



Research Article

CRITICAL REVIEW OF *PHANTA KALPANA* AND PHYTOCHEMICAL COMPARISON OF
PANCHAKOLA PHANTA WITH *PANCHAKOLA KASHAYA*

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ABSTRACT

Phanta Kalpana, the process of herbal hot infusion is one of the five fundamental Ayurvedic preparations. A unique *Kalpana* is specifically mentioned for those with a minor illness, little strength, and younger age. However, this *Kalpana* is not widely utilizing because of the unavailability of scientific data and uncertainty about its action. Even though it is a simple *Kalpana* while analyzing available references numerous differences were determined among Ayurvedic classics. Differences of opinion or expression of comments noted in drug to water ratio, order mixing of water and drug, temperature of the water, time of contact, Powder size, and the need for stir and strain. Different experiments were conducted based on these parameters. And it shows their significance. In addition, a market sample examination of two separate *Kashaya Choornas* of two companies produced results with completely different powder sizes. Product output will vary due to these practical variations unless later changes are made to other parameters. Comparative physiochemical and phytochemical analyses of *Kashaya* and *Phanta Kashaya* were done. Values are almost similar except for total solid content and GCMS. Total solid rises along with the reduction in *Kashya*. Total phenolic and flavonoid contents show almost similar values, whereas GCMS analysis shows peaks of some molecules in *Phanta Kashaya* and peaks of some other molecules in *Kashaya Kalpana*. So, each of these two *Kalpana* favors solubilizing and makes bioavailable different ranges of biomolecules. So, each of these *Kalpana* has a different and specific utility and function.

INTRODUCTION

The entire science of Ayurveda has been framed on *Trisutra (Hetu, Linga, Aushada)*. Among them, *Aushada* i.e., medicine is very important as it is responsible for the alleviation of disease as well as safeguarding and endorsing wellbeing. The vivid formulations explained in classics are to make the blend compatible and efficient without losing its potency. It has been described considering all the aspects like *Desa* (land/soil), *Kala* (time), *Bala* (strength) etc. The importance of various forms of *Aushada* is to make it attuned and palatable as well as they are sacred different techniques to solubilize different soluble components and make it bioavailable in different concentrations.

Phanta Kalpana is the process of hot infusion in Ayurveda mentioned 5th among the *Panchavida Kashaya Kalpanas* (five basic pharmaceutical dosage forms) i.e., *Swarasa* (juice), *Kalka* (paste), *Kwatha* (decoction), *Sheeta kashaya* (cold infusion), and *Phanta kashaya* (hot infusion). [1] The magnitude of the preceding formulation is more intense than the succeeding one. This difference in its property is because of the diverse method of preparation. So *Phanta Kashaya* is mild potency and most *Laghu* (light for digestion) in nature, compared to other *Kashaya Kalpana*. *Phanta* is apt for drugs that are fragrant, easier to digest, and free from dense tissues. This preparation does not require as many restrictions as other *Kalpanas*. In the long run, it has been widely used in different forms for curative and preventive purposes in various lifestyle diseases and different communicable and pandemic conditions. This *Kalpana* specifically mentions for *Alpadosha* (mild vitiation of *Doshas*), *Abala* (mild strength), *Bala* (young age), and *Laghu vyadhi* (mild diseases) conditions. [2]

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Even though *Phanta Kashaya Kalpana* is one of the basic and simplest *Kalpana*, while examining various references, several variations are found in the preparatory steps. Although the changes are slight, they are crucial for optimizing the *Kalpana*. This article aims to explore the possibilities and scientific roots of *Phanta Kashaya Kalpana* in the classics as well as in the current scenario and to do a comparative analytical study with a *Kashaya Kalpana* to understand the specificity of these two *Kalpana*.

AIM AND OBJECTIVES

- To review the *Phanta Kashaya Kalpana* through its various references.
- To optimize the *Phanta kashaya*-making process.
- Physiochemical and phytochemical comparison of *Panchakola Phanta* and *Kashaya*.

MATERIALS AND METHODS

1. Literature Review on Phanta Kashaya Kalpana

Compiled the existing literature about *Phanta Kashaya Kalpana*, and based on that multi-phase discussion was done in the department of *Rasa sastra* and *Bhaishajya Kalpana*, Government Ayurveda College, Thiruvananthapuram, and significant parameters were identified to optimize the *Phanta Kashaya Kalpana* process.

2. Process optimization of Phanta Kashaya Kalpana

Different experiments were planned and conducted to optimize the identified parameters of

Phanta Kashaya Kalpana, by preparing *Phanta Kashaya* with *Panchakola choorna*.

3. Comparative analytical study of Phanta Kashaya and Kashaya

- Coarse size *Panchakola choorna* was prepared with drugs having API parameters.
- *Panchakola Phanta* was prepared by an optimized *Phanta Kalpana* process.
- *Panchakola Kashaya* prepared by the formula 1:8 reduced to 1/4 and 1:16 reduced to 1/8.
- Physio-chemical comparison of two *Kalpanas* was done with total solid content, pH, and specific gravity, and phytochemical comparison was done with total phenolic content by spectrophotometric method of folincio-calteaureagent with standard graph of gallic acid, total flavonoid content using the standard graph of quercetin, and GCMS analysis after lyophilization.

OBSERVATION

1. Literature Review on Phanta Kashaya Kalpana

For preparing *Phanta Kashaya* the raw drugs are to be macerated with boiled water in a specific ratio for a specific time and to be filtered well at last is also known as *Churnadrava*. Even though the preparation is simple while going through the classic reference various opinions can be seen as tabulated in Table No.1.

Table 1: Difference of Opinion About Phanta Kashaya Kalpana

Parameters	Sa.sa* [1]	Gu.di* [1]	Dipika [1]	Ch.Sa*[5]	AS* [3]	AH*[4]	Ka.Sa*[2]
Ratio	1:4						
Order	<i>Ushna jala</i> to drug			Drug to <i>Ushnajala</i>			
Temperature		<i>Kwathita matramithi</i>					
Time						<i>Sadyo</i>	<i>Ardava sesidam/ Phenod Gama</i>
Powder size	<i>Kshunnam</i>		<i>Kshunnam (Atyanta kuttide choorna sadrushya)</i>		<i>Kshunnam</i>		
Stir			<i>Nirmadya visravyami Tyartha</i>	<i>Mruditam</i>			
Strain				<i>Kshipto Shnatoye Mruditam</i>			

*Sa.Sa-Sharangadhara Samhitha, Gu.Di-Gudartha Dipika, Ch.Sa- Charaka Samhitha, A.S- Ashtanga Sangraha, AH-Ashtangahrudaya, Ka.Sa-Kashyapa Samhitha

The identified parameters of *Phanta Kashaya* preparation are as follows:

1. Dose

The dose mentioned in Sarangadhara samhitha is 2 *Pala* i.e., 96ml.

2. Drug to water ratio

Only Sarngadhara Samhitha mentions drug to water ratio as, 1 *Pala* drug and 1 *Kudava* water i.e., 1:4, all other *Acharyas* explain *Phanta Kalpana* following the *Kashaya Kalpana*.

3. Powder size

According to classic reference, powder size is *Kshunna* means *Atyanta kuttitha choorna sadrushya* so drug is crushed to powder form. According to API recommended powder size for *Kashaya Kalpana* is a coarse powder.

4. Order mixing of water and drug

Various references are available for both pouring hot water on drugs and vice versa.

5. Temperature of the water

Classics says water has to be used as *Ushnodaka*, Dipika commentary of Srangadhara Samhita clarified it as *Ushnamiti kwathitamatramiti kechit*, so it should be boiled *Kashyapa Samhitha* also supporting this opinion *Kwadidasthu antareekshena varina ardavasheshita* or boil till the appearance of bubbles.

6. Time of contact

According to *Ashtangahrudaya, sadyoabhishta: phanta*. It means the raw drugs are to be dispensed in boiling water in a ratio of 1:4 and are to be macerated and strained immediately. Some commentators say that *Phanta* has to be macerated, and filtered after cooling down to a lukewarm temperature. Other classics say nothing about the time for *Phanta* preparation

7. Stir and Strain

According to *Charaka Kshiptoshnatoye mruditam tat Phantam* i.e., after mixing powder and hot

water, forceful maceration and churning have to be done before filtering Sarangadara commentary Deepika also explains *Nirmadya visravayamityartha* means it needs forceful filtration i.e., straining.

8. Phanta Kashaya Kalpana and hot infusion

Phanta Kashaya is generally considered a hot Infusion, one of the modern extractive techniques. Even though they are closely similar while scrutinizing the definition we can find little differences. In both of them, boiling water is used as a solvent, and after mixing boiling water and the drug, filtering is mentioned. In *Phanta Kashaya* after contacting the drug and boiling water immediate stirring and filtering are recommended, whereas in hot infusion it is recommended to pour hot water over the drugs and then allow it to keep in contact with water for the stated period, usually 15 minutes. In *Phanta Kashaya* stirring and straining are recommended whereas in hot infusion occasional stirring is indicated and marc pressing is contra-indicated. While analyzing the size of the drug, there is no clear-cut recommendation in *Phanta Kalpana*, the size of powder mentioned with traditional terminologies *Kshunna, Athyanta kuttida, Churna samam*, only gives the idea that it should be in powder form. Whereas in the case of hot infusion size of the powder is generally recommended as coarse.

Process optimization of Phanta Kashaya Kalpana

Output of the *Phanta Kashaya* according to various powder sizes as in Table No.2

Table 2: Powder Size and Output of Phanta Kashaya

Experiment no	Powder size	Ratio	Measurement	Output
1. [Fig.1]	Coarse powder	1: 4	24gm :96ml	48 ml
2. [Fig.2]	Moderate coarse	1: 4	24gm:96 ml	10 ml
3. [Fig.3]	Moderate fine	1: 4	24 gm:96 ml	No output
4. [Fig.4]	Moderate fine	1: 20	5 gm:100 ml	80 ml

Market sample analysis of four *Kwatha choorna* sizes as in Table No. 3, Table No.4

Table 3: Size Separation of Four Kashaya Choornas (10gm Each)- Sieve Method

Yoga	Company	120	85	60	44	22	10	Which cant sieve
<i>Panchakola</i>	A	7.5	2	0.5				
<i>Panchakola</i>	B	5.5	1	1.5	1	1		
<i>Drakshadi</i>	A	5	1.5	3	0.5			
<i>Drakshadi</i>	B	0.5		0.5	0.5	1.5	4	2.5

Table 4: Size of Market Sample Choornas [Fig No.5]

<i>Panchakola</i>	
A	Fine
B	Moderate coarse
<i>Drakshadi</i>	
A	Coarse
B	Moderate fine

Output measurement of classical *Phanta Kashaya* procedure with coarse *Kashaya* powder.

Table 5: The Output of Phanta Kashaya in the Process Sequence

Step	Procedure	Measurement 1	Measurement 2
1	Coarsely powdered <i>Panchkola choorna</i>	24 gm	48 gm
2	Poured into boiling water	96 ml	192 ml
3	Gently stir quickly		
4	On filter	28 ml	56 ml
5	On strain	20 ml	40 ml
	Total output	48 ml	96 ml

Preparation and comparison of conventional *Panchkola Phanta Kashaya* and *Kashaya* in the ratio 1:8 reduced to 1/4 and 1:16 reduced to 1/8 with respect to total solid and pH.

Table 6: Total Solid Comparison of Panchkola Kashaya and Phanta Kashaya

S.No	Ratio	Total solid	pH
1	Conventional <i>Phanta</i> in the ratio 1:4	0.671	6.44
2	<i>Kashaya</i> in the ratio 1:8 reduced to 1/4	0.811	6.26
3	<i>Kashaya</i> in the ratio 1:16 reduced to 1/8	1.004	6.08

Preparation and comparison of conventional *Panchkola Phanta Kashaya* and *Kashaya* in the ratio 1:8 reduced to 1/4 and 1:16 reduced to 1/8 with respect to total phenols.

Table 7: Total Phenolic Content Comparison of Panchakoala Kashaya and Phanta Kashaya

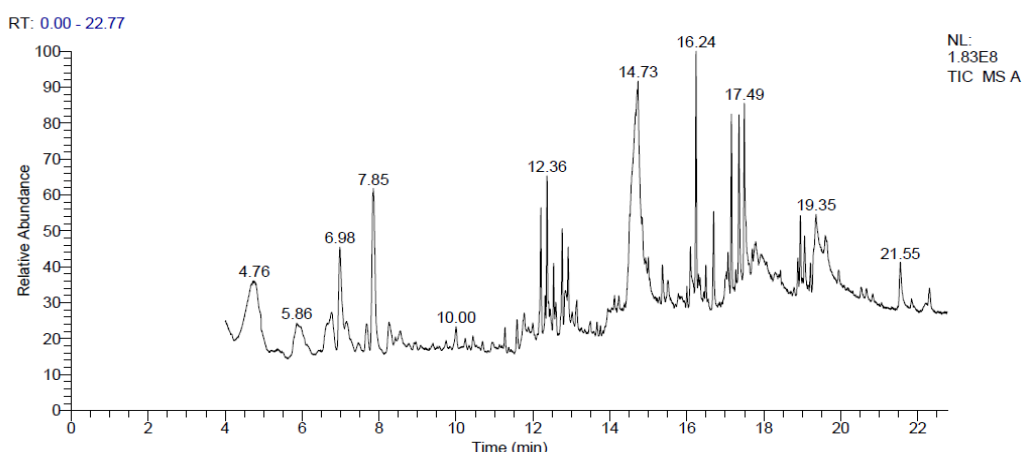
Sample code	Absorbance	Amount of phenol in terms of gallic units (mg)	Amount of phenol in 1mg
<i>Phanta Kashaya</i>	0.131	0.085	0.425
1:8 reduced to 1/4	0.1315	0.0855	0.4275
1:16 reduced to 1/8	0.1377	0.0917	0.4585

Preparation and comparison of conventional *Panchakoala Phanta Kashaya* and *Kashaya* in the ratio 1:8 reduced to 1/4 and 1:16 reduced to 1/8 concerning, total flavonoids.

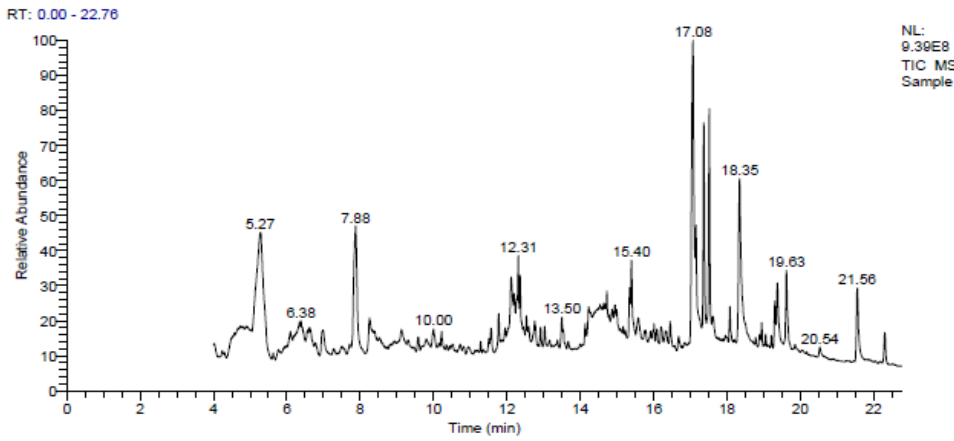
Table 8: Total Flavonoid Content Comparison of Panchakola Kashaya and Phanta Kashaya

Sample code	Absorbance	Amount of flavanoid in terms of quercetin units (mg)	Amount of flavanoid in per mg sample
1	0.0654	0.213146	0.42629108
2	0.0701	0.235211	0.470422535
3	0.0745	0.255869	0.511737089

Preparation and comparison of conventional *Panchakoala Phanta Kashaya* and *Kashaya* in the ratio 16 reduced to 1/8 concerning GCMS Analysis.



Graph 1: GCMS spectrum of lyophilized Panchakola Phanta Kashaya



Graph 2: GCMS Spectrum of lyophilized *Panchakola Kashaya*

Table 9: Gcms Analysis Report of *Panchakola Phanta* and *Kashaya*

No	Compound name	Sample A-Kashaya B - Phanta	Retention time	Probability	Area %	Molecular weight
1	4HPyran4one, 2,3dihydro3,5dihydroxy6methyl	A	7.88	91.94	6.88	144
		B	7.85	90.84	8.03	
2	1,3Cyclohexadiene, 5(1,5dimethyl4hexenyl)2methyl,	A	12.36	22.36	0.98	204
		B	12.36	70.32	7.01	204
3	Benzene, 1(1,5dimethyl4hexenyl)4methyl	A	12.20	5.20	0.48	202
		B	12.20	75.17	4.02	202
4	Gingerol	A	21.55	63.06	2.70	294
		B	21.55	64.62	1.38	294
	Shogaol	A	20.64	52.45	1.08	276
		B	20.67	50.15	0.14	276
6	Phytol	A	19.06	57.87	1.08	296
		B	19.02	52.84	1.01	296
7	Hexadeconoic acid	A	17.15	58.11	3.61	270
		B	17.15	60.86	3.01	270
	Safrole	A	22.31	3.06	0.96	294
		B	-	-	-	-
8.	Alfa curcumene	A	12.36	16.62	0.98	204
		B	12.36	3.29	7.71	204

FIGURES



Fig.1 *Phanta Kashaya* with coarse powder



Fig.2 *Phanta kashaya* with moderate coarse powder



Fig.3 Phanta Kashaya with Moderate fine powder

Fig.4 Phanta Kashaya with moderate fine in 1:20 ratio

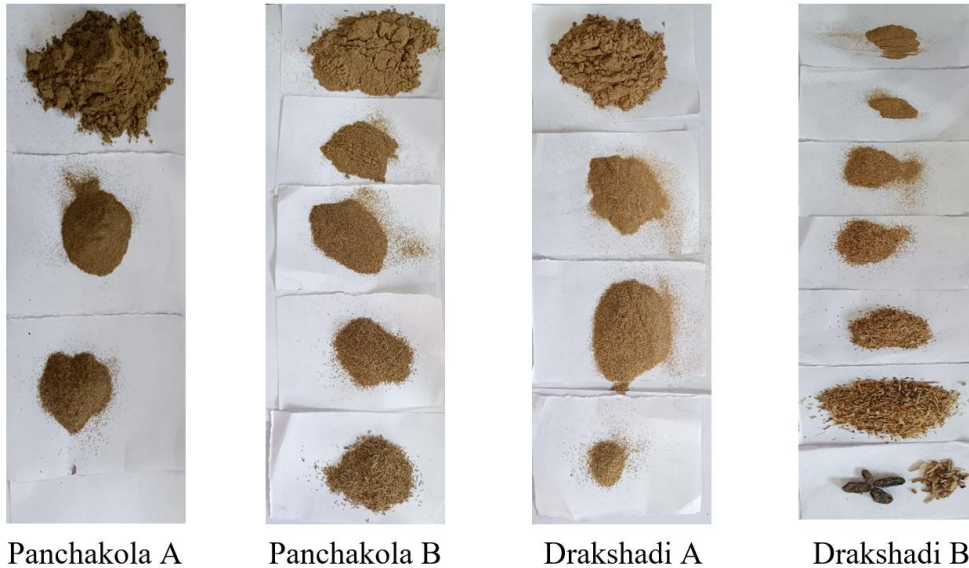


Fig.5. Size separation of four Kashaya Choornas (10 gm each)- Sieve method

RESULTS AND DISCUSSION

Different viewpoints on powder size, ratio, and process sequences can be found in the literature of *Phanta Kashaya*. In addition, a market sample examination of two separate *Kashaya Choornas* of two companies produced results with completely different powder sizes, powder size of *Kwatha Choorna* available in the market are different gradients. Even though our *Kwatha choorna* is said to be coarse it includes coarse to very fine powder in different ratios. Product output will vary due to these practical variations unless later changes are made to other parameters.

Sarangadhara Samhita mentions drug to water ratio as, 1 *Pala* drug and 1 *Kudava* water i.e., 1:4, and the dose is mentioned as 2 *Pala* or 1/2 *Kudava*. The product obtained while preparing *Phanta Kashaya* as per the above ratio with coarse *Kashaya choorna* is also 2 *Pala*. So the mentioned proportion in *Sarangadhara Samhita* is considered for one-day medication.

In the case of powder size experimentation was done by preparing *Phanta Kashaya* with various powder sizes as per classical ratio. It is noted that output was gradually reducing along with decreasing

powder size. The desired output of *Phanta Kashaya* is getting only while prepared by coarse powder. It is also noted that there is no output while using moderate fine powder onwards unless changes the classical ratio.

Classics says water has to be used as *Ushnodaka*, *Dipika* commentary of *Sarangadhara Samhita* clarified it as "*Uhnamiti Kwathitamatramiti Kechit*", *Kashyapa Samhita* also supporting this opinion "*Kwadidasthu antareekshena varina ardavasheshita*" or till the appearance of bubbles. So plain water *Kwathana* or boiling occurs on attaining 100°C. If a coarsely powdered drug is poured into boiled water output will be half and froth will occur instantly. So, it will satisfy all the mentioned references.

According to *Ashtangahrudaya* "*Sadyoabhishta: phanta*": The raw drugs are to be dispensed in boiling water in a ratio of 1:4 and are to be macerated and strained immediately Some articles say that *Phanta* has to be macerated, and filtered after cooling down to a lukewarm temperature. In experiments when 24g drug is poured into 100ml boiled water, water will cool down to a lukewarm temperature immediately i.e., within 15 seconds.

Optimized Phanta Kashaya process

The coarsely powdered raw drugs are to be dispensed in boiling water in a ratio of 1:4 and are to be immediately macerated and strained. The liquid so obtained is *Phanta* which is also known as *Churna drava*.

Total phenolic contents of traditional *Phanta Kashaya* prepared in the optimized process, *Kashaya* prepared by 1:8 reduced to ¼ and 1:16 reduced to 1/8 are 0.425, 0.4275, 0.4585 in 1mg and flavonoids 0.42629108, 0.470422535, 0.511737089 mg contents per mg sample respectively. Even though method and ratio have massive differences there is no significant difference in total flavonoids and phenolic content. Only a slight rise was there in total solid content with a reduction for *Kashaya*. But in the GCMS analysis of *Phanta* and *Kashaya* probability and area percentage of some molecules appear or increase and some other molecules decrease or disappear in *Phanta* and *Kashaya*. For example, one of the terpenes, alpha curcumin is more in *Phanta Kashaya* but gingerol and shogaols are gradually increasing with reduction for *Kashaya*. Along with that safrole like uncertain molecules begins to appear with reduction. So even though total phenolic and total flavonoid content value is almost similar the molecules will be different, because each of these molecules will appear in a specific temperature range only. So *Acharya* mentions *Phanta Kashaya* for those having minor *Dosha*, morbidities, strength, and age, because that many extractives are sufficient for them. So, each of these two *Kalpana* favors solubilizing and makes bioavailable different ranges of biomolecules. So, each of these *Kalpana* has a different and specific utility and function.

CONCLUSION

One of the main problems with Ayurvedic powder is its non-uniform size. The surface area, extraction, and rate of water absorption, powder flow will change as powder size decreases with decreasing powder size product output will also decrease in the case of *Phanta* so need to adjust the drug-to-water

ratio when we are using a small powder size. Further research and standardization are necessary to determine the optimal drug-to-water ratio with powder size. *Phanta Kashaya* has less abundance of molecules compared to *Kashaya* but it is enriched with a lot of thermolabile molecules, and others in minor proportion. So *Phanta Kashaya* can be utilized wisely considering the strength of morbidity, *Dosha*, patient, and his age, to deliver optimum dosage form and action.

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