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Pharmaceutical and Analytical Study of Saptasaram Ghana Vati

Nidhi Sharma, Rita Makim
Dept of Prasuti Tantra Evum Stri Roga, Parul Institute of Ayurveda, Parul University, Vadodara, India

ABSTRACT

According to Acharaya Sushruta, pain is a symptom of Vata Vikriti. 'Saptasaram' is composed of 7 herbs hence the name. In the traditional Indian medical system, it is known for its therapeutic effects. They are of pharmacological value because of the presence of important bioactive compounds in plants. Saptasaram is a prescription mentioned in Sahasra Yoga Kashaya Prakarana 284. It was prepared according to the classical method described in Sarangdhara Samhita. Therefore, in this study, pharmacological and analytical studies of Saptasaram Ghana Vati for phytochemical profiling were conducted. Pharmaceutical analysis of the tablets showed that the tablets were dark brown in color and average in weight. = 530 mg, LOD = 1.70, DT = 17.30 min, AV = 7.3, AIA = 4.0, WSE = 63, and ASE = 11. HPTLC analysis of the methanol extract of Saptasaram Ghana Vati was performed on a CAMAG HPTLC system and the results were obtained in the form of a chromatogram (scanned at a wavelength of 254 nm) showing several peaks. The phytochemical profiles of the drugs were determined and presented in a table showing total number of peaks, peak heights, peak areas, area percents and Rf values. In this study, the methanol extract of Saptasaram Ghana Vati contains a rich array of phytochemicals that may be responsible for its therapeutic value, justifying its traditional use in India. Concludes, this formulation is safe to use and does not contain pathogenic microorganisms.

Keywords: *Chromatography, HPTLC, Kashtaratva, Methanol extract, Saptasaram ghana vati.*

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INTRODUCTION

Ayurveda is one of the oldest forms of health care system practiced in the Indian subcontinent and is now an integral part of India's health care system. Although Kashtartava is not specifically mentioned as a disease anywhere in the Ayurvedic classics, Kashtartava is conceived and described as a symptom. Vega Avaroda causes vata prakopa and consequently menstrual cramps. [1] Saptasaram is a very famous Ayurvedic medicine mentioned in the Sahasra Yoga Kasahya Prakarana. It is often used to treat menstrual pain, indigestion, and to balance vata. [2] There are thousands of medicinal plants that have long been known to be used for their healing properties against various ailments and ailments [3]. Medicinal plants play a very important role in human life to maintain health due to the presence of bioactive phytochemicals. The use of medicinal herbs in the treatment of infectious diseases has a long history, and several natural products are used as phytotherapy to treat many ailments [4]

MATERIAL AND METHODS

The herbal medicines for the Sapsaram Ghana Vati formulation were supplied by a herbal supplier in Vadodara, Gujarat. The PG Dravyaguna Division identified the ingredients and a specimen sample coupon PU/PIA/DG/147 was deposited with the Division.

Method of Preparation of Saptasaram ghana Vati

Saptasaram Ghana Vati was prepared at the GMP certified Parul Ayurvedic Pharmacy Laboratory in Vadodara, Gujarat. Saptasaram Ghana Vati is prepared according to the standard procedure for the preparation of Ghana Vati in Ayurvedic Pharmacopoeia of India. Equal amounts of the seven drugs listed in Table 1 were ingested and separately powdered. To make kwatha, these coarse powders are steeped overnight (12 hours) eight times in drinking water. Gently heat the mixture to a boil and continue cooking until the volume of the mixture is reduced to a quarter of its original volume. A binder solution was then prepared from 5% gum acacia powder by adding the required amount of water. To obtain the shape of Ghana, the filtered kwatha is reduced to the point where the material becomes a "thick, gooey mass". Spread the resulting wet material with a stainless steel spreader into a 5-7 mm thick layer in a steel tray. The tray was stored in a hot air tray dryer at 55°C. Finally, the tablets were compressed on a multi-station rotary

tablet press equipped with punches and 500 mg tablet was prepared . Store and pack the tablets in an airtight container to protect it from moisture and light.

Table No 1: Ingredients and composition of Saptasaram ghana vati

NAME OF DRUG	LATIN NAME	RASA	GUNA	VIRYA	VIPAKA	PART USED	PROPORTION
Varshabhu (punarnava)	Boerhaavia diffusa	Madhura, Tikta, Kashaya	Laghu, Ruksha	Ushna	Katu	Root	1 Part
Bilva	Aegle marmelos	Katu, Tikta, Kashaya	Grahi, Snigdha Tikshna	Ushna	Katu	Root/ Stem Bark	1 Part
Khalva purana	Dolichos biflorus	Kashaya	Laghu, Sara	Ushna	Katu	Seed	1 Part
Urubu (castor)	Ricinus communis	Madhura, Katu, Kashaya	Snigdha,Sukshma, Tikshna	Ushna	Madhura	Root	1 Part
Sahachara	Barleria prionitis	Tikta, Madhura	Laghu,	Ushna	Katu	Root	1 Part
Shunti	Zingiber officinalis	Katu,	Guru,Ruksha, Tikshna	Ushna	Madhura	Rhizhome	1 Part
Agnimantha	Premna mucronate	Katu,Tikta, Kashayaa	Laghu, Ruksha	Ushna	Katu	Root / Stem Bark	1 Part

Figure no 1: Raw Drugs of Saptasaram ghana vati

Figure No 2: Pharmaceutical unit operation of tablet formation

Determination of Total Ash: About two gm accurately weighed the ground drug in a silica dish at a temperature not exceeding 450º C. Determination of Acid Insoluble Ash: Boil the ash from the procedure mentioned above for 5 minutes with 25 ml of diluted HCl, collect the insoluble matter on an ash-less filter paper, wash with hot water and ignite to constant weight.
Determination of Water-Soluble Ash: Boil the ash for 5 minutes with 25 ml of water; collect insoluble matter on an ashless filter paper, wash with hot water, and ignite for 15 minutes at a temperature not exceeding 450 º C. Subtract the weight of the insoluble matter from the weight of the ash; the difference in weight represents the water-soluble ash.
Determination of Alcohol Soluble Extractive: Macerate 5 gm of the air-dried drug, coarsely powdered, with 100 ml of Alcohol of the specified strength in a closed flask for twenty-four hours, frequently shaking for six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105 º C to constant.
Determination of Loss on Drying (Moisture Content): Place about 10 gm of the drug (without preliminary drying) after accurately weighing (accurately weighed to within 0.01 gm) it in a tared evaporating dish. After placing the above-said amount of the drug in the tared evaporating dish, dry at 105 º C for 5 hours and weigh. Continue the drying and weighing at one-hour intervals until the difference between two successive weighing corresponds to less than 0.25 per cent. Constant weight is reached when two consecutive weighing after drying for 30 minutes and cooling for 30 minutes in a desiccator show not more than 0.01 g difference10. **Uniformity of Weight/ Weight variation test**: The test for uniformity of weight is performed by weighing 20 tablets randomly selected from a tablet batch and determining their weights. The individual weights are compared with the average weight10.
Disintegration Time Test: For tablets, the first important step towards drug dissolution is a breakdown of the tablets into granules or primary powder particles, a process known as disintegration. The apparatus consists of a basket-rack assembly containing six open-ended transparent tubes held vertically upon a 10-mesh stainless steel wire screen. During testing, a tablet is placed in each of the basket's six tubes, and through a mechanical device, the basket is raised and lowered in a bath of fluid at 30 to 32 cycles per minute for 15 minutes.[5]

RESULT AND DISCUSSION

Table No 2: Organoleptic properties:

Colour	Dark Brown
Odour	Characteristic
Taste	Pungent
Consistency	Tablet

Table No 3: Physiochemical parameters of Saptasaram Ghana Vati

PARAMETER	RESULT
Loss on Drying at 110 c (%w/w)	1.70
Total Ash Value(%w/w)	7.3
Acid Insoluble Ash (%w/w)	4.0
Water Soluble Extractive (%w/w)	63
Alcohol Soluble Extractive(%w/w)	11
Tablet Average Weight (in mg)	530Mg
Tablet Hardness (kg/ cm^2)	4kg/cm^2
Tablet Friability Test (%w/w)	5.9
Tablet Disintegration Time (in minutes)	17.30

Chromatograph profiling by HPTLC
Instrumentation: A CAMAG HPTLC system equipped with LINOMAT 5 applicator fitted with 100 µl syringe, CAMAG TLC scanner, and winCATS software was used.
Chemicals and solvents: All the solvents used were of chromatography grade, and all the chemicals used were of analytical reagent grade. Preparation of 1 ml methanolic extract of Saptsaram ghana vati was used as a test solution for the HPTLC study.
Chromatographic conditions The HPTLC was performed on 7.0 × 10.0 cm precoated silica gel 60 F 254 HPTLC plate. No pre-washing and modification of the plate were done. The sample solution was applied as bands to the plate by CAMAG Linomat applicator fitted with 100 µl syringe (Table 1). The stable application

rate was 150 nl/s. The sample loaded plate was kept in automatic development chamber with mobile phase—toluene ethyl acetate (8:2 v/v/). Densitometric scanning was performed with CAMAG TLC scanner-4 equipped with winCATS software. The bands were visualized using CAMAG visualizer, and the images were captured in white light and 254 nm (short UV) and 366 nm (long UV) wavelengths (Table 2). When exposed to short-wave UV light of 254 nm, UV-active compounds will undergo fluorescence quenching and appear as dark spots on a bright background. Conversely, compounds that absorb 366 nm UV light will appear as bright spots on a dark background [6].

Table No 4

Track	Vial ID	Description	Volume	Position	Type
1	1	Saptasaram ghana vati	5.0 µl	N/A	Reference
2	1	Saptasaram ghana vati	10.0 µl	N/A	Reference
3	1	Saptasaram ghana vati	15.0 µl	N/A	Reference

Table No 5 Parameters used for HPTLC:Calibration Parameters:

Calibration mode	Single level
Statistics mode	CV
Evaluation mode	Peak height

Linomat 5 application Parameters:

Sample solvent type	Methanol
Dosage speed	150nl/s
Predosage volume	0.20ul
Syringe size	100 µl
Application position	Y;8.0mm, length :8.0mm, width: 0.0mm
Solvent front position	80mm
Band length	8.0mm

Integration Parameters

Bounds	(-0.001, 1.000)
Smoothing	Savitzky- Golay of order 3 and window 7
Baseline correction	Lowest slope with noise 0.05
Profile subtraction	None
Peaks Detection	Gauss (legacy) with sensitivity 0.1, separation 1 and threshold 0.1

Measurements

Wavelength	254nm
Measurement Mode	Absorbance
Detector Mode	Automatic
Lamp	Deuterium & Tungsten

RESULTS

The HPTLC analysis of Saptasaram Ghana Vati revealed the presence of various phytochemicals as illustrated in the figures and tables below. The chromatograms (Fig 3) were obtained upon scanning at UV 254 nm, and peak tables were generated. The Rf values, peak height, peak area, and percent area of the unknown substances are depicted in the figures (Fig.4,5)

Figure no 3 Chromatogarm at UV 254nm

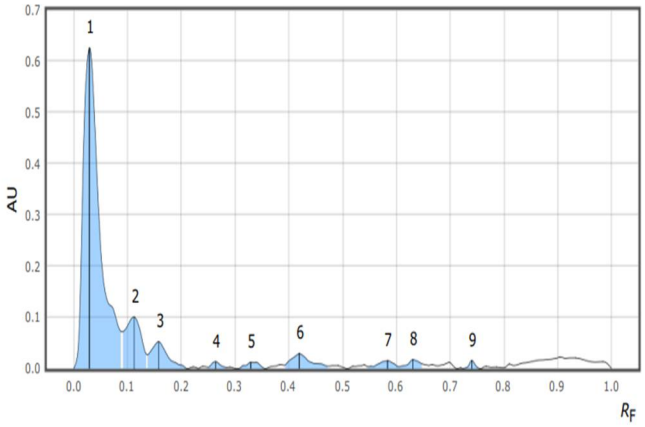
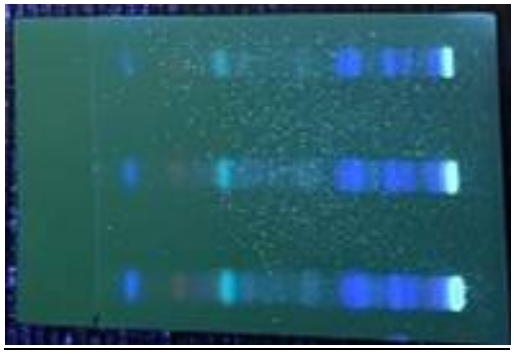


Figure No 4 RF Values

dr.nidhi 24-03-23_20230324_145024 visionCATS

Peak	Start		Max			End		Area		Manual	Substance
#	R_F	H	R_F	H	%	R_F	H	A	%	peak	Name
1	0.000	0.0000	0.029	0.6259	70.76	0.089	0.0718	0.02262	72.53	No	
2	0.090	0.0716	0.113	0.1009	11.41	0.136	0.0274	0.00351	11.25	No	
3	0.138	0.0272	0.158	0.0527	5.96	0.211	0.0000	0.00188	6.04	No	
4	0.250	0.0027	0.264	0.0135	1.53	0.285	0.0021	0.00027	0.85	No	
5	0.304	0.0000	0.329	0.0126	1.42	0.356	0.0000	0.00036	1.16	No	
6	0.392	0.0067	0.419	0.0294	3.33	0.474	0.0047	0.00126	4.05	No	
7	0.547	0.0035	0.583	0.0155	1.75	0.606	0.0036	0.00054	1.73	No	
8	0.606	0.0036	0.631	0.0178	2.01	0.660	0.0064	0.00055	1.76	No	
9	0.724	0.0004	0.740	0.0162	1.83	0.756	0.0000	0.00019	0.62	No	

Figure No 5: The bands of separated compounds can be seen on the TLC plates visualized under white light and UV of wavelengths 254 nm.



DISCUSSION

The HPTLC performed on the methanolic extract of Saptasaram Ghana Vati showed the presence of various phytoconstituents in different concentrations as illustrated in figures and tables. The chromatogram scanned at 254 nm represents 8-9 peaks in (Figure no 3). The number of peaks indicates the presence of different phytoconstituents present in the sample. The Rf values (Figure no 4) calculated for the phytoconstituents present in the tested sample would be helpful in the identification of the unknown compounds by comparing them with the reference standards, and from the values of peak area, the concentration of the compounds can be determined.

The bands of separated compounds can be seen (Figure no 5) on the TLC plates visualized under white light and UV of wavelengths 254 nm.

The findings of the present study are limited to the HPTLC analysis methanolic extract to estimate the presence of different phytochemicals from the chromatogram peaks and obtain the peak tables.

CONCLUSION

The contents of Saptasaram Ghana Vati are predominantly Vata Shamaka, work on vitiated Vata Dosha. All the ingredients were proven authentic and readily available in the market.
The development of the present study will also serve as reference standards for drug formulation and help in further pre-clinical and clinical research studies.

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