PHARMACEUTICO- ANALYTICAL STUDY OF VACHADI GANA KWATHA AND ITS GHANVATI

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ABSTRACT

Ayurveda is an impeccable and traditional system of medicine that is used to treat various diseases with different drugs. In today's era, *Ayurvedic* medicines are getting more popular because of their natural origin and lesser side effects, many traditional medicines in use are derived from medicinal plants, minerals and organic matter. *Vachadi Gana* is mentioned by *Acharya Vagbhatta* in his text *Ashtang Hridaya* for treatment of *Medoroga*, *Kaphaj roga*, *Ama atisaar*, *Vataj roga*, *Urustambha* and *stanya dosha*. *Panchvidha Kashaya Kalpanas* are fundamental preparations in *Ayurvedic* pharmaceutics from which various other preparation are attained. *Kwatha Kalpana* is one of the significant, very effective and widely used dosage form but it has some disadvantages such as bitterness in taste, palatability, feasibility, short shelf life, inconvenience in its preparation, transportation etc; here an effort is made to convert it into new dosage form i.e *Vachadi Gana Ghanvati*. Aims & objectives: Aim was to prepare samples of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati* and to evaluate the formulations through Pharmaceutical and analytical measures. Materials & methods: *Vachadi Gana Kwatha* was formulated then *Vachadi Gana Kwatha* was formulated as per the reference of *Sharangdhar Samhita* and *Vachadi Gana Ghanvati* was prepared by adopting an appropriate heating procedure to *Vachadi Gana Kwatha*. Results: It was observed that the average yield of *Vachadi Gana Kwatha Churna* was 98% and yield of *Vachadi Ghana* was 3.75%. Discussion: *Ghanavati* is obtained by *Ghana Kalpana*, it is obtained by extraction method of further heating of *Kwatha* and it is a most concentrated form of active constituents, easy to consume & easy to handle by patients as compared to *Kwatha preparation*.

Keywords: *Vachadi Gana, Kwatha Kalpana, Ghanvati*, Physico-chemical parameters.

INTRODUCTION

Bhaishajya Kalpana mainly consists of two words *Bhaishajya* and *Kalpana* which means to converts the raw drugs into the effective dosage form. The Pharmaceutical study includes mainly preparation of crude drugs and pharmaceutical processing in which drug ratio, liquid quantity, the intensity of the fire and its duration etc. In the present study, on taking into consideration all the above things, here an attempt was made to prepare *Vachadi Gana Kwatha Churna* and *Vachadi Gana Ghanvati* repeatedly three times to ensure the process validation and to evaluate, compare the formulation on the basis of Physico-chemical parameters. *Vachadi Gana*, quoted by *Acharya Vagbhatta* in his vibrant classical text *Ashtang Hridaya* for treating *Medoroga, Kaphaj roga, Ama atisaar* etc. In the present study the *Vachadi Gana* is selected in the context of *Sthaulya*.

MATERIALS AND METHODS

Plant Material

All the raw drug materials were collected from the Hans Pharmacy Haridwar and authenticated by P.G department of Dravya Guna, Rishikul campus, Uttarakhand Ayurved University Haridwar. The ingredients are mentioned in table 1.

Pharmaceutical Study

For preparing samples of *Vachadi Gana Kwatha Churna* and *Vachadi Gana Ghanvati* following experiments were carried out in the Department of Rasa Shastra evum Bhaishajya Kalpna, Rishikul Campus, UAU, Haridwar. During pharmaceutical procedure the temperature was between 28°C-31°C and whole procedure was conducted into following experiments:

Experiment No.1: Preparation of *Vachadi Gana Kwatha Churna* & details are shown in table 2. Experiment No.2: Preparation of *Vachadi Gana Kwatha*[1] & details are shown in table 3.

Experiment No.3: Preparation of *Vachadi Gana Ghana*[2] & details are shown in table 4. Principle: Boiling

Experiment No.4: Preparation of *Vachadi Gana Ghanvati* & details are shown in table 5.

Principle: Compression

Vachadi Gana Kwatha was prepared after mixing of raw drugs mentioned in table 1. Then *Ghana* was obtained after boiling procedure. After that granules were prepared through sieve no.20. With the help of Cadmach tablet punching machine the granules form of drugs were compressed and punched into tablets. Due to the elimination of heat and moisture from the granules, stability of the formulation may be increase.

Physico-Chemical Parameters

Vachadi Gana Kwatha Churna & *Vachadi Gana Ghanvati* were analyzed by using qualitative and quantitative parameters at Vasu Research Centre, Vadodara, Gujrat. The analytical parameters mentioned for *Kwatha Churna* and *Ghanvati* (compressed tablets) are, Loss on drying at 105°C, total ash, pH value and water soluble extractives, alcohol soluble extractives, Determination of acid insoluble Ash, water soluble ash, Friability, Disintegration time, Hardness, Average weight, Assay of Alkaloid, diameter of tablet.[3]

HPTLC

High performance thin layer chromatography (HPTLC) is a method for identification of constituents, determination of impurities & quantitative determination of active substances. It allows for the analysis of a large number of compounds both efficiently and cost-effectively. With HPTLC, the same analysis can be viewed using different wavelengths of light, thus providing a complete profile of the plant than is typically observed with more specific types of analyses. **Preparation Of Test Solution –** 1g of sample was weighed

accurately in an Iodine flask. To it 20ml methanol was added, refluxed for 15 min. Then filtered with the help of Whatman filter paper No. 1. The filtrate thus obtained was used for HPTLC fingerprinting.

Preparation of Spray reagent [Anisaldehyde – sulphuric acid reagent]: 0.5 ml Anisaldehyde is mixed with 10 ml Glacial acetic acid, followed by 85 ml Methanol and 5 ml Sulphuric acid (98%).

Measure and record the distance of each spot from the point of its application and calculate the Rf. value by dividing the distance travelled by the spots by the distance travelled by the front of the mobile phase5.

Table no. : 1 Ingredients of Vachadi Gana

S.No.	Ingredients	Latin Name	Part used	Prportion
1.	*Vacha*	Acorus calamus	Root	1
2.	*Nagarmotha*	Cyperus sacriosus	Root	1
3.	*Devdar*	Cedrus deodara	Wood	1
4.	*Shunthi*	Zingiber officinale	Rhizome	1
5.	*Atish*	Aconitum heterophyllum	Root	1
6.	*Haritaki*	Terminalia chebula	Fruit	1

Table no. 2: The amount of ingredients and the successive quantity of *Kwatha Churna* along with average yield and average % loss obtained in the experiment.

S.No.	Name of Drug	Original Amount	*Kwatha Churna* Obtained			Average Yield(gm)	Average loss (%)
			Sample I	Sample II	Sample III		
1.	*Vacha*	150	145	146	148.5	146.5	2.3
2.	*Nagarmotha*	150	145	147	147.5	146.5	2.3
3.	*Devdar*	150	146	146.5	147	146.5	2.3
4.	*Shunthi*	150	146	146.5	146	146.1	2.6
5.	*Atish*	150	146	147	146.5	146.5	2.3
6.	*Haritaki*	150	146	146.5	148	146.8	2.1

Table no. 3: Showing the observations and results during preparation of *Vachadi Gana Kwatha*

Parameters	Sample I	Sample II	Sample III	Mean
Initial qty. of *Kwatha Churna* (g)	2500	2500	2500	2500
Total qty of water (L)	40	40	40	40
Total time for soaking (h)	12	12	12	12

Temp. during preparation of *Kwatha*	90-100 ^{0}C	90-100 ^{0}C	90-100 ^{0}C	90-100 ^{0}C
Total time taken for *Kwatha* (h)	5:30	5:30	5:30	5:30
Total qty. of *Kwatha* obtained (L)	5	5	5	5
Wt. of residue after filteration (g)	6500	6880	7000	6793.3

Table no. 4: Showing results obtained during preparation of *Vachadi Gana Ghana*

Parameters	**Samples**			
	I	**II**	**III**	**Mean**
Total time taken for preparation of *Ghana* (h)	4:30	4:45	4:30	4:35h
Final qty. of *Ghana* obtained before drying (g)	280	308	300	296 g
Total time for drying (h)	27	26	28	27h
Final Qty. of dried *Ghana* obtained (g)	191	190	182	187.5
Percentage of dried *Ghana* obtained (%)	3.82	3.8	3.64	3.75

Table no. 5: Details during preparation of *Vachadi Gana Ghanvati*

Weight of *Ghana*	**No. of Tablets obtained**	**Weight of each tablet**
187.5	360	500mg

1) Organoleptic Parameters –

Table no. 6: Organoleptic characters of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati*

Parameters	***Vachadi Gana Kwatha Churna***	***Vachadi Gana Ghanvati***
Colour	Brown	Dark Brown
Taste	Characteristic	Characteristic
Odour	Characteristic	Characteristic

2) Physico-chemical Parameters-

Table no. 7: Physicochemical Characters of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati*

Parameters	*Vachadi Gana Kwatha Churna*	*Vachadi Gana Ghanvati*
Loss on drying %	11.88%	-
pH	-	3.82
Aqueous Extractive Value%	20.47%	-
Alcoholic Extractive Value %	21.51%	-
Total Ash %	4.90%	-
Acid Insoluble Ash%	0.83%	-
Water Soluble Ash%	-	-
Particle size	Moderately coarse powder	-
Average Weight (mg)	-	496.65
Disintegration time (min.)	-	25 min 28 sec
Hardness(kg/cm^2)	-	4.9 kg/cm^2
Friability(%w/w)	-	0.089%
Diameter(mm)	-	10.73
Assay of Alkaloid	-	1.14%

3) Assay for Heavy Metals-

Table no. 8: Assay for heavy metals of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati*

Heavy Metals	*Vachadi Gana Kwatha Churna*	*Vachadi Gana Ghanvati*
Lead	ND	ND
Cadmium	ND	ND
Arsenic	0.329 ppm	0.243 ppm
Mercury	ND	ND

ND = Not Detected

4) Test for Microbial contamination-

Table no. 9: Microbial contamination of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati*

Test (cfu/gm)	*Vachadi Gana Kwatha Churna*	*Vachadi Gana Ghanvati*	Possible Limit	Refrence
Total Plate Count	76 cfu/gm	10 cfu/gm	100000 cfu/gm	API
Total Yeast and Mould Count	Absent	Absent	1000 cfu/gm	API

Table no.10: Result of Specific pathogen Analysis of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati*

Parameter	*Vachadi Gana Kwatha Churna*	*Vachadi Gana Ghanvati*	Possible Limit	Refrence
E.coli	Absent	Absent	Absent	API
Salmonella	Absent	Absent	Absent	API
S.aureus	Absent	Absent	Absent	API
P.aeruginosa	Absent	Absent	Absent	API

RESULTS AND DISCUSSION

Pharmaceutical Study

During the preparation of *Vachadi Gana Kwatha Churna* the yield from raw drug were found to be 99% with *Vacha*, 98.3% with *Nagarmotha*, 98% with *Devdaru*, 97.3% with *Shunthi*, 97% with *Atisa* and 98.6% with *Haritaki*. Maximum loss was seen during *Kwatha Churna* preparation due to manual errors such as scattering during crushing. Drugs having more fibrous parts showed more % loss. For preparation of *Vachadi Gana Ghanvati*, *Vachadi Gana Kwatha* was prepared as per the text *Sharagadhar Samhita*, sixteen times of water has been added to the *kwatha churna* material, soaked overnight, the volume of which was reduced to 1/8th on the next day. Average temperature observed during the preparation of *Kwatha* i.e. 95°C. The solubility of the compound in a solvent increases by increasing temperature and up to some extent higher temperature facilitates penetration of the solvent into the cellular structure of the organism to be extracted. *Ghana* is the most concentrated form of active constituents. That is why the formulation is more acceptable than *Kwatha* form. The average yield of *Vachadi Gana Ghana* was 3.75%. Loss was encountered may be due to adherence to hand gloves during collection and also sticking to the equipment. For preparation of *Vachadi Gana Ghanvati*, granules (sieve no 20) were compressed and punched into 500mg (approx.) tablets and 96.6% final yield was obtained.

Organoleptic Characters

Organoleptic features like colour, odour, and taste of *Vachadi Gana Kwatha Churna* and *Vachadi Gana Ghanvati* were observed and are placed at table 6.

Physico-Chemical Parameters

Physico-chemical parameters of *Vachadi Gana Kwatha Churna* & *Vachadi Gana Ghanvati* like Loss on drying, uniformity of *vati*, Disintegration time, friability, assay of alkaloid are within normal range. In test for heavy metals, Arsenic detected in both of the formulations is within permissible limit, microbial estimation all were found to be within the normal range. Details are placed at table 7-9.

HPTLC (High performance thin layer chromatography)

In HPTLC profile, the number of spots was found different at different wavelengths. In short UV (254nm), 6 spots were observed in *Vachadi Gana Ghanvati*. In long UV (366nm) the number of spots observed in Ghanvati are 7. In *Vachadi Gana Ghanvati* 13 spots were observed at UV (540 nm). R_f Value 0.09, 0.48 was found at all three wavelengths. R_f Value 0.13 is common at UV (254nm) and UV (366nm). R_f Value 0.52, 0.60 was found common at UV (254nm) and UV (540nm). R_f Value 0.56 was found common at UV (366nm) and UV (540nm).

CONCLUSION

Here, *Vachadi Gana* is used for the management of *Sthaulya*. *Kwatha Kalpana* is one of the most important, very effective and widely used dosage form but it has also some disadvantages like as difficulties in ensuring quality control of herbal ingredients, time and inconvenience required during its preparation, transportation, storage and is difficult to take in fix dose. These obstacles lower the complaisance and may impede with treatment. So it is need of the hour, to make advancement in its dosage forms so they will become more easily palatable, easy to handle, convenient transport and the potency of the drug should also be maintained as there should be no change in efficacy of drug, it is good to make it more potent and effective. Considering all these issues, so scholar had an attempt to prepare a new dosage form i.e. *Vachadi Gana Ghanvati* of the formulation and compare it on analytical parameters. The ingredients were identified, authenticated and used for the preparation. The formulation was subjected to physico-chemical, and HPTLC studies. It is concluded that both formulations had all qualitative standards as mentioned in the API. The Pharmaceutical parameters from this study may be used as a reference standard in further quality control researches.

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