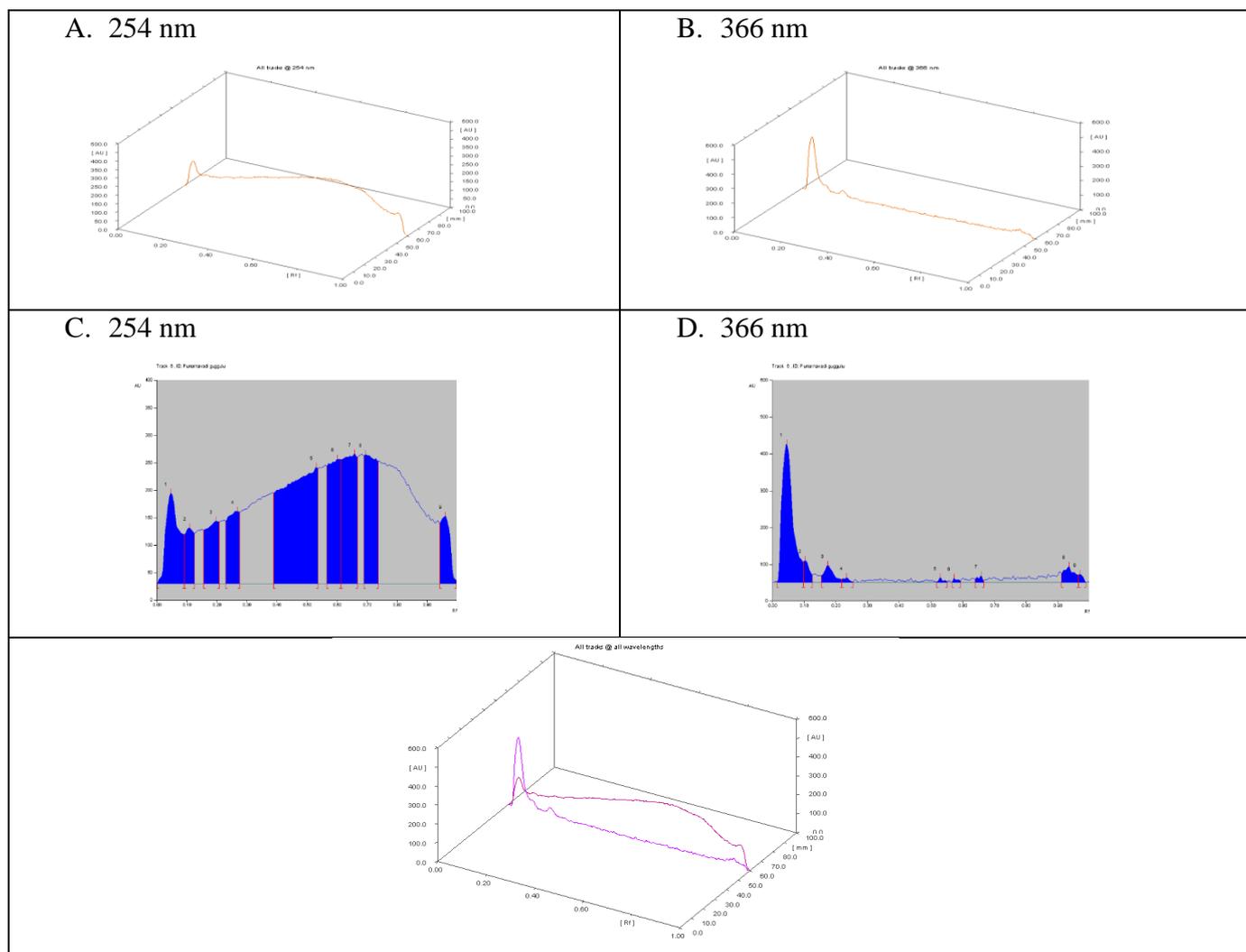


Figure 2. HPTLC plate Here, **A** represents 3D graph at 254 nm, **B** represents 3D graph at 366 nm, **C** represents peak display at 254 nm, **D** represents peak display at 366 nm, **E** represents multiple wavelength 3D graph



CONCLUSION

Ayurveda, Unani, Siddha and other traditional systems of medicine are the ancient systems of medicine and utilize numerous numbers of medicinal plants. India has one of the oldest cultural traditional uses of its herbal plants since *Vedic* period. People are using herbal based remedies which serve as an importance of therapeutic medical treatment. Pharmacognostical, phytochemical examination and biological screening of randomly collected plants have proved to be helpful in discovering the new drugs.

Pharmacognostical evaluation of *Punarnavadi Guggulu* illustrated the specific characters of ingredients which were used in the preparation. The physicochemical evaluation of *Punarnavadi Guggulu* revealed that the standard quality and purity of drug. Phytochemical studies on the extracts of *Punarnavadi Guggulu* showed presence of alkaloids, carbohydrates, steroids and cardiac glycosides. In the present work, the obtained results were found within prescribed limits. this study may be used as standard in the further quality control researches.



REFERENCES

1. Bhishak Shree Govindadas, Bhaishajya Ratnavali, Vidyotini commentary by Kaviraj Shree Ambikadatta Shashtri, Shotharoga Chikitsa 42/ 135, ed. by Shree Rajeshwar Datta Shashtri Ayurvedacharya, Chaukhambha Sanskrut Sansthana, Varanasi, 1997, p.803.
2. Tivari, P.V.2003, Ayurvediya Prasutitantra Evam Striroga, Part 2, Chaukhambha Orientalia, Varanasi p-31.
3. Ford GW, Decker CF. Pelvic inflammatory disease. Dis Mon 2016;62 (August (8)):301.
4. Anonymous, the Ayurvedic Pharmacopoeia of India, Part-I, Vol. 1-4, Govt. of India, Ministry of Health & Dept. of ISM and H. New Delhi; Dept. of AYUSH; 1999; 155-56.
5. Trease, G.E., Evans, W.C. Pharmacognosy, 12th Ed. Bailliere Tindall, Eastbourne. U.K. 1983; 95-99, 512-547.
6. Anonymous. Ayurvedic Pharmacopoeia of India, Part-I, Vol-1. New Delhi: Dept. ISM & H, Govt. of India; 2001.
7. Khandelwal KR. Practical Pharmacognosy. Nirali Prakashan, Pune, Edition. 2006; 16:149-153.
8. Kalasz, H. and Bathory, M., Present status and future perspectives of thin layer chromatography, LC-GC Int, 10: 440-445.