



## Research Article

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### COMPARATIVE PHARMACEUTICAL STUDY OF DIFFERENT KALPANAS OF SANKHPUSHPI & ITS MICROBIAL ANALYSIS

Mitra Shuchi<sup>1\*</sup>, Saxena G.K.<sup>2</sup>, Verma Nisha<sup>3</sup>, Kestwal Kamini<sup>3</sup>

<sup>1</sup>Associate Professor, P.G. Department of Rasa-Shastra & Bhaishajya Kalpana, Rishikul Government Ayurvedic P.G. College & Hospital, Haridwar, Uttarakhand, India

<sup>2</sup>Principal, Quadra Institute of Ayurveda, Roorkee, Haridwar, Uttarakhand, India

<sup>3</sup>P.G. Scholar P.G. Department of Rasa-Shastra & Bhaishajya Kalpana, Rishikul Government Ayurvedic P.G. College & Hospital Haridwar, Uttarakhand, India

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#### \*Corresponding author

Dr. Shuchi Mitra, Associate Professor, P.G. Department of Rasa-Shastra & Bhaishajya Kalpana, Rishikul Government Ayurvedic P.G. College & Hospital, Haridwar, Uttarakhand, India E-mail: drshuchirsk@gmail.com

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#### ABSTRACT

The intellectual capability of children have become a matter of concern for the scientific community. The effect of Ayurvedic drugs in improving the intellectual capacity should be subjected for a thorough analysis. Acharya Charaka has described four drugs under the heading Medhya Rasayana. Among these, Sankhpushpi advocated in kalka form is considered as the best. Five different dosage forms of Sankhpushpi were prepared. Two samples of each dosage forms were prepared with tap water and Gangajal and a comparative microbial analysis has been done and a data was generated for quality control of these formulations by adopting advanced analytical techniques. The dosage forms of Sankhpushpi were prepared: Sharkar, Arka, Ghanvati, Ghrit and Churna. The microbial analysis was done as per standard given in PLIM Protocol for testing of Ayurvedic, Siddha and Unani Medicines. Total bacterial counts of the samples prepared with Gangajal were found to be comparatively lesser as compared to the tap water. Among various dosage forms, Syrup and Arka were found to be cost effective. So the present study concluded that, according to the cost effectiveness syrup and Arka are the best and if we prepare these with Gangajal, the preparation will have comparatively lesser microbial count.

**Keywords:** Sankhpushpi, Medhya Rasayana, Microbial analysis.

#### INTRODUCTION

Ayurvedic drugs are best described as herbal, mineral and herbo-mineral. The herbal medication are more accepted today on national and international level as these have less or negligible adverse effect on human health.<sup>1</sup> "Medha" has been defined as "Dhee dharanvati medha" by Amarkosha<sup>2</sup> and the drugs which improve the function of Medha have been termed as Medhya. Rasayana is the unique therapeutic modality to rejuvenate the body and mind.<sup>3</sup> So, Medhya Rasayana specially influence the Medha (memory), promote mental competence along with quality of life. Arka, Sneha, Churna, Sharkar and Vati Kalpana are modified form of Panchavidha Kashaya Kalpana to make the availability of the drug throughout the year, longer shelf life, palatability, quick action, elegant look and pleasant smell.

#### MATERIAL AND METHODS

##### Procurement of Raw Material

Fresh and mature plant of Sankhpushpi (*Convolvulus microphyllus* Sieb Ex Spreng) was collected from village area of District Muzzafanagar, India.

##### Preparation of sankhpushpi sharkar (syrup)

Sankhpushpi was cut into small pieces and kept in water for overnight. Next day morning the contents were heated

on mandagni (30-40 °C) and reduced to ¼ quantity. Now 2 kg sugar was added to the kwatha and then citric acid and alum was added to it. The contents were slowly heated till tantuyukta *stage* was obtained.

##### Preparation of sankhpushpi arka (distillates)

Sankhpushpi was dipped in water. Next day it was transferred to distillation apparatus. The apparatus was then heated, initially at 100 °C. and after 10 minutes temperature was reduced to 60 °C and maintained. After 35 minutes Arka started draining out in the receiver. Arka was collected up to 1/3rd amount of water.

##### Preparation of sankhpushpi ghanvati (tablet)

Firstly Sankhpushpi kwatha was prepared and boiled over mandagni till it reaches to thick consistency. Then the contents were spread uniformly and exposed to sunlight for 2 to 3 days and molded into tablets.

##### Preparation of sankhpushpi ghrit (ghee)

Firstly ghrit murrchana was done as per given in Bhaishjya Rantavali. Then paka of murrchita ghrit was done with Sankhpuspi kwatha and kalka till the attainment of sneha sidhi lakshanas.

**Preparation of sankhpushpi rasayana churna (powder)**

Firstly Sankhpushpi churna and swarasa were prepared. Then the trituration of churna was done with swarasa till the attainment of desired condition.

**Analytical Study**

The five preparations selected for the present study, i.e Sankhpushpi Arka, Sankhpushpi Ghrit, Sankhpushpi Sharkar, Sankhpushpi Vati, Sankhpushpi Rasayana were prepared without altering the classical methods and by using authenticated raw material.

**Microbial Analysis**

**Media Preparation for Bacterial Count**

Take 10 gm soybean casein digest agar, dilute to 250 ml with distill water and sterilize for 30 minutes at 15 lb/inch. Plate count for bacteria was done as per standard method given in the Protocol for testing of Ayurvedic, Siddha and Unani Medicines. <sup>4</sup> Table 11 and Figure 1 to 5 shows the total bacterial count of the different formulations of Sankhpushpi.

**Table 1: Practical Details of Sankhpushpi Sharkar<sup>5</sup> (Syrup)**

Parameters	Sharkar (Tap water)	Sharkar (Gangajal)
Sankhpushpi panchang	1 kg	½ kg
Amount of water	4 liters	2 liters
Yield of kwath	1.100 liters	560 ml
Time taken in kwath formation	2 hour	50 minutes
Temperature during preparation	85-90°C	85-90°C
Amount of sugar	2 kg	1 kg
Yield of syrup	2.8 liter	1.3 liter

**Table 2: Practical Details of Sankhpushpi Arka<sup>5</sup> (Distillates)**

Parameters	Arka (Tap water )	Arka (Gangajal)
Amount of Sankhpushpi	200gm	100 gm
Amount of water	2 liter	1 liter
Arka start draining out	After 45 minutes	After 40 minutes
Yield	650 ml	330 ml

**Table 3: Practical Details of Sankhpushpi Ghanvati<sup>6</sup> (Tablet)**

Parameters	Ghanvati (Tap water )	Ghanvati (Gangajal)
Amount of Sankhpushpi	2 kg	1 kg
Amount of water	8 liters	4 liters
Yield of kwath	2.100 liters	1.100 ml
Time taken in kwath formation	4 hour	2.10 hours
Temperature observed	85-90°C	85-90°C
Time taken in kwatha to ghan formation	1.30 hour	50 minutes
Yield	280 gm	150 gm

**Table 4: Practical Details of Sankhpushpi Ghrit<sup>7</sup> (Ghee)**

Parameters	Ghrit (Tap water )	Ghrit (Gangajal)
Amount of Sankhpuspi	1.2 kg	800 gm
Amount of water	4.8 liters	3.2 liters
Yield of kwath	1.2 liters	850 ml
Time taken in kwath formation	2 hour	1.15 hours
Temperature observed	85-90°C	85-90°C
Amount of Sankhpushpi kalka	75 gm	50 gm
Amount of Murchhit ghrit	300 gm	200 gm
Amount of Sankhpushpi ghrit	235 gm	156 gm

**Table 5: Practical Details of Sankhpushpi Rasayana Churna<sup>8</sup> (Powder)**

S.no.	Parameters	Quantity
1.	Sankhpushpi panchang	250 gm
2.	Sankhpushpi swarasa	70 ml
3.	Sankhpushpi churna taken	200 gm
4.	After one bhavana	204 gm
5.	After second bhavana	207 gm
6.	After third bhavana	210 gm
7.	Sankhpushpi Rasayana Churna	210 gm
8.	Increase in weight	10 gm

Here the two samples of Sankhpushpi Rasayana Churna are prepared, one with tap water and other with Gangajal through same procedure.

**Table 6: Physico-Chemical Parameters of Sankhpushpi Sharkar (Syrup)**

Physico-chemical Parameter	Sharkar (with Tap water)	Syrup (with Gangajal)
pH	4.45	4.47
% of Sucrose	69%	68%
Specific Gravity	1.16	1.17
Wt/ml	1.14	1.15

**Table 7: Physico-Chemical Parameters of Sankhpushpi Arka (Distillates)**

Physico-chemical Parameter	Arka (with Tap water)	Arka (with Gangajal)
pH	8.02	8.07
Specific Gravity	1.0013	1.0016

**Table 8: Physico-Chemical Parameters of Sankhpushpi Ghanvati (Tablet)**

Physico-chemical Parameter	Ghanvati (Tap water)	Ghanvati (with Gangajal)
Total Ash	16.45	16.93
Acid insoluble Ash	4.46	4.04
Water soluble extractive	14.02	14.96
Alcohol soluble extractive	7.28	6.86

**Table 9: Physico-Chemical Parameters of Sankhpushpi Ghrít (Ghee)**

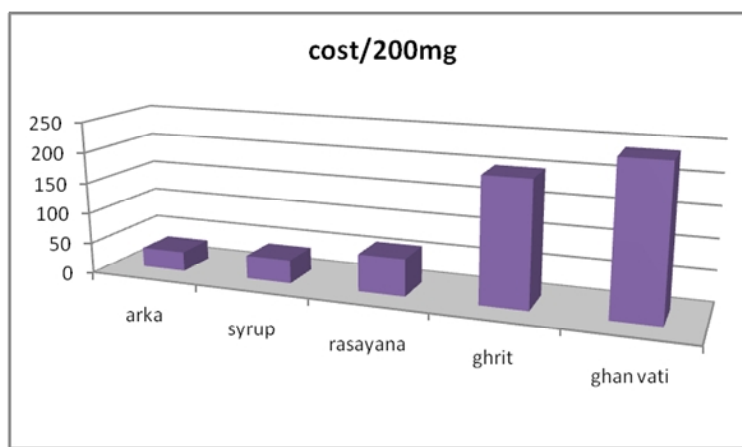
Physico-chemical Parameter	Ghrít (with Tap water)	Ghrít (with Gangajal)
Refractive index at 40°C	1.434	1.420
Acid value	0.55	0.52
Saponification value	3.79	3.72

**Table 10: Physico-Chemical Parameters of Sankhpushpi Rasayana Churna (Powder)**

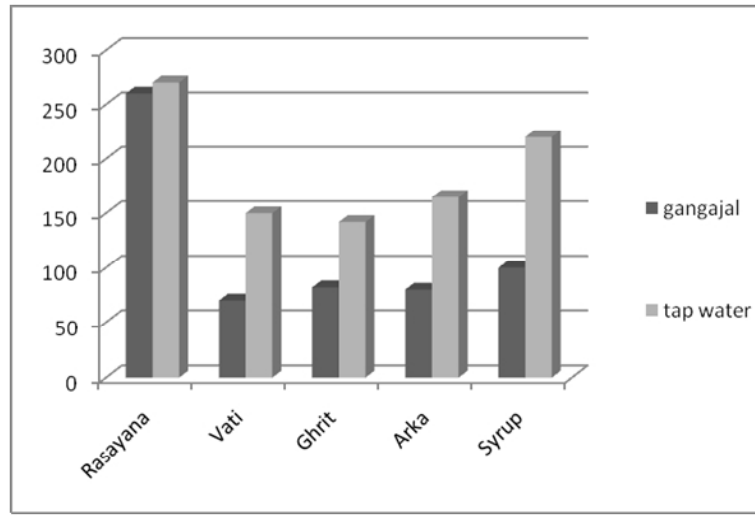
Physico-chemical Parameter	Rasayana Churna (Tap water)	Rasayana Churna (Gangajal)
Total Ash	17.28	18.02
Acid insoluble ash	5.06	5.86
Water soluble extractive	16.20	16.94
Alcohol soluble extractive	8.28	7.93

**Table 11: Total Bacterial Count**

Name of Preparation	With Tap water	With Gangajal
Sankhpushpi Sharkar	220 cfu/ml	100 cfu/ml
Sankhpushpi Arka	165 cfu/ml	80 cfu/ml
Sankhpushpi GhanVati	150 cfu/ml	70 cfu/ml
Sankhpushpi Ghrít	142 cfu/ml	82 cfu/ml
Sankhpushpi Rasayana Churna	270 cfu/ml	260 cfu/ml



**Graph 1: Cost of different preparations of sankhpushpi**



Graph 2: Total bacterial count of different preparations of sankhpushpi



Sharkar (Tap Water)



Sharkar (Gangajal)

Figure 1: Microbial Analysis of Sankhpushpi Sharkar (Syrup)

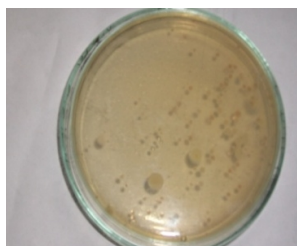


Arka (Tap Water)



Arka (Gangajal)

Figure 2: Microbial Analysis of Sankhpushpi Arka (Distillates)

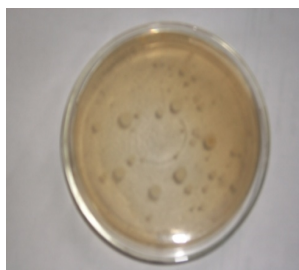


Ghanvati (Tap Water)



Ghanvati (Gangajal)

Figure 3: Microbial Analysis of Sankhpushpi Ghanvati (Tablet)



Ghrit (Tap Water)



Ghrit (Gangajal)

Figure 4: Microbial Analysis of Sankhpushpi Ghrit (Ghee)



Rasayana (Tap Water)



Rasayana (Gangajal)

Figure 5: Microbial Analysis of Sankhpushpi Rasayana Churna (Powder)

## RESULT

Because yield is minimum in ghan vati so cost has been maximum for it. Graph no.1 shows the cost of different formulation of Sankhpushpi.

A comparative analysis of total bacterial count of the samples prepared with tap water and Gangajal was done. Graph 2 shows the total bacterial count of different formulation of Sankhpushpi. The results shows that the samples prepared with Gangajal have less bacterial count.

## DISCUSSION

Sankhpushpi is not available throughout the year, that's why it is essential to convert it into different kalpanas. The different kalpanas of Sankhpuspi were prepared by the scholar.

Sharkar (syrup) is palatable liquid formulation and easy to administer specially in children. Arka has the advantages of longer shelf life period<sup>5</sup>, easy administration, dose fixation, palatability and wide therapeutic range. Ghanvati ensures that the patient is getting exact amount of the drug. It was prepared by kwatha of the drug.<sup>6</sup> During kwatha kalpana, maximum amount of water soluble constituents of the drug get into it and the growth of micro-organisms get hampered due to boiling of kwatha. Sneha Kalpana favors the quick absorption and drug diffusion across the cell membrane. During ghrit murchana fatty acids concentration increases which become helpful in micelle formation that forms bond with water soluble part from kwatha, swarasa etc. Rasayana Churna was made by bhavana of Sankhpushpi swarasa in churna. Bhavana of swarasa increases its potency as the molecules present in swarasa binds in between churna particles thereby increasing its bioavailability.<sup>8</sup> Two

samples of each dosage form were prepared by using Tap water and Gangajal. On microbial analysis, the samples prepared with Gangajal was found to have lesser bacterial count which proves that Gangajal was saturated with antiseptic minerals and has antimicrobial activity due bacteriophage present in it. Also by analytical study, it was found that the percentage of sucrose in tap water is 68% and in Gangajal was 70 %, this concentration retards the growth of microorganisms and the pH of syrup with tap water was 4.45 and pH of syrup with Gangajal was 4.68, this acidic pH favours breakdown of sucrose into glucose and fructose. So the above study proves the antimicrobial property of Gangajal. With the analysis done on the yield, it is minimum for Ghanvati and maximum for Syrup and Arka.

## CONCLUSION

So the above study proves the antimicrobial property of Gangajal in selected preparation. With the analysis done on the yield, it is minimum for Ghanvati and maximum for Syrup of Shankhpushpi.

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