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Mishra Gauridutt

Ph.D., Scholar, Department of Roga Nidana Evam Vikriti Vijnana, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Pandya DH

Assistant Professor, Department of Roga Nidana Evam Vikriti Vijnana, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Harisha CR

Head, Pharmacognosy Laboratory, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Shukla VJ

Head, Pharmaceutical Chemistry, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Correspondence

Mishra Gauridutt

Ph.D., Scholar, Department of Roga Nidana Evam Vikriti Vijnana, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

A revised Pharmacognostical and physico-chemical analysis of *Simhanada Guggulu*

Mishra Gauridutt, Pandya DH, Harisha CR and Shukla VJ

Abstract

Background: *Simhanada Guggulu* has *Vata-Kapha Shamaka*, *Deepana*, *Pachana*, *Shulaghna* properties, it is drug of choice of *Amavata* (Rheumatoid arthritis). A lot of work has been carried out on *Simhanada Guggulu*, this study will definitely strengthen the previous one.

Aims: To evaluate Pharmacognostical and physico-chemical characters of *Simhanada Guggulu*.

Materials & Methods: Prepared drug was collected from pharmacy I.P.G.T. & R.A. and authenticated in respective Laboratory of I.P.G.T. & R.A., G.A.U., Jamnagar. Standard procedures were followed to undertake the Pharmacognostical and physico-chemical analysis.

Results: The Pharmacognostical results of *Simhanada Guggulu* showed Trichoma of *Bibhitaki*, Starch grain of *Haritaki*, Fibers of *Amalaki*, Silica deposition of *Amalaki* etc., without staining. Tannin content of *Haritaki* and Tannin content of *Bibhitaki* after staining with (Phloroglucinol & Con. HCL). Physicochemical analysis of *Simhanada Guggulu* revealed weight variation 18.53%, Hardness 3.0 kg/cm², Disintegration time > 1 hr. etc., In HPTLC, *Simhanada Guggulu* revealed 9 spots at 254 nm and 4 spots at 366 nm.

Discussion: Pharmacognostical study helps in exact authentication of ingredients present in formulation through its organoleptic characters like taste, odor, color and touch along with microscopical characters and physico-chemical parameters. The presence of all contents of raw drugs in the final product shows the genuinity of the final product. All the pharmaceutical parameters analyzed showed values permissible for the *Vati*.

Conclusion: As there are a lot of study on the *Simhanada Guggulu*, The findings of the study will definitely strengthen the previous one.

Keywords: HPTLC, *Simhanada Guggulu*, *Deepana*, analysis, physicochemical

Introduction

The desirable effect of the medicine depends upon the genuine nature of its ingredients, so exact identification of original plant is essential. If the plant is adulterated, then the quality of prepared drug will not yield desirable therapeutic results. So, before using a drug it is necessary to identify raw materials at the basic level with the help of microscopic and morphological characteristics. *Simhanada Guggulu* has ingredients like *Haritaki*, *Bibhitaki*, *Amalaki*, *Suddha Gandhaka*, *Suddha Guggulu* and *Erand Tail*. *Haritaki* (*Terminalia chebula* Retz) belongs to Combretaceae family. Its fruits contain about 30%, astringent substance, the astringency is due to a characteristic principle 'Tannin' which consists of chebulic acid, diagalloylglucose and a dibasic acid, ellagic acid and free tannic acid etc. The greenish oleorasin obtained from these fruits is called myrobalan. They also contain tannic acid (20-40%), gallic acid, resin etc. and some purgative principles of the nature of anthraquinone [1]. *Bibhitaki* (*Terminalia bellerica* Roxb) belongs to Combretaceae family. Its fruits contain Sitosterol, gallic acid, ellagic acid, chebulic acid galloyl glucose and number of free sugars. Mannitol, glucose, ethylgallate, chebulic acid, fructose, rhamnose, a new cardiac glycosides bellericanin in the fruit, Kernels yielded yellow fatty oil, seeds contain protein and oxalic acid [2]. *Amalaki* (*Embllica officinalis* Gaertn) belongs to Euphorbiaceae family. Its fruit contains moisture (81.2%), Protein (0.5%), Fat (0%), Mineral (0.7%), Fibres (3.4%), Carbohydrate (14.1%), Ca (0.05%), P (0.02%), Fe (1.2mg / 100gm) Nicotinic acid (0.2 mg / 100gms) and Vit. C (600 mg/100gm). Fruits, bark and leaves are rich in tannin and (6%) Gallic acid, Lipids (6%) acid (5%) and emblicol, Phyllembin from the fruit pulp is identified as ethyl gallate Vit. C is found 921 mg/100ml of *Svarasa of Amalaki* fruit [3]. *Gandhaka* (Sulphur) belongs to *Uprasa* [4]. *Suddha Guggulu* (*Commiphora mukul* Hook) belongs to Burseraceae family. The gum resin of *Guggulu* contain about 4.65% of foreign impurities, 32% of gum and 19.5% of mineral matter consisting chiefly of SiO, Ca, Mg, Fe and Al.

It contains about 1.45% essential oil having a faint aromatic odor [5]. *Erand Tail (Ricinus communis* Linn) belongs to Euphorbiaceae family. Seeds contain Ricinine, ricine, and lipase enzyme. Oil contains Glycerides like ricinoleic acid, oleic acid, linoleic acid, & stearic acid [6]. It's having *Vata-Kapha Shamaka, Deepana, Pachana* and *Shulaghna* properties.

Materials and Methods

Plant material: The raw drugs were obtained from the pharmacy department, GAU, Jamnagar, Gujarat, India. The ingredients, useful part and ratio of drug are mentioned in Table- 1.

Pharmacognostical Evaluation [7]:

The formulation was identified and authenticated and powder microscopy was done in the pharmacognosy department, IPGT & RA, GAU, Jamnagar, Gujarat, India. The study includes organoleptic evaluation and microscopic evaluation (Anonymous, 1999). They are stored according to SOP of WHO guidelines (World Health Organization, 1996).

Preparation of the *Simhanada Guggulu* [8]:

The formulation was prepared at Pharmacy of Gujarat Ayurved University, Jamnagar, Gujarat, India. First of all equal quantity of coarse powder *Haritaki, Bibhitaki* and *Amalaki* fruits were taken in iron vessel, after that four times of water was added and decoction was prepared up to ¼th part remaining then castor oil was added in given amount and again it was boiled until it become concentrated. Then purified *Guggulu* and *Gandhaka* were added, mixed well and *Vatis* were prepared. No any preservative was used for preparation of *Vati*. Parts of individual drugs in prepared *Vati* are mentioned in Table-1.

Microscopic Study

Vati was broken and fine powder was taken then examined under microscope without staining for the observation of cellular materials, then stained with Phloroglucinol and conc. Hcl [9] for the lignified characters. Raw drugs were separately studied under microscope; the microphotographs of diagnostic characters were taken by using Carl Zeiss trinocular microscope [10].

Organoleptic Study

Simhanada Guggulu was evaluated for organoleptic characters like taste, odor and color, touch [11].

Physico-chemical analysis

Physico-chemical Parameters of *Simhanada Guggulu* like

weight variation, Hardness, Disintegration time, Loss on drying, Ash value, water soluble extract, Alcohol soluble extract, pH were determined as per the API guideline [12].

HPTLC

Methanol extract of *Simhanada Guggulu* was used for High performance thin layer chromatography (HPTLC) study. Methanol extract of *Simhanada Guggulu* was spotted on pre-coated silica gel GL60254 aluminum plate as 10mm bands by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (9ml) and ethyl acetate (1ml) was used for *Simhanada Guggulu* as a mobile phase. The development time was 30 minutes. After development, Densitometry scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of Win CATS software (V1.2.1. Camag) [13].

Observations and Results

Microscopic Study of *Simhanada Guggulu*

The diagnostic microscopical characters of sample showed Trichoma of *Bibhitaki*, Starch grain of *Haritaki*, Fibers of *Amalaki*, Silica deposition of *Amalaki*, Pittet stone cell of *Bibhitaki*, Starch grain of *Bibhitaki*, Epicarp cells of *Haritaki* along with Sulphur debris, Rosset crystals of *Bibhitaki*, Mesocarp cell of *Amalaki*, without staining. Tannin content of *Haritaki*, scleroids, stone cells and lignified elements are observed after staining with (Phloroglucinol & Con. HCL) are shown in plate – 1 (Figure 1–10).

Organoleptic characters of *Simhanada Guggulu*

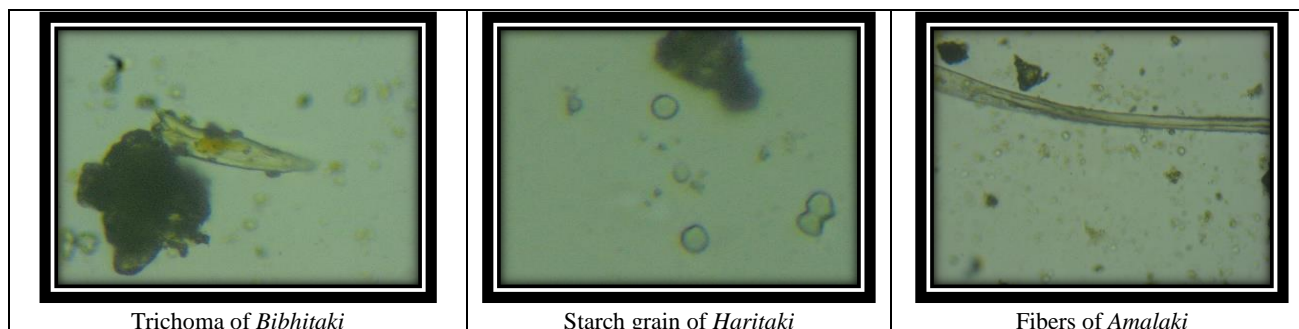
Organoleptic characters of contents of *Vati* like color, taste odor and touch were recorded separately and are mentioned. (Table-2).

Physicochemical tests result

Physicochemical analysis of *Simhanada Guggulu* revealed the weight variation 18.53%, Hardness 3.0 kg/cm², Disintegration time > 1 hr., loss on drying 14.30 %, Ash value was 6.4% w/w, water soluble extract was 41.30%, Alcohol (Ethanol) soluble extract 28.28% and PH Value 6 (Table- 3).

HPTLC study results

Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 09 spots at 254 nm with Rf values and 04 spots at 366 nm with Rf values recorded which may be responsible for expression of its pharmacological and clinical actions (PLATE-2 & 3, Table- 4).



Trichoma of *Bibhitaki*

Starch grain of *Haritaki*

Fibers of *Amalaki*

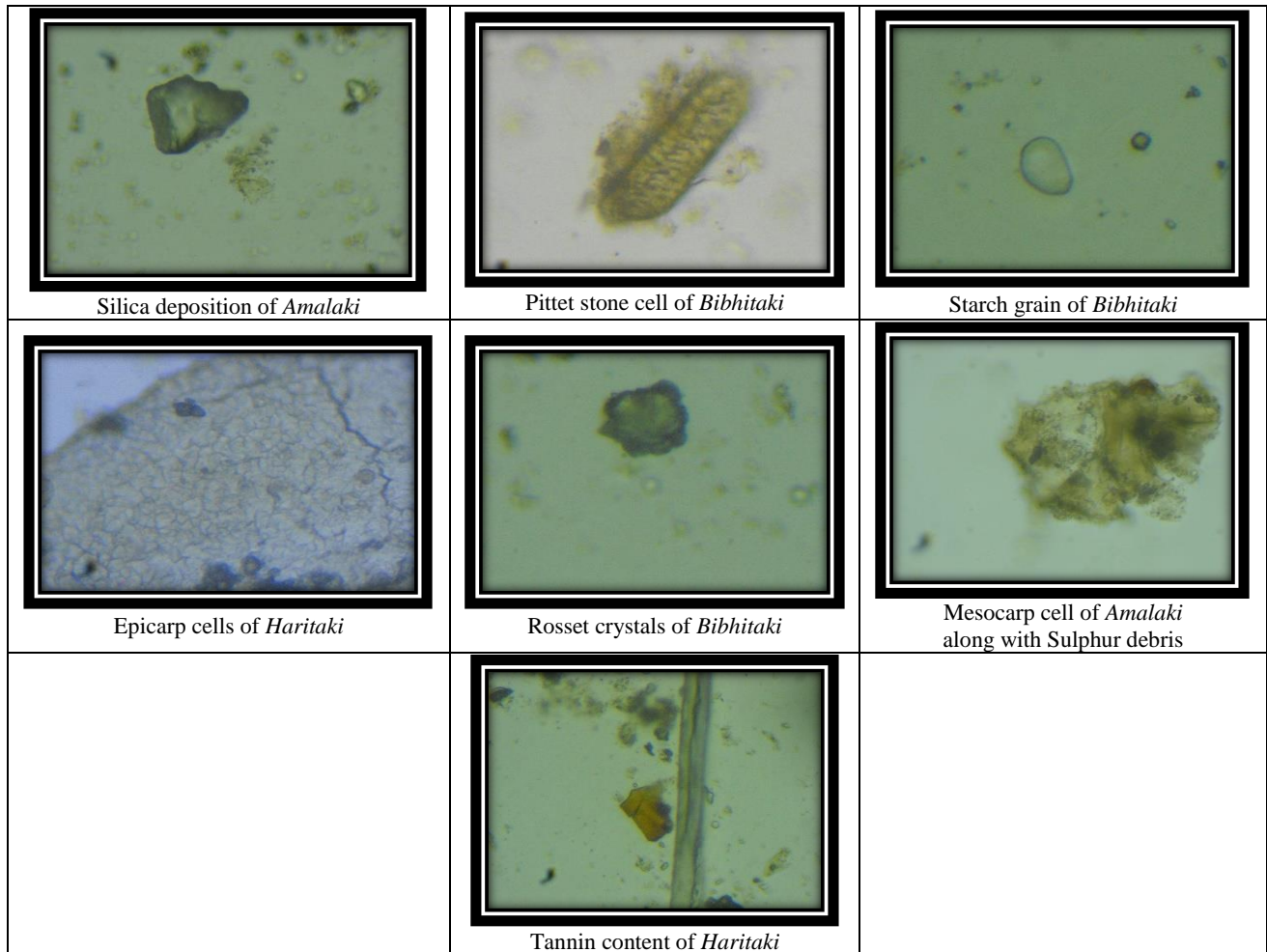


Plate 1: Microphotographs of *Simhanada Guggulu* (Figure 1-10)

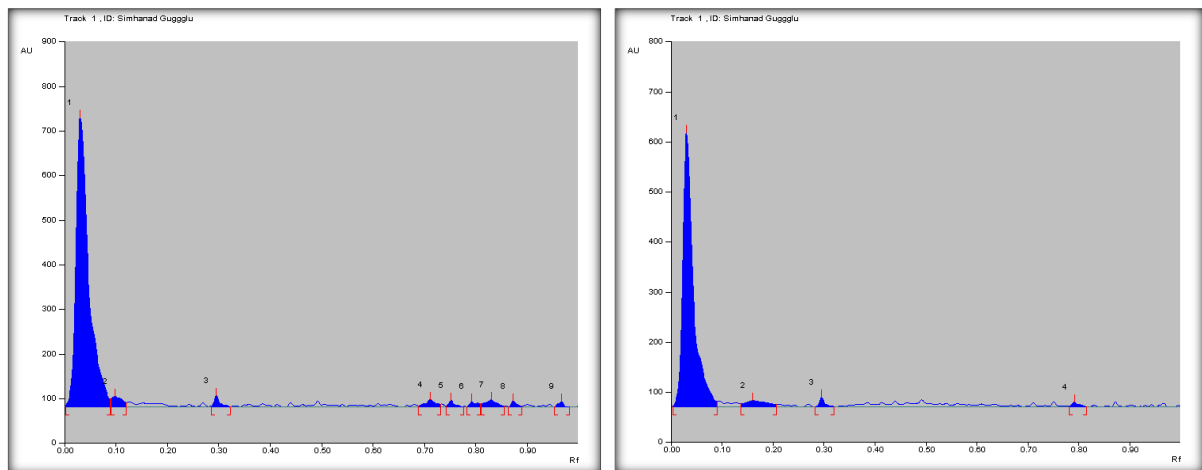


Plate 2-3: Densitogram of *Simhanada Guggulu* at 254 & 366 nm.

Table 1: Ingredients of *Simhanada Guggulu*

S.no.	Drugs	Latin name	Part	quantity
1)	<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Fruit	1 part
2)	<i>Bibhitaki</i>	<i>Terminalia bellerica</i> Roxb.	Fruit	1 part
3)	<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	Fruit	1 part
4)	<i>Suddha Gandhaka</i>	Sulphur	-	1 part
5)	<i>Suddha Guggulu</i>	<i>Commiphora mukul</i> Hook.	Gum resin	1 part
6)	<i>Erand Tail</i>	<i>Ricinus communis</i> Linn.	Seed oil	4 part

Table 2: Organoleptic characters of *Simhanada Guggulu*

Name of drug	Color	Taste	Odor	Nature of powder (touch)
<i>Simhanada Guggulu</i>	Slight Greyish	Astringent	Sulphur Smell	Hard

Table 3: Physico-chemical evaluation of *Simhanada Guggulu*

No	Name of the Analysis	Values
1.	Weight variation	18.53%
2.	Hardness	3.0kg/cm ²
3.	Disintegration time	> 1 hr.
4.	Loss on drying in percentage	14.30%
5.	Ash value in percentage	6.4% w/w
6.	Water soluble extract in percentage	41.30%
7.	Alcohol (Ethanol) soluble extract in percentage	28.28%
8.	PH Value	6.0

Table 4: HPTLC of *Simhanada Guggulu*

254nm		366nm	
No of spots	Rf	No of spots	Rf
09	0.03, 0.10, 0.29, 0.71, 0.75, 0.79, 0.83, 0.87 and 0.97	04	0.03, 0.16, 0.29 and 0.79

Discussion

Pharmacognostical study helps in exact authentication of ingredients present in formulation through its organoleptic characters like taste, odor, color and touch along with microscopical characters and physico-chemical parameters. This can prevent the accidental misuse of drugs and adulteration to a greater extent. The present Pharmacognostical study revealed the presence of Trichoma of *Bibhitaki*, Starch grain of *Haritaki*, Fibers of *Amalaki*, Silica deposition of *Amalaki*, Pittet stone cell of *Bibhitaki*, these all are the common characters of the ingredients present in formulation. The presence of all contents of raw drugs in the final product shows the genuinity of the final product. All the pharmaceutical parameters analyzed showed values permissible for the *Vati*. The Physicochemical Parameters show that percentage of water soluble material is more than alcohol soluble extract. It also showed presence of acidic nature of *Vati* which will be helpful to improve the *Jatharagni* (digestive fire). The phyto-chemical evaluation of *Simhanada Guggulu* was done and it shows the presence of carbohydrates (starch), Sulphur, brown content and Tannin. Thus it can be inferred that the drug may yield desired pharmacological action. HPTLC is the most common form of chromatographic method used by *Ayurvedic* researchers to identify the number of ingredients present in a formulation. It also helps to determine the purity of the sample.

Conclusion

The Microscopic pictures showed Trichoma of *Bibhitaki*, Starch grain of *Haritaki*, Fibers of *Amalaki*, Silica deposition of *Amalaki*, Pittet stone cell of *Bibhitaki*, Starch grain of *Bibhitaki*, Epicarp cells of *Haritaki* along with Sulphur debris, Rosset crystals of *Bibhitaki*, Mesocarp cell of *Amalaki* and all the previously described organoleptic characters, these all are the striking characters of all the ingredients present in formulation and all previously described physico chemical parameters showed within permissible limits. As there has been a lot of study on *Simhanada Guggulu* till date, the findings of the study will definitely strengthen the previous one.

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