



## PHARMACOGNOSTICAL AND PHYSICO-CHEMICAL PROFILE OF *SHIRISHAVALEHA* GRANULES

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### ABSTRACT

**Background:** Pharmacognosy provides a full understanding of natural products from various herbal sources. Specifically, this area encompasses the study of secondary metabolites, including alkaloids, glycosides, phenolic compounds, tannins, phytosterols, and terpenoids. These compounds have potential medicinal applications for the prevention and treatment of numerous conditions and diseases. **Aim:** To evaluate pharmacognostical and physico-chemical characteristic of *Shirishavaleha* Granules. **Materials and Methods:** *Shirishavaleha* Granules consists of ten herbal components viz. *Shirisha*, *Pippali*, *Priyangu*, *Kushta*, *Ela*, *Nilini*, *Haridra*, *Daruharidra*, *Shunthi*, and *Nagakesara*. The main ingredient *Shirisha* [*Albizialebeck* Benth] is a drug having multiple actions like *Swasahara*, *Vishahara* etc. Recent

studies conducted in past reveals the Anti-allergic, Mast Cell Stabilizing and Immunomodulatory activities of the drug. These activities will be beneficial in pacifying the symptomatology of *Tamaka Shwasa*. **Results & Conclusion:** On pharmacognostical study, tannin content and combidal crystals of *Shirisha bark*, starch grains with fibers of *Shunthi*, black debris and stone cells of *Pippali*, fragment of scalaris forum vessel and parenchyma cells of *Haridra*, pitted vessel and prisamatic crystal of *Daruharidra*, pollan grains of *Nagakeshara*, epidermal cell and oil globules of *Priyangu*, pitted vessel of *Nilini*, fragmented

of border pitted vessels of *Kustha* and silica deposition of Sugarcandy were verified. HPTLC showed 5 spots at 254nm and 6 spots at 366nm.

**KEYWORDS:** *Shirishavaleha* Granules, *Shirisha*, Tannin, Sugar Candy.

## INTRODUCTION

Ayurveda, an Indian System of medicine is known for its significant contribution in maintaining the health care of human society. However, the scientific evidence to prove the rationale of using these formulations in health care is not well established. The need to explore time tested, though less-scientifically proven, Ayurvedic system of medicine in health care has been realized of late.<sup>[1]</sup> The World Health Organization estimates that about 80% of the populations living in the developing countries rely almost exclusively on traditional medicine for their primary health care needs.<sup>[2]</sup> Herbal medicines were in great demand in the developed as well as in developing countries for primary health care because of their wide biological and medicinal activities, higher safety margin, and lower costs.<sup>[3]</sup> But the most important challenges faced by these formulations arise because of their lack of complete standardization. Herbal medicines are prepared from materials of plant origin which are prone to contamination, deterioration and variation in composition. Therefore, quality control of herbal medicines offers a host of problems. Standardization and quality control have remained grey areas in the preparation of Ayurvedic medicines.

In present study *Shirishavaleha* Granules was prepared as per the reference of *Shirisharista* with modification from Bhaishjya Ratnavali. *Shirishavaleha* Granules consists of ten herbal components viz. *Shirisha*, *Pippali*, *Priyangu*, *Kushta*, *Ela*, *Nilini*, *Haridra*, *Daruharidra*, *Shunthi*, and *Nagakesara*. Though many of these drugs are non-controversial; it becomes important to evaluate their botanical identity and elimination of possible adulterants, as adulteration with substances which are similar morphologically became a routine practice in recent past *Shirisha* [*Albizia lebeck* Benth.] is a drug having multiple actions like *Swasahara*, *Vishahara* etc.<sup>[4,5]</sup> recent studies conducted in past reveals Anti-allergic, Mast Cell Stabilizing and Immuno-modulatory activities of the drug.<sup>[6,7,8]</sup> These activities are beneficial in pacifying the symptatology of *Tamaka Shwasa*. Earlier study reported the comparative efficacy of *Shirishavaleha* in *Tamaka Shwasa*.<sup>[9]</sup>

## MATERIALS AND METHODS

### Procurement of raw drugs

The raw materials viz. stem bark of *Albizia lebbbeck* Benth was freshly collected from Botanical Garden, Sasoi, GAU, Jamnagar. They were shade dried and utilized for present study. All *Prakshepa dravya* like *Pippali* (*Piper longum* Linn.), *Haridra* (*Curcuma longa* Linn.), *Priyangu* (*Callicarpa macrophylla* Vahl.), *Shunthi* (*Zingiber officinale* Roscoe.), *Kushtha* (*Saussurea lappa* C. B. Clarke), *Daruharidra* (*Berberis aristata* DC.) and *Ela* (*Elettaria cardemomum* Maton.) were procured from the Pharmacy, Gujarat Ayurved University, Jamnagar, Gujarat; where as *Nilini* (*Indigofera tinctoria* Linn.) was collected from local area of Jamnagar and *Nagakesara* (*Mesua ferrea* Linn.) from Udupi, Karnataka. The ingredients & part used in preparation of final product are listed in Table no.1

**Table 1: Ingredient of *Shirishavaleha* Granules.**

	Ingredient	Botanical Name	Part	Quantity in gram
1	<i>Shirisha</i>	<i>Albizia lebbbeck</i> Benth.	Dried Bk.	1250
2	<i>Pippali</i>	<i>Piper longum</i> Linn.	Dried Fr.	25
3	<i>Priyangu</i>	<i>Callicarpa macrophylla</i> Vahl.	Dried Fl.	25
4	<i>Kushtha</i>	<i>Saussurea lappa</i> C. B. Clarke	Dried Rt.	25
5	<i>Ela</i>	<i>Elettaria cardemomum</i> Maton.	Dried Sd.	25
6	<i>Nilini</i>	<i>Indigofera tinctoria</i> Linn.	Dried Rt.	25
7	<i>Haridra</i>	<i>Curcuma longa</i> Linn.	Dried Rz.	25
8	<i>Daruharidra</i>	<i>Berberis aristata</i> DC.	Dried St.	25
9	<i>Shunthi</i>	<i>Zingiber officinale</i> Roscoe.	Dried Rz.	25
10	<i>Nagakesara</i>	<i>Mesua ferrea</i> Linn.	Dried Stmn.	25
11	<i>Khnda Sharkara</i>	Sugar-candy	-	5000
12	<i>Jala</i>	Water (R.O)	-	12.500 l

### Preparation of drug

*Shirishavaleha* Granules was prepared in Rasashastra and Bhaishjya Kalpana Department, IPGT&RA, Gujarat Ayurved University, Jamnagar. For the preparation of *Shirishavaleha* Granules, *Yavakuta* (Coarse powder) of *Shirisha* was added with ten times of potable water in a stainless steel vessel and soaked over the night. Next morning, it was heated on mild flame until the volume of the liquid (*Kwatha*) was reduced to 1/4<sup>th</sup>. *Khanda Sharkara* (Sugar candy) was added to *Kwatha* and it was boiled till the appearance of 3 thread consistency. After this, the vessel was removed from the fire and stirred continuously to reduce the temperature. When the temperature was reduced to 75-80<sup>0</sup>C, fine powder of *Prakshepa dravya* (ingredients numbered 2-10 of Table-1) in fine powder form were added and stirred well to

get a homogenous blend. The blended mass was passed through 10# sieve to obtain granules dried at room temperature. Granules were packed in food grade plastic containers.

## Pharmacognostical study

### 1. Organoleptic Study

Organoleptic evaluation can be done by means of sense organs which provide simplest and quickest means to establish the identity of a particular drug. The finished product evaluated by organoleptic characters like taste, odour, colour and touch.<sup>[10]</sup> Powder characteristics of the sample were identified with the help of Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.

### 2. Microscopy of *Shirishavaleha* Granules:

The finished product was identified and authenticated by the Pharmacognosy laboratory, IPGT&RA, Jamnagar. The identification was carried out based on the morphological features of the individual drugs i.e. ingredients of *Shirishavaleha* Granules. Microphotographs were taken by using Carl-Zeiss trinocular microscope attached with camera.

## Physico-chemical analysis

*Shirishavaleha* Granules was analyzed using various standard physico-chemical parameters such as Loss on drying, Ash value, water soluble extract, alcohol soluble extract, pH, Total Sugar Content.<sup>[11]</sup>

## High Performance Thin Layer Chromatography (HPTLC)

HPTLC was performed as per the guideline provided by API. Methanol extract of drug sample was used for the spotting. The colour and  $R_f$  values of resolved spots were noted.<sup>[12]</sup>

## Chromatographic conditions

- ✓ Application mode : CAMAG Linomat V Hamilton Syringe
- ✓ Development chamber : CAMAG Twintrough chamber (20x10 cm<sup>2</sup>)
- ✓ Plates : Precoated silica gel GF254 plates.
- ✓ Chamber saturation : 30 min
- ✓ Development distance : 10 cm
- ✓ Development time : 30 min
- ✓ Scanner : Camag TLC Scanner III
- ✓ Scanning mode : Linear at 254 nm and 366 nm

- ✓ Detection : Deuterium lamp, Mercury lamp
- ✓ Photo documentation : Camag reprostar
- ✓ Data system : Cats software (Ver. 3.17)
- ✓ Drying device : Oven
- ✓ UV Spectrum : 200 nm to 800 nm
- ✓ Mobile Phase : Toluene: Ethylacetate: formic acid (7:2:1)
- ✓ Spray reagent : Anisaldehyde Sulphuric Acid reagent

## OBESERVATIONS AND RESULTS

### Organoleptic characters of *Shirishavaleha* Granules

Organoleptic characters of *Shirishavaleha* Granules such as colour, odour, taste etc. examined by sensory organs and results are depicted in Table 2. It showed that the colour of *Shirishavaleha* Granules was chocolate brown. Sweet taste was found with Astringent taste and is granular in appearance.

**Table 2: Organoleptic characters of *Shirishavaleha* Granules.**

Parameters	SHA
<i>Sparsa</i> (Consistency)	Rough & Granular
<i>Rupa</i> (Colour)	Dark brownish
<i>Rasa</i> (Taste)	<i>Madhura, Kashaya</i>
<i>Gandha</i> (Odour)	Characteristic

### Microscopic characters of *Shirishavaleha* Granules

Diagnostic character of *Shirishavaleha* Granules were observed more number of stone cells with tannin content and cuboidal crystals of *Shirisha bark*, starch grains with fibers of *Shunthi*, black debris and stone cells of *Pippali*, fragment of scleroids Scalariform vessel and parenchyma cells of *Haridra*, pitted vessel and prisamatic crystal of *Daruharidra*, pollen grains of *Nagakeshara*, epidermal cell and oil globules of *Priyangu*, pitted vessel of *Nilini*, fragmented of border pitted vessels of *Kustha* and silica deposition of Sugar candy. The product was stained with phloroglucinol and hydrochloride acid and to observe the epidermal cells of *Priyangu*, corkin surface of *Shunthi* and mesocarp cells of *Pippal*. [ Fig 1].

### Physicochemical parameters of *Shirishavaleha* Granules

Physicochemical parameters of *Shirishavaleha* Granules such as Ash value, water soluble extracts, ash value, total sugar content, alcohol soluble extract, pH, Loss on Drying was done. Results are shown in Table no.3.

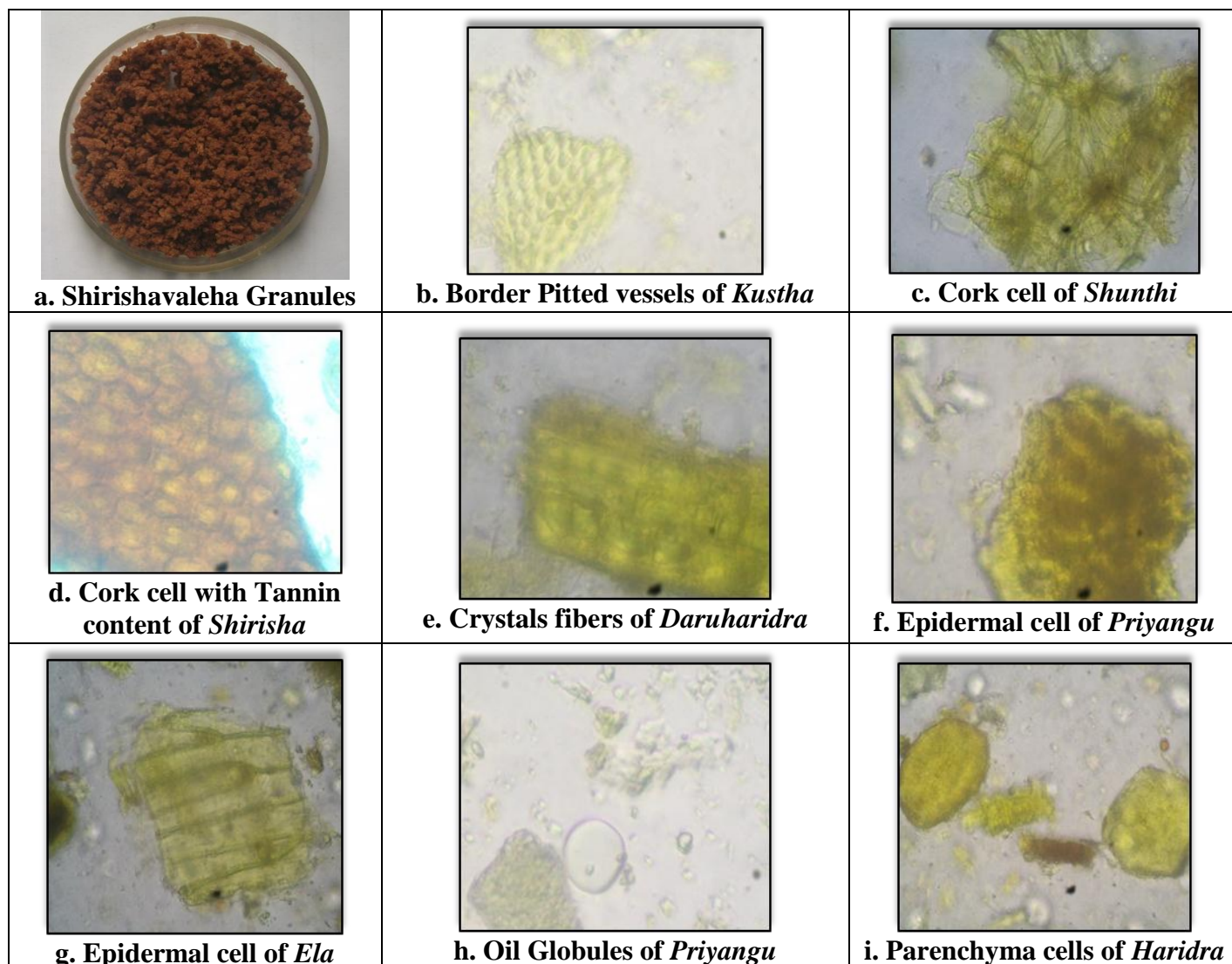
Table 3: Physico-chemical Parameter of *Shirishavaleha* Granules

Parameters	<i>Shirishavaleha</i> Granules
pH of 5% aqueous sol.	6.23
LoD at 110 <sup>0</sup> C ( % w/w)	4.6
Total ash value	1.27
Water soluble extractive ( % w/w)	93.09
Methanol Soluble extractive ( % w/w)	40.25
Sugar content (%)	
Total sugar	73.51
Reducing sugar	16.23
Non-reducing sugar	57.28

### HPTLC Study

Chromatogram shows 4 prominent spots at 254nm and 5 spots at 366nm. [Fig.-2]

	Chromatogram	No. of spots	Max. Rf value
<i>Shirishavaleha</i> Granules	254 nm	4	0.3,0.42,0.68,0.72
	366 nm	5	0.03,0.64,0.68,0.73,0.96



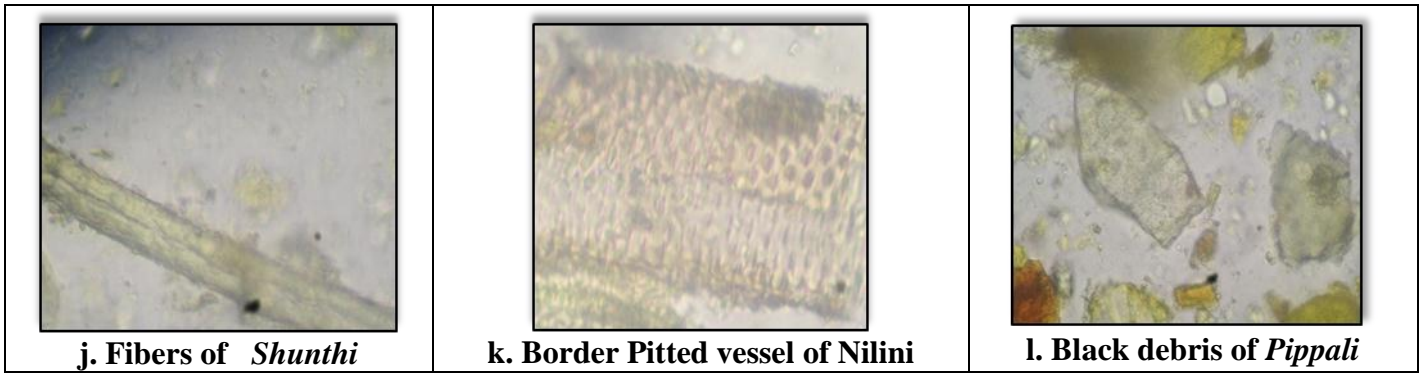


Figure 1: Microscopy of *Shirishavaleha* Granules.

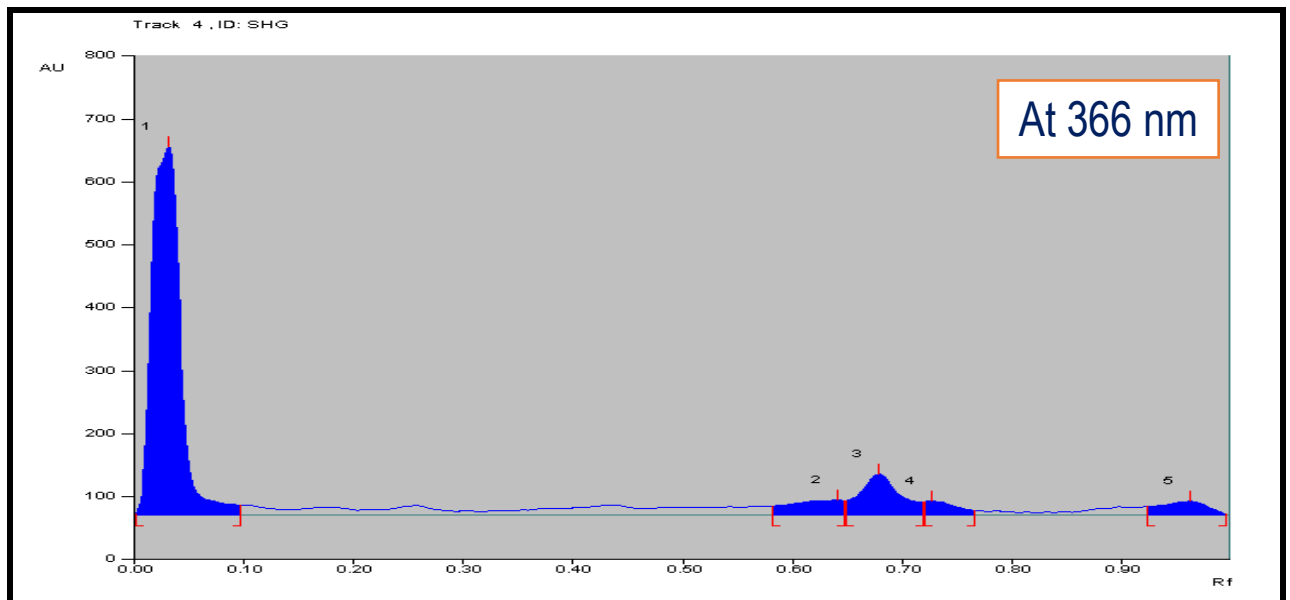
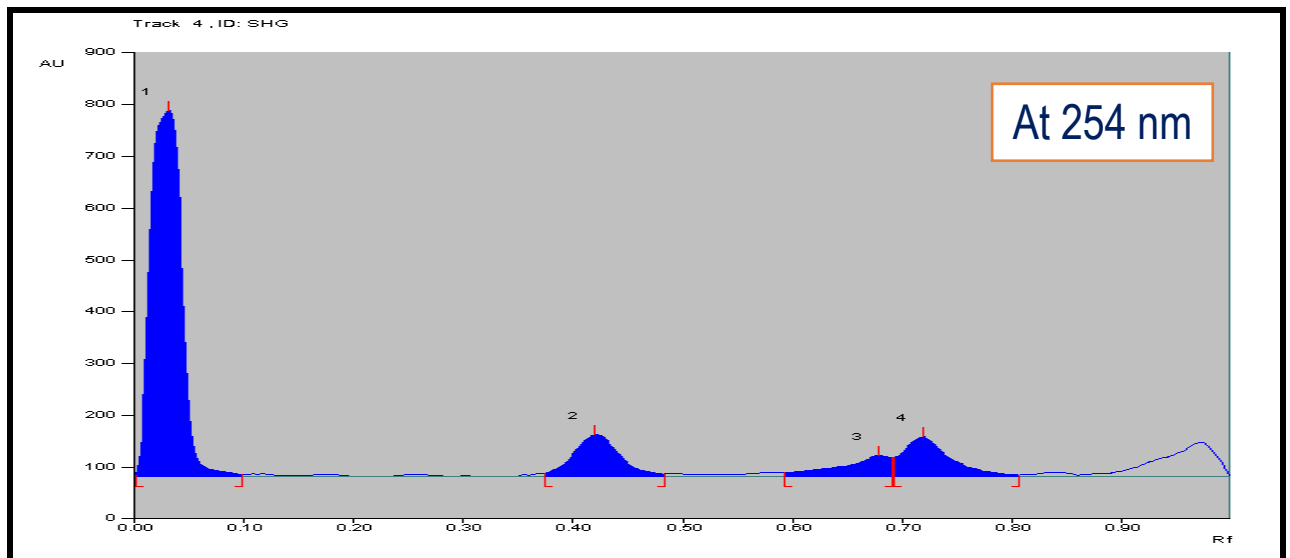


Figure 2: HPTLC of *Shirishavaleha* Granules at 254 nm and 366 nm.

## DISCUSSION

The sweetness in *Shirishavaleha* Granules is due to addition of Sugar candy, which makes it more palatable and masks the Astringent taste of drugs. Most of the Granules contains *Madhura Dravya* and *Prakshepa Dravya* as base ingredients. Here, the use of *Madhura Dravya* is of great importance because it reduces the *Tikta, Katu, Kashaya* taste of drug, ultimately making it more palatable, and it also nourishes all *Dhatus* along with *Oja*.<sup>[13]</sup> *Prakshepa Dravya* (adjuvant) serves specific functions, e.g. *Pippali* (*Piper longum* Linn.) acts as a bioavailability enhancer,<sup>[14]</sup> and is anti-bacterial.<sup>[15]</sup>

The results shows that the finished product studied under the microscope reveals that the presence of the ingredients cellular characters i.e. Finished product considered as genuine and authentication. Stone cells with tannin content and cuboidal crystals, starch grains with fibers, black debris, stone cells prismatic crystals were important microscopic characters which were observed in the finished product reveals that the product consists all the ingredients.

pH shows that the 5% w/v aqueous solution of the sample was Slightly acidic in nature i.e. 6.23 (Table no.3). As tannin is weak in acidic nature,<sup>[16]</sup> the acidic pH of final product may be due to rich tannin content in final product. In *Shirishavaleha* Granules less moisture i.e. 4.6 % may be due to more heating duration during process. Water Soluble Extractive value was found 93.09%, which shows more bio availability in the body. Water-soluble extractive value plays an important role in evaluation of crude drugs. Less extractive value indicates addition of exhausted material, adulteration or incorrect processing during drying or storage or formulating.<sup>[17]</sup> Total sugar content (%) 73.51 was found in *Shirishavaleha* Granules. Sugar act as self-preservative and also provides palatability to the formulation.

HPTLC for *Shirishavaleha* Granules is not mentioned in API. So HPTLC done in current attempt cannot be comparable but may be taken as preliminary standards for this sample.

## CONCLUSION

Pharmacognostical study findings confirm that all characters were found in ingredient drugs of *Shirishavaleha* Granules. The physicochemical analysis are inferred that the formulation meets maximum qualitative standards and all the parameters discussed here may be useful in scientific evaluation, identification and authentication of the *Shirishavaleha* Granules.



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