

COMPARATIVE PHARMACEUTICAL STUDY OF DIFFERENT FORMULATIONS OF SHANKHPUSHPI AND MICROBIAL ANALYSIS USING GANGAJAL AND TAP WATER

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ABSTRACT:

Background: 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 which is the need of the day. Acharya Charaka has described four drugs under the heading *Medhya Rasayana*. Among these, *Sankhpushpi* is the best and advocated in *kalka* form.^[1] **Aim:** Five different dosage forms of *Sankhpushpi* are prepared. Two samples of dosage forms are prepared with Tap water and *Gangajal* and a comparative microbial analysis is done. (as *Gangajal* is known for their antimicrobial activity). **Method:** The dosage forms of *Sankhpushpi* to be prepared are following : *Sharkar, Arka, Ghanvati, Ghrit, Rasayana*. The microbial analysis are done as per standard given in Protocol for testing of Ayurvedic, Siddha and Unani Medicines.^[2] **Result:** Total bacterial count of the samples prepared with *Gangajal* is comparatively less. According to the cost syrup and *arka* are the best preparation. **Discussion:** To make the availability of the drugs throughout the year, it is essential to convert the drug into the formulation without losing their potency. Among the five different *upkalpanas* of *Sankhpushpi* *Arka* and *Sharkar* is cost effective. On microbial analysis the total bacterial count of the samples prepared with *Gangajal* is less that proves antimicrobial property of *Gangajal*. **Conclusion:** So the study conclude that according to the cost, syrup and *arka* are the best and if we prepare these with *Gangajal* the preparation will have comparatively less microbial count.

Key Words: *Sankhpushpi, Medhya Rasayana, Microbial Analysis.*

INTRODUCTION:

'Medha' has been defined as "Dhee dharanvati medha" by Amarkosha^[3] 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.^[4] So, *Medhya Rasayanas* specially influence the medha promote mental competence along with quality of life.

Charaka has considered *Shankhpushpi* (*Convolvulus microphyllus sieb ex spreng*) among the best *medhya rasayana* and advocated it in the *kalka* form.^[1] *Arka, Sneha, Rasayana, Sharkar* and *Vati Kalpana* were modified form of *Panchavidha Kashaya Kalpana* to make the availability of the drug throughout the year, longer shelf life, good taste, quick action, elegant look and pleasant smell. This study had been done with following aims and objectives.

AIMS AND OBJECTIVES:

1. To prepare different *Upakalpanas* of *Shankhpushpi* with Tap water.

2. To prepare different *Upakalpanas* of *Shankhpushpi* with *Gangajal*.
3. To compare the microbial count of all preparations, prepared by using two different media (*Gangajal* and tap water).
4. To generate the data for quality control of these formulations by adopting advanced analytical techniques.

MATERIAL AND METHODS:

Procurement of raw material- Fresh and mature plant of *Shankhpushpi* (*Convolvulus microphyllus sieb ex spreng*) was collected from village area of distt. Muzzafanagar.

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Table 1: Practical details of Shankpushpi Syrup^[5]

Parameters	Syrup (Tap water)	Syrup (Gangajal)
Shankpushpi 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 ⁰ C	85-90 ⁰ C
Amount of sugar	2 kg	1 kg
Yield of syrup	2.8 liter	1.3 liter
Sparsha	Viscous	Viscous
Rasa/Taste	Sweet	Sweet
Rupa/Colour	Yellowish brown	Yellowish brown
Gandha/Odour	Sweet smell	Sweet smell



Figure 1: Shankpushpi Syrup

Table 2: Practical details of Shankpushpi Arka^[6]

Parameters	Arka (Tap water)	Arka (Gangajal)
Amount of Shankpushpi	200 gm	100 gm
Amount of water	2 liter	1 liter
Arka start draining out	After 45 minutes	After 40 minutes
Yield	650 ml	330 ml
Sparsha	Watery	Watery
Rupa/Colour	Transparent white	Transparent white
Rasa/Taste	Tasteless	Tasteless
Gandh/Odour	Characteristic to Shankpushpi	Characteristic to Shankpushpi



Figure 2: Shankpushpi Arka

Table 3: Practical details of Shankpushpi Ghan Vati^[7]

Parameters	Ghanvati (Tap water)	Ghanvati (Gangajal)
Amount of Shankpushpi	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 ⁰ C	85-90 ⁰ C
Time taken in kwatha to ghan formation	1.30 hour	50 minutes
Yield	280 gm	150 gm
Sparsha	Smooth in texture	Smooth in texture
Rupa/Colour	Blackish	Blackish
Rasa/Taste	Tikta	Tikta
Gandh/Odour	Characteristic to Shankpushpi	Characteristic to Shankpushpi



Figure 3: Shankpushpi Ghan Vati

Table 4: Practical details of Shankpushpi Ghrit^[8]

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 Shankpushpi kalka	75 gm.	50 gm
Amount of Murchhit ghrit	300 gm.	200 gm
Amount of Shankpushpi ghrit	235 gms	156 gm
Sparsha	Smooth in texture	Smooth in texture
Rupa/Colour	Greenish	Greenish
Rasa/Taste	Tikta Kashya	Tikta Kashya
Gandh/Odour	Characteristic to Shankpushpi	Characteristic to Shankpushpi



Figure 4: Shankpushpi Ghrit

Table 5: Practical details of Shankpushpi Rasayana^[9]

S.No.	Parameters	Quantity
1.	Shankpushpi panchang	250 gm
2.	Shankpushpi swarasa	70 ml
3.	Shankpushpi churna taken	200 gm
4.	After one bhavana	204 gm
5.	After second bhavana	207 gm

6.	After third bhavana	210 gm
7.	Shankpushpi Rasayana	210 gm
8.	Increase in weight	10 gm
9.	Sparsha	Rough in texture
10.	Rupa/Colour	Brownish
11.	Rasa/Taste	Tikta
12.	Gandh/Odour	Characteristic to Shankpushpi

Here the two samples of Shankpushpi rasayana are prepared , one with tap water and other with gangajal through same procedure.



Figure 5: Shankpushpi Rasayana

ANALITICAL STUDY:

Table 6: Showing the Physico-chemical parameters of Shankpushpi syrup with tap water and Gangajal.

Physico-chemical Parameter	Shankpushpi Syrup (with Tap water)	Shankpushpi 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: Showing the Physico-chemical parameters of Shankpushpi Ghanavati with tap water and Gangajal.

Physico-chemical Parameter	Shankpushpi Ghanvati (with Tap water)	Shankpushpi 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 8: Showing the Physico-chemical parameters of Shankhapushpi Arka with tap water and Gangajal.

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

Table 9: Showing the Physico-chemical parameters of Shankhapushpi Ghrit with tap water and Gangajal.

Physico-chemical Parameter	Shankhpushpi Ghrit (with Tap water)	Shankhpushpi Ghrit (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: Showing the Physico-chemical parameters of Shankhapushpi Rasayana with tap water and Gangajal.

Physico-chemical Parameter	Shankhpushpi Rasayana (with Tap water)	Shankhpushpi Rasayana (with 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

MICROBIAL ANALYSIS:

Media Preparation For Bacterial Count

Take 10 gms soyabean casein digest agar dilute to 250 ml with distill water and sterilize for 30 minutes at 15 lb/inch .

Plate count for bacteria are done as per standard method given in the Protocol for testing of Ayurvedic, Siddha and Unani Medicines.^[2]

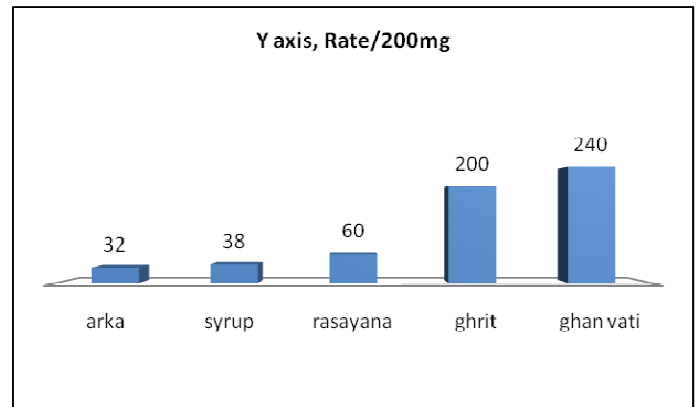
Table 11: Showing Total bacterial count with tap water and Gangajal.

Name of Preparation	With Tap water	With Gangajal
Shankhpushpi Syrup	220 cfu/ml	100 cfu/ml
Shankhpushpi Arka	165 cfu/ml	80 cfu/ml

Shankhpushpi Ghan Vati	150 cfu/ml	70 cfu/ml
Shankhpushpi Ghrit	142 cfu/ml	82 cfu/ml
Shankhpushpi Rasayana	270 cfu/ml	260 cfu/ml

RESULTS:

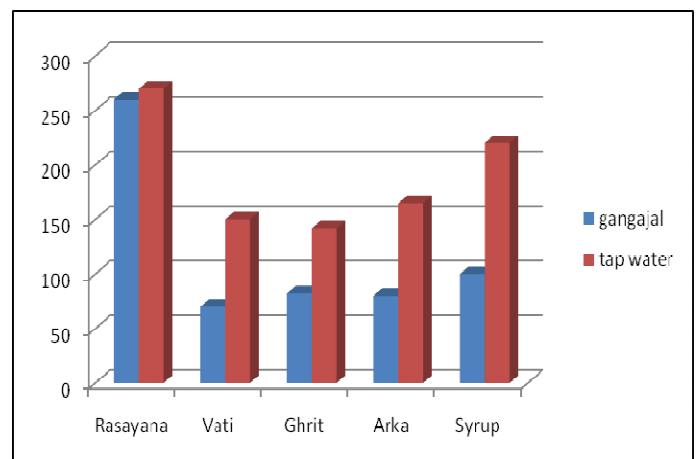
Graph 1: Comparison of cost of different preparations.



Because yield is minimum in Ghan vati, so cost has been maximum for it. But according to patient compliance it is best preparation. Following chart shows rate of different formulation.

Graph 2: Comparison of total bacterial count in different preparations.

A comparative analysis of total bacterial count of the samples prepared with tap water and gangajal is done. The results shows that the samples prepared with gangajal have less bacterial count. It clears that the gangajal itself has antimicrobial property.



DISCUSSION: .

As the *Shankhpushpi* is not available with a peak of their active principles throughout the year. That's why it is essential to convert these plants in some formulation without losing their potency so that

they may be available to us in their original potency throughout the year. So the different kalpanas of *Shankhpushpi* are prepared by scholar. These are:

Syrup as *Sharkar kalpana* is a palatable liquid formulation and easy to administered specially in children.

Arka as *Arka kalpana* has the advantage of longer self life period^[6], easy administration, dose fixation, palatability and wide therapeutic range.

Ghanvati as it is prepared by kwath of drug.^[7] During *kwath* preparation all the water soluble constituents of drug comes in water to its maximum and also the boiling hampers the growth of micro-organisms. Also in tablet form this ensured that the patient is getting exact amount of drug.

Ghrit as by *ghrit murchana* fatty acids concentration is increased that is helpful in micelle formation which may form bond with water soluble part from kwath, swarasa etc. Also *Sneha kalpana* favours quick absorption and drug diffusion across cell membrane .

Rasayana as it is made by *bhavana* of *Shankhpushpi swarasa* in *churna*. By *bhavana* of *swarasa* potency of it increases and particles of *swarasa* binded in between *churna* particles thus bioavailability of *churna* increases.^[9]

Two samples of each dosage form is prepared by using Tap water and Gangajal. On microbial analysis , the samples prepared with Gangajal have less bacterial count that proves that Gangajal is saturated with antiseptic minerals and has antimicrobial activity due bacteriophage present in it. Also in analytical study it is found that the percentage of sucrose in tap water is 68% and in Gangajal it is 70 %, this concentration retards growth of microorganisms and the pH of syrup with tap water is 4.45 and pH of syrup with Gangajal is

4.68, this acidic pH favours break of sucrose into glucose and fructose.

So the pharmaceutical study reveals that according to the cost syrup and *arka* are the best and if we prepare these with Gangajal the preparation will have comparatively less microbial count.

CONCLUSION:

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*.

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