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## A NOBLE STUDY ON PHARMACEUTICAL AND PHYTOCHEMICAL ANALYSIS OF NIMBATWAGADI GHANAVATI -A POLYHERBAL FORMULATION

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### Abstract

Nimbatwagadi kashaya is a polyherbal preparation which is in liquid form and bitter for palatability many times the patients reject or discontinue taking Ayurveda medicine because of palatability. Different dosage forms are explained in the Ayurveda system of medicine hence the present study was taken up for the preparation of ghanavati of Nimbatwagadi kashayam of sahasraya yoga kashaya prakarana. The prepared vati was subjected for physicochemical and phytochemical analysis, HPTLC, microbial load as per the who guidelines .efforts were made to laydown the analytical standars for the Nimbatwagadi ghanavati which were not reported till date. Loss on drying 3.767% , Ash value-14.064%, Acid insoluble ash 1.04%, Water soluble extractive-74.832,Alcohol soluble extractive-8.514%, Hardness-3.0kg/cm, Friability-0.400%, Disintegration-30 min, Ph-5.58%, in HPTLC of Nimbatwagadi Ghanavati maximum five sports at short UV and 4 spots at long UV. Microorganisms in the formulation was zero.

**Key words-** Nimbatwagadi Ghanavati, Physico chemical Analysis, Phytochemical Analysis, HPTLC

## Introduction

Ayurveda system of medicine explains about various dosage forms. In that consistency wise dosage forms is further classified as solid, liquid and gaseous<sup>1</sup>. Nimbatwagadhi kashaya is one such liquid dosage form polyherbal preparation explained under kamalahara kashaya prakarana in Sahasra Yoga text book. Nimbatwagadhi kashaya comprises of following ingredients Nimbatwak, Triphala, Patola, Rajani(Haridra), Vaasa, Amruta (Guduchi), Saariva, Shyama, Tamalaki(Bhumiamalaki), Phalanksha(Gokshura), Bala, Nili, Sthira(Prishnaparni), Yeshti. Phalashruti of this kashaya is as follows, administration of this kashaya with honey,pippali, and shilajatu for 5days will cure Kumbhakamala and Halimaka<sup>2</sup>. Main disadvantage of kashaya preparation is palatability, storage and transport difficulties.

The kashayas(decoctions) are used as base in preparation of medicated oils, ghee, arista, rasakriya etc<sup>3</sup> With the concept of rasakriya classical formulation of Nimbatwagadhi Kashaya was modified into a ghanavati form for better efficacy and palatability.

This kashaya is further boiled to form the raskriya/Ghana. Ghana or Rasakriyas are solidified decoctions or swarasa of a drug or drugs. In other words they are water soluble extracts in solid form. All water soluble principles of a drug can be extracted and preserved for more days, when compared to decoction, powder, and other preliminary preparations. The dose of a drug could be minimized in this form. It becomes easy to consume bitter drugs in this form<sup>4</sup>.

WHO estimates that approx 81% of the world populations presently use herbal medicine for primary health care<sup>5</sup>. Herbal drugs of Ayurveda are widely used now a days because of their effectiveness and less side effects hence preparation of the medicine according to standards is very important. World Health Organization has set specific guidelines for the assessment of final herbal product for the safety, efficacy, and quality of herbal medicines<sup>6</sup>.

In the present study effort is made to prepare Nimbatwagadhi Ghanavati as per classical reference. The organoleptic, physicochemical and phytochemical HPTLC and microbial

analysis was done by considering the Parameters mentioned for standardization of vati/gutika/modaka as the preparation is in vati form.

## Materials and Methods:

### Collection of Raw Drugs

All the required raw drugs was collected from KLE pharmacy and authenticated of raw drugs was done in central research facility, Shri BM K Ayurveda Mahavidyalaya Belgam. The list of the ingredients mentioned in table no 1

**Table No1: Ingredients of Nimbatwagadi Kashaya with Quantity**

Sl No	Drug Name	Botanical Name	Part used	Quantity
1.	Nimbatwak	Azadirachta indica	Bark	1part
2.	Haritaki	Terminalia chebula	Fruit	1 part
3.	Vibitaki	Terminalia bellerica	Fruit	1 part
4.	Amalaki	Emblica officinalis	Fruit	1part
5.	Patola,	Trichosanthes dioica	Whole plant	1part
6.	Rajani(Haridra),	Curcuma longa	Rhizome	1part
7.	Vasa	Adhatoda vasica	Leaves and root	1part
8.	Amruta(Guduchi)	Tinospora cordifolia	Stem	1part
9.	Sariva	Hemidesmus indicus	Roots	1part
10.	Shyama,	Operculina turpenthum	Roots	1part
11.	Tamalaki(Bhumiamalaki)	Phyllanthus urinaria linn	Whole plant	1part
12.	Phalankasha(Gokshura)	Tribulus terrestris	Root and fruit	1part
13.	Bala	Sida cardifolia	Roots	1part
14.	Nili(Neelini)	Indigofera tinctoria	Whole plant	1part
15.	Sthira(Prishnaparni)	Uraria picta desv	Roots	1part
16.	Yeshti(Yestimadhu)	Glycyrrhiza glabra	Rootsand stolons	1part

### **Preparation of Nimbatwagadi Ghanavati**

All the individual drugs were taken in equal parts, kept for soaking overnight by adding  $1/4^{\text{th}}$  quantity of water in the total measurement of the water. On the next day after adding remaining amount of water it was kept over low flame till volume of water reduced to  $1/4^{\text{th}}$ . During complete process of making kashaya the continues stirring was there. To maintain the uniform low temperature the biogas masifier is used

After complete preparation of the kashayam, container was taken out of fire and allowed for complete cooling (swanga sheeta) and the content was filtered to another vessel through a fine clean cloth. Thus obtained kashaya is Nimbatwagadhi kashaya. This kashaya is again subjected for reheating under continues low flame. After about  $1/4^{\text{th}}$  of water evaporated the consistency of the liquid started to thicken slowly. The heating process was continued till the semisolid mass is obtained care is taken so that the sticking of the mass to the container and overheating is avoided. Then that cooled semisolid paste is spread very thin on the plastic sheet in a tray with the help of spatula, subjected for drying naturally under sun. It took almost more than a week for completely drying. After drying it was very hard, it made into small pieces by breaking. The powder of the Ghana of Nimbatwagadi kashaya is obtained. This Ghana powder was then punched into tablet form which is measuring about 500mg each. Thus prepared tablets were stored in air tight jar.

### **Physiochemical and Phytochemical parameters**

The finished drug was analyzed by using qualitative and quantitative parameters at central research facility Shri B M Kankanawadi Ayurveda Mahavidyalaya, Belgam. Physical tests like organoleptic characteristics ,physico chemical , phytochemical analysis, was carried out.

### **HPTLC**

1gm of sample of each of Nimbatwagadhi Ghanavati, was dissolved in 10.0ml of ethanol kept overnight and filtered. 6 $\mu$ l of each of the above extract was applied on a pre-coated silica gel F<sub>254</sub> on aluminum plates to a band width of 7 mm using Linomat 5 TLC applicator. Kshara agada sample plate was developed in Toluene: Ethyl acetate: Formic Acid

(5.0:3.5:0.5). The developed plates were visualized in short UV, long UV and then derivatised with Vanillin sulphuric acid (VSA) reagent subsequently scanned under UV 254nm, 366nm and 620nm (after derivatisation).  $R_f$ , colour of the spots, densitometric scan and 3-D chromatograms were recorded.

### Microbial Load analysis

Preparation of Casein Soya bean Digest Agar Medium (CSDAM): Casein peptone (15 g), Soya peptone (5 g), Sodium Chloride (5 g) were taken and dissolved in 990 ml distilled water and pH was adjusted to  $7.3 \pm 0.2$  and make up the volume to 1000 ml. Finally add 15 g of agar to the media and autoclaved at  $121^\circ\text{C}$  for 20 minutes.

HPTLC and Microbial load analysis was done in Sri Dharmasthala Manjunatheshwara centre for research in Ayurveda and allied sciences, Kuthpady, Udupi.

## OBSERVATIONS AND RESULTS

### Organoleptic evaluation

Various parameters such as colour, odour, taste etc of Nimbatwagadi Ghanavti were observed and recorded. The results were mentioned in table no2

**Table no2: Organoleptic characteristics of Nimbtwagadhi ghanavati**

Sl No	Parameters	Results
1	Form	Vati
2	Colour	Dark Brown colour
3	Odour	Characteristic
4	Taste	Sour,bitter and astringent

### Physicochemical analysis

Physicochemical analysis were carried out by following parameters i.e loss on drying, total ash, acid insoluble ash, water soluble extract, alcohol soluble extract ,average weight, hardness, friability, disintegration, pH results were mentioned in the table no3

**Table No: 3 Physico chemical analysis parameters and results**

Sl No	Parameters	Results
1	Loss on drying	3.767%
2	Total ash	14.064%
3	Acid insoluble ash	1.047%
4	Water soluble extract	74.832%
5	Alcohol soluble extract	8.5145%
6	pH value(5% solution)	5.58
7	Tablet Hardness	3.0kg/cm
8	Friability test	0.400%
9	Disintegration	30 min
10	Average weight	476.3mg

### Phytochemical analysis

Preliminary phytochemical analysis was done and the results were mentioned in the table no 4.

**Table No: 4 Phyto chemical analysis parameters and results**

Sl No	Components	Water	Alcohol
1	Test for carbohydrates	Positive	Negative
2	Reducing sugar	Positive	Positive
3	monosaccharides	Negative	Positive
4	Pentose sugar	Negative	Negative
5	Non reducing sugar	Positive	Negative
6	Hexose sugar	Positive	Negative
7	Proteins	Positive	Negative
8	Amino acids	Positive	Negative
9	Steroids	Positive	Negative
10	Flavonoids	Negative	Positive
11	Alkaloids	Negative	Negative
12	Tannins	Positive	Positive
Test For Glycosides			
13	Cardiac glycosides	Positive	Positive
14	Anthraquinone glycosides	Negative	Positive
15	Saponin glycosides	Positive	Positive

### HPTLC Study

The given sample of Nimbatwagadhi ghanavati, was standardized analytically by HPTLC as per testing protocol mentioned in Ayurvedic Pharmacopoeia of India. Results as R<sub>f</sub> values, Densitometric scan and 3-D Chromatogram are presented in respective tables and figures

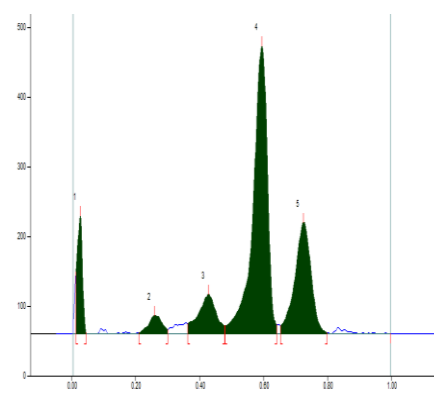
**Table no5 : Rf value of Ethanolic extract of Nimbatwagadi Ghanavati at short UV, long UV and after derivatisation**

No of spots	Short UV	No of spots	Long UV	No of spots	After derivatisation
1	0.22(D green)	1	0.12(f blue)	1	0.49(PINK)
2	0.40(green)	2	0.25(f dark blue)		-
3	0.47(green)		-	2	0.59(PURPLE)
4	0.53(D green)		-		-
5	0.65(green)	3	0.53(f red)		
		4	0.86(f green)		

**Figure 1. Densitometric scan of Ethanolic extract at 254nm**

Track 2, ID: Nimbatwagadi ghanavati

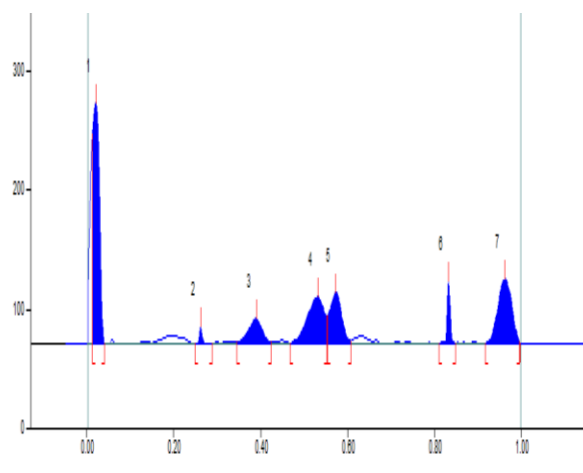
Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	147.8 AU	0.01 Rf	147.8 AU	17.37 %	0.04 Rf	0.0 AU	584.7 AU	1.79 %
2	0.17 Rf	0.2 AU	0.27 Rf	533.9 AU	62.72 %	0.37 Rf	0.6 AU	27777.3 AU	84.83 %
3	0.39 Rf	1.3 AU	0.44 Rf	27.5 AU	3.24 %	0.47 Rf	3.9 AU	678.3 AU	2.07 %
4	0.48 Rf	4.1 AU	0.52 Rf	31.6 AU	3.71 %	0.56 Rf	20.4 AU	1055.2 AU	3.22 %
5	0.56 Rf	20.6 AU	0.59 Rf	68.0 AU	7.99 %	0.65 Rf	0.4 AU	1606.7 AU	4.91 %
6	0.69 Rf	3.4 AU	0.73 Rf	31.1 AU	3.65 %	0.78 Rf	2.0 AU	867.7 AU	2.65 %
7	0.90 Rf	0.6 AU	0.95 Rf	11.3 AU	1.33 %	0.97 Rf	1.3 AU	175.5 AU	0.54 %

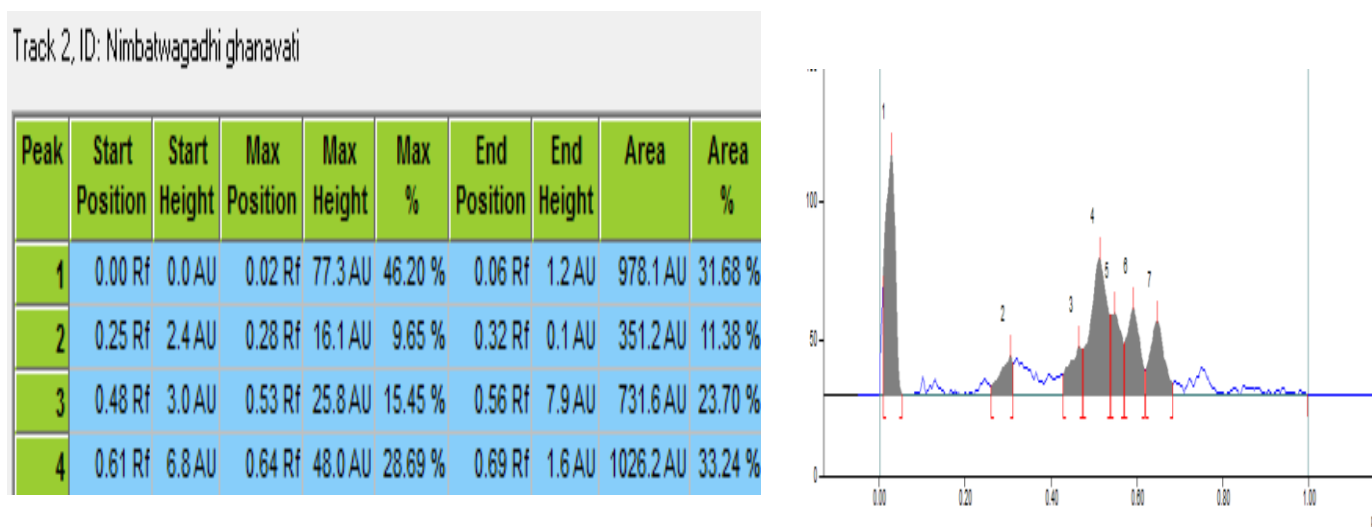


**Figure 2. Densitometric scan of Ethanolic extract at 366nm**

Track 2, ID: Nimbatwagadi ghanavati

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.06 Rf	0.1 AU	0.17 Rf	38.4 AU	22.23 %	0.26 Rf	0.2 AU	2532.1 AU	27.30 %
2	0.28 Rf	0.1 AU	0.37 Rf	54.0 AU	31.24 %	0.42 Rf	33.5 AU	3173.4 AU	34.21 %
3	0.55 Rf	28.9 AU	0.58 Rf	65.4 AU	37.80 %	0.71 Rf	15.2 AU	3167.2 AU	34.14 %
4	0.92 Rf	5.8 AU	0.95 Rf	15.1 AU	8.73 %	0.99 Rf	0.1 AU	403.9 AU	4.35 %



**Figure 3. Densitometric scan of Ethanolic extract at 620nm (after derivatisation)**

### MICROBIAL LOAD

The given sample Nimabatwagadi Ghanavati was free from microorganisms. The results were mentioned in table no6.

**Table No 6: Microbial load analysis of Nimabatwagadi Ghanavati**

Sl. No.	Dilutions	Number of Colonies (NOC)		CFU/ml
1	Direct	0	0	0

### DISCUSSION

Preparation of Ghanavati is a tedious procedure like preparation of kashaya, filtering, reheating continuous stirring, maintaining uniform temperature, drying under sun and powdering and punching etc some time if it is not dried completely it will be very difficult to powder it and also for punching the tablets. It is also very expensive preparation as the yield is only 10%, need more quantity of raw drugs for preparation than regular vati preparation if the ingredients are more of fibrous in nature and may be suitable for the drugs which have more starch content. The Ghanavatis are like in concentrated form dose

of the medicine may be reduced in this dosage form. The vati were found to have 476.3mg average weight  $\pm$  10% range of weight variation is acceptable<sup>7</sup>. Bioavailability of the medicine is depending on harness and disintegration of the vati. Nimbatwagadi Ghanavati found to be having hardness of 3.0kg/cm and 30 min for disintegration which was found to be within normal limits. Moisture content (loss on drying) found to be 3.767% which is also within normal limit if the moisture content is more it may easily catch the microbial contamination. Ash value is the criteria for considering the purity of crude drug. Nimbatwagadi Ghanavati contained 14.064% of total ash and 1.047% of acid insoluble ash. The 74.832% w/w of water soluble extractive and 8.514%w/w of alcohol soluble extractive were present this indicated the drugs are having very good solubility in water. In HPTLC of Nimbatwagadi Ghanavati maximum five spots at short UV and 4 spots at long UV.

## CONCLUSION

Physicochemical and phytochemical analysis which were carried out in the present study it can be concluded that the formulation of Nimbatwagadi Ghanavati contains all good characters of an ideal vati, and also the formulation is of good quality and purity. API standards are not mentioned for this formulation. Hence the obtained results of present study may serve as reference standards in the preparation of drug formulation and may also help in further clinical research.

## References

1. Devendra Josi, Introduction to Ayurvedic Pharmaceutics, Chaukhamba Orientalia, Varanasi, 2014, chapter1, p3.
2. Nishteswar, Sahasrayogam, kashaya prakarana, 2<sup>nd</sup> edition 2008, Chowkhamba Krishnadas Academy.varanasi, p37.
3. Dr shobha G Hiremath –A Text Book of Bahisajya –Kalpana ,IBH prakashana,Bangalore,2016,chapter 9,p103.
4. Dr shobha G Hiremath –A Text Book of Bahisajya –Kalpana ,IBH prakashana, Bangalore, 2016,chapter 10,p137.

5. P. Nainwal Dev -Pharmacovigilance of Herbal Medicines: An Intangible Approach IJPSR, 2010,Vol 1/11.
6. [https://cdn.who.int/media/docs/default-source/medicines/norms-and-standards/guidelines/production/trs1010-annex2-who-gmp-manufacture-herbal-medicines.pdf?sfvrsn=9241812\\_0&download=true](https://cdn.who.int/media/docs/default-source/medicines/norms-and-standards/guidelines/production/trs1010-annex2-who-gmp-manufacture-herbal-medicines.pdf?sfvrsn=9241812_0&download=true).
7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3361938/>