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PHARMACEUTICAL AND ANALYTICAL STUDY OF RASNASAPTAK KASHAYA GHANVATI AND RASNAPANCHAK KASHAYA GHANVATI

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ABSTRACT

Bhaishajya Kalpana is the branch of *Ayurveda* which primarily deals with different kinds of dosage forms & their therapeutic utility. The *Panchavidha Kashaya Kalpana* have great importance as they form the primary or basic dosage forms from which other secondary dosage forms are prepared. *Ghana Kalpana* is the modified form of *Kwatha Kalpana*. Different varieties of *Ghana* are mentioned in various *Ayurvedic* classics & it is most accepted varieties of *Ayurvedic* dosage forms due to its easy administration, palatability & long shelf life. In this article, an attempt has been made to have an understanding regarding the *Ghana* and general method of preparation. **Aims and Objectives:** To prepare *Rasnasaptak Kashaya Ghanvati* and *Rasnapanchak Kashaya Ghanvati* according to *Sharangdhar Samhita* and do the comparative analysis of their Physico-Chemical properties. **Materials and Methods:** The study involves the preparation of *Rasnasaptak Kwatha* and *Rasnapanchak Kwatha* according to *Sharangdhar Samhita* which was then modified into *Ghanvati*.

Thereafter samples of *Rasnasaptak Kashaya Ghanvati* and *Rasnapanchak Kashaya Ghanvati* according to *Sharangdhar Samhita* were taken for the comparative pharmaceutical and physicochemical study**. Results and Conclusions:** The Physico-Chemical analysis of *Rasnasaptak Kashaya Ghanvati* and *Rasnapanchak Kashaya Ghanvati* revealed that all test parameters were within API limits which ensure the safety and purity of the drug.

KEYWORDS: *Ghana, Kwatha, Rasnasaptak Kashaya Ghanvati, Rasnapanchak Kashaya Ghanvati.*

INTRODUCTION

Panchvidha Kashaya Kalpana[1] are fundamental preparations in *Ayurvedic* pharmaceutics from which various other preparations are attained. *Kwatha Kalpana* is one of the significant, very effective and widely used dosage form. This dosage form is acquired by boiling the herbal drugs with water in specific proportion and is reduced to desired quantity.[2]

Due to bitterness in taste, palatability, feasibility, short shelf life, inconvenience in its preparation, transportation etc., *Kwatha ghana* is preferred over *Kwatha*. *Ghana* (an *Upkalpana* of *Kwatha*) is a dried aqueous extract prepared by evaporating all the aqueous portion from the *Kwatha*.[3] It is form of *Kwatha Kalpana*, in which *Kwatha* is modified into concentrated dosage form. It is obtained by heating *Kwatha* till it comes in semi-solid state and then it is dried to solid form. *Ghana Kalpana* is more palatable and potent, longer shelf life, high therapeutic efficacy and accepted by all age groups.

Kwatha Kalpana is 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 compliance and may impede with treatment. So it is need of the hour to make advancement in its dosage form. Considering all these issues, so there is need of modifications in *Ayurvedic* Ancient dosage forms. Because most of the ancient dosage forms are not easily Palatable, not easy to carry, having short shelf life, not simple to dispense and not good in appearance. So we should modify *Ayurvedic* drugs with increasing therapeutic utility and potency. Hence, for Globalization of *Ayurveda*, these kinds of innovations are needed. So, in the present study the effort has been made to prepare *Ghanvati* of *Rasnasaptak Kashaya* and *Rasnapanchak Kashaya*. The study aims at developing more potent, efficient and palatable formulation by converting *Kashaya* into *Ghanvati*.

MATERIALS AND METHODS

Procurement of raw material: All the raw drugs/dry samples (standardized and authenticated with certificate of analysis) were procured from Herbal Health Research Consortium, Amritsar.

Table I: Composition of *Rasnasaptak Kashaya Ghanvati* according to *Sharangdhar Samhita.*[4]

Name	Botanical Name	Family	Part Used	Proportion
Rasna	*Pluchea lanceolata*	*Asteraceae*	Leaves	1Part
Gokshura	*Tribulus terrestris*	*Zygophyllaceae*	Fruit	1Part
Guduchi	*Tinospora cordifolia*	*Menispermaceae*	Stem	1Part
Punarnava	*Boerhavia diffusa*	*Nyctaginaceae*	Root	1Part
Erand	*Ricinus communis*	*Euphorbiacaeae*	Root	1Part
Devdaru	*Cedrus deodara*	*Pinaceae*	Heartwood	1Part
Aragvadha	*Cassia fistula*	*Caesalpiniaceae*	Fruit	1 Part

Table II: Composition of *Rasnapanchak Kashaya Ghanvati* according to *Sharangdhar Samhita.*[5]

Name	Botanical Name	Family	Part Used	Proportion
Rasna	*Pluchea lanceolata*	*Asteraceae*	Leaves	1Part
Guduchi	*Tinospora cordifolia*	*Menispermaceae*	Stem	1Part
Erand	*Ricinus communis*	*Euphorbiacaeae*	Root	1Part
Devdaru	*Cedrus deodara*	*Pinaceae*	Heartwood	1Part
Sunthi	*Zingiber officinale*	*Zingiberaceae*	Rhizome	1 Part

Pharmacological overview

Rasna

Rasna (*Pluchea lanceolata*) is a major ingredient of the famous anti-inflammatory *Ayurvedic* decoction *Rasna Saptak Kwatha*. It is used to treat various painful afflictions and swelling of joints.It is *Sothahara* (Anti-inflammatory), *Sheethara* and *Vednashamaka* (analgesic).It acts as *Aampachana* (Aids in digestion), *Shoolprashamana* (alleviates intestinal spasms), *Rasayana* (*Rejuvenative*), and *Vrishya* (Increases sexual potency). It is useful in *Kaphaja* and *Vataja* disorders.

Gokshura

This spiky fruit looks like the cloven hoof of a cow and hence the name of a *goka* (cow-hoof). *Kshura* means scratcher. It is a *vatashamaka*. It specifically moves *Apana Vayu* downwards. The fruit and roots are used in *Ayurveda*.

Guduchi

It is bitter, astringent, pungent yet heating and also sweet post digestively action. Its bitter and astringent quality clears *pitta* and *kapha*, its heating energy burns *Ama* while its enduring sweet effect regulates *Vata* and gives an aphrodisiac effect that nourishes reproductive fluids. Its *Prabhava* (effect) is to clear *Ama* (toxins).[6] It is used in Gout (*Vata-rakta*), Arthritis (Amavata), and other inflammatory joint conditions. It acts by clearing *Pitta* and uric acid via the urinary system that have accumulated in *Raktavahasrotas* (circulatory channels). It also removes *Ama* toxins from the system without destabilizing any of the other *dosha*.

Punarnava

It is the main ingredient in *Punarnavadi Guggulu*,the famous *Ayurvedic* formulation for reducing water retention, congestive heart conditions, and treating oedematous inflammatory joint diseases. It can effectively treat swollen joints with fluid retention with pitting oedema from a *Kapha* imbalance by moving toxic accumulations out of joints and tissues and excreting them via the Kidneys through urine.

Eranda

Castor oil is superb for pain and congestion. The leaf and roots are commonly used in preparing medicines for Arthritis. Traditionally it is used for all conditions where both *Ama* and *Vata* mix. This manifests as pain, swelling, deformations of the joints and bones. The oil is externally applied and taken internally for Sciatica, Arthritis, Gout and Paralysis.

Devadaru

This hardy tree thrives in the high altitudes of the Western Himalayas. It means Wood of the Gods. The inner wood is aromatic and is also distilled into essential oils. The outer bark is astringent and is used for diarrhoea and pain. The essential oil usually comes from the uprooted stumps of fallen trees. It is an excellent anti-inflammatory that relieves cold, spasm and contractions in the muscles. Its pungent and warm properties increase circulation and relax muscular tension. It is used in Arthritis, Sciatica, Headache, pain from high *Vata* and used to enhance the digestive power, as it alleviates *Vata* it can reduce intestinal spasms and cramping by relaxing the nervous system and easing flatulence. Its hot resinous nature is beneficial for reducing Ama (Toxins) from the intestines and excess weight and cholesterol from *Medas Dhatu* (Fat tissues).

Aragvadha

It pacifies *Vata* and purges *Pitta* and *Kapha*. A gentle laxative used to clear *Pitta* from the intestines. It descends *Apana Vayu* and clears flatulence. The *Ayurvedic* adage is to purge a fever after it breaks, and *Aragvadha* is specifically indicated for cleansing the bowel after a fever.

Sunthi

Dry ginger being hot is better for stimulating *Agni* (Digestive power) and cleansing *Kapha*, it removes constipation as its penetrating quality breaks up impacted faeces (*Vibandhabhedana*). Basically, *Prabhava* is the causative factor for its Anti-inflammatory property. It's *Vipaka* is *Madhura* therefore it has the nourishing phenomena. Its *Virya* is *Ushna* therefore it aids in digestion and hence clears *Ama* which is better for *Kledaka Kapha* aggravation. As it has prominent role in digestion and have anti-inflammatory property, it aids in Arthritis also. Fresh ginger is more peripherally active while dry ginger is more centrally stimulating and warming.[7]

Method of preparation of drug

Rasnasaptak Kashaya Ghanavati and *Rasnapanchak Kashaya Ghanvati* is prepared by using herbal ingredients as mentioned in *Sharangdhar Samhita*. The ingredients were taken in equal amount and crushed to coarse powder. This coarse powder was soaked in sixteen times of water and kept overnight. Then in morning it was boiled on *Mandagni* and reduced to one eighth (as mentioned in AFI and classical texts).[8] After this process, *Kwatha* was filtered and boiled again on *Mandagni* till it attains semisolid state which was then modified into *Vati* of 500 mg each.

Pharmaceutical processing

The whole process of preparation of *Rasnasaptak Kashaya Ghanvati* and *Rasnapanchak Kashaya Ghanvati* was done at GMP certified Government *Ayurvedic* Pharmacy and Stores, Patiala. In this phase of study following pharmaceutical processes were carried out.

Practical 1: Preparation of *Rasnasaptak Kashaya Yavkut Choorna*

Practical 2: Preparation of *Rasnasaptak Kashaya*

Practical 3: Preparation of *Rasnasaptak Ghana*

Practical 4: Preparation of *Rasnasaptak Kashaya Ghanvati*

Practical 5: Preparation of *Rasnapanchak Kashaya Yavkut Choorna*

Practical 6: Preparation of *Rasnapanchak Kashaya*

Practical 7: Preparation of *Rasnapanchak Ghana*

Practical 8: Preparation of *Rasnapanchak Kashaya Ghanvati*

Practical 1: Preparation of *Rasnasaptak Kashaya Yavkuta Churna*

Equipments used

1. Weighing Machine
2. Disintegrator
3. Trays
4. Vessels etc

Procedure

Dried sample of each Raw drug was taken separately and powdered in Disintegrator and passed through mesh no.08 size for maximum extraction to form coarse powder (*Yavkuta Churna* or the size of Barley grains). *Yavkuta Churna* of all the raw drugs was mixed thoroughly to form a homogenous mixture. *Yavkuta Churna* was collected and stored in air tight container for further use.

Precautions taken

1. Each ingredient was weighed separately in its raw form.
2. Each ingredient was properly dried and separately powdered.
3. Grinding and filtering was done carefully to decrease percentage loss of *Churna*.
4. After preparation, *Yavkuta Churna* was kept in air tight container to avoid moisture.

Practical 2: Preparation of *Rasnasaptak Kashaya*

Reference: Sh. S/Ma. Kh. 2/89

Equipments used

1. Gas stove
2. Stainless steel vessel
3. Big Spatula
4. Thermometer
5. Clean cotton cloth
6. Measuring jar

Principle used: *Toyagni Sannikarsha* (Open Pan Boiling)

Procedure

1 Prepared *Yavkuta Churna* was taken in a big stainless steel vessel and kept soaked in 16 times = 400 litres water approx. (as per principle *Shodasha gunam jalam* for *Kathina dravya*)[9] overnight.

2 The next morning *Kwatha* material was heated on *Mridu Agni* with continuous stirring without covering the vessel.

3 The temperature was checked with the help of thermometer and was maintained between 85- 90°C.

4 Constant mild heat was applied to facilitate evaporation until it was reduced to 1/8th of initial quantity.

5 When the water-soluble phytochemicals of the *Kwatha dravyas* were extracted completely in water (*Gatarasa*)[10] and the *Kwatha dravya* became *Neerasa* then it was filtered through a fourfold clean cotton cloth. Filtered *Kwatha* was then collected in a vessel for further procedure.

Precautions

1 Wash all equipments properly before use.

2 *Yavkuta Churna* or coarse powder of the ingredients was taken for the preparation of *Kwatha* (size below mesh no. 8).

3 Boiling was done on *Manda Agni* so that water evaporates slowly and this enables the complete extraction of phytochemicals and active pharmacological ingredients present in crude drugs. Also, high temperature can disintegrate some of the thermolabile active constituents.

4 Temperature was maintained below 100°C.

5 During boiling process liquid was frequently stirred to check frothing and liquid out of the vessel.

6 Continuous stirring was done to prevent sticking of the material at the bottom of the vessel. It also facilitates proper homogenous treatment to substances**.**

Practical 3: Preparation of *Rasnasaptak Kashaya Ghana*

Ref: Sh. S/Ma. Kh. 8/1

Equipments used

1. Stainless steel vessel
2. Stainless steel ladle

3. Gas stove
4. Thermometer
5. Steel tray

Principle: *Toyagni sannikarsha* (Open Pan Boiling)

Procedure

1. Previously prepared *Rasnasaptak Kashaya* was taken in steel vessel and heated again (*Punaha paka*) with continuous stirring on mild heat till the complete evaporation of water content was achieved.
2. When material got concentrated and changed into semisolid consistency i.e., *Asanna Paka Lakshana-Tantumatvam, Apsu majjati, Kharatvam, Peedite Mudra, Gandha, Varna, Rasodbhava*[11] appeared then heating process was stopped.
3. The semi-solid matter (*Ghana*) was carefully transferred into steel trays smeared with *Ghrita* and kept in sunlight for drying completely till the suitable elasticity was obtained for pounding.

Precautions

1. All the equipments were washed properly before use.
2. Continuous stirring of *Kwatha* was done to avoid sticking of the material at the bottom of vessel.
3. Temperature was maintained between 70-75°C to avoid burning of *Kwatha*.
4. During final stage mild heat was given and continuous stirring was done to avoid adhesiveness to the vessel.
5. The *Ghana* was properly and carefully shifted in tray.

Practical 4: Preparation of *Rasnasaptak Kashaya Ghanvati*

Equipments used

1. Weighing machine
2. Electric pounding machine
3. Pill making machine
4. Steel trays

Procedure

1. After drying when the mixture attains elasticity then it was pounded in an electric

pounding machine.

2. At the end of smooth pounding, dark brown coloured smooth mass was formed.
3. 500mg sized *Vatis* were made.
4. First of all the dye was configured to make wicks for making 500mg sized *Vatis* with the help of extruder.
5. Then prepared *Vatis* were dried in shade.

Precautions

1. The *Vati* was properly dried in shade.

Practical 5: Preparation of *Rasnapanchak Kashaya Yavkuta Churna*

Procedure

Dried sample of each raw drug was taken separately and powdered in Disintegrator and passed through mesh no. 08 size for maximum extraction to form coarse powder (*Yavkuta Churna* or the size of barley grains). *Yavkuta Churna* of all the raw drugs was mixed thoroughly to form a homogenous mixture. *Yavkuta Churna* was collected and stored in air tight container for further use.

Precautions: Same as Practical 1

Practical 6: Preparation of *Rasnapanchak Kashaya* (Ref: *Sh. S/Ma. Kh2/87*)

Equipments, Principle, Procedure, Precautions: Same as *Rasnasaptak Kashaya*

Practical 7: Preparation of *Rasnapanchak Ghana* (Ref: *Sh. S/Ma.Kh.* 8/1)

Equipments, Principle, Procedure, Precautions: Same as *Rasnasaptak Kashaya* Ghana

Practical 8: Preparation of *Rasnapanchak Kashaya Ghanvati* (Ref: API, Part II, Vol. IV page no. 106)[12]

OBSERVATIONS AND RESULTS

General observations & Results during preparation of *Rasnasaptak Kwatha Churna* & *Rasnapanchak Kwatha Churna*

Table III: General observations & Results during preparation of *Rasnasaptak Kwatha Churna* & *Rasnapanchak Kwatha Churna*

Sr. no.		RSK	RPK
1	Weight of each raw ingredient in kg	3.5 kg	5 kg
2	Total weight of raw drugs in kg	24.5 Kg	25 Kg

3	Total weight of *Churna* collected in kg	24 Kg	24.6Kg
4	Loss (gm)	500 gm	400gm
5	Loss in %	2%	1.6%

General observations during preparation of *Rasnasaptak Kwatha* & *Rasnapanchak Kwatha*

1. *Kashaya Yavkuta Churna* became soft and swollen when kept soaked overnight (12hrs)
2. During boiling of *Kwatha* little frothing was observed.
3. Evaporation started at 70°C which aggravated on stirring.
4. The maximum temperature during boiling stage was found between 90-95°C.
5. The menstruum was brown in colour during initial stage which gradually turned to dark brown.
6. The colour of prepared *Kwatha* was dark brown.
7. The taste of the *Kwatha* became bitter at the end and had the characteristic smell.
8. It was observed that *Kwatha* gradually became thicker in consistency and the material became softer.

RESULTS

Table IV: Results of *Rasnasaptak Kwatha* & *Rasnapanchak Kwatha*

Sr. no.		RSK	RPK
1	Initial quantity of *Kwatha Churna* taken (kg)	24	24.6
2	Total quantity of water taken (Lt.)	400	400
3	Total time for soaking	12 hrs	12 hrs
4	Temp. during preparation of *Kwatha* (after 1 h)	80-90°C	80-90°C
5	Colour	Brown	Brown

General observations during preparation of *ghana*

1. After 4 - 4.5 hrs of boiling, the consistency of the liquid started becoming thicker and mild sticky nature was observed when rubbed between two fingers.
2. After 6 hrs of heating, the viscosity of the liquid and adhesiveness to the vessel was further increased.
3. There was a gradual increase in thickness of liquid and its adhesiveness to vessel with time.
4. After the completion of process, dark brown coloured *Ghana* of semi-solid (pouring) consistency was obtained.
5. The *Ghana* was sticky in nature.

General observations during preparation of *Rasnasaptak Kashaya Ghanvati* & *Rasnapanchak kashaya ghanvati*

Rasnasaptak Kashaya Ghana was quite sticky during handling.

- ***Rasnasaptak kashaya ghana*:** After pounding dark brown coloured dough mass was formed which was converted into dark blackish coloured round shaped tablets with smooth margins.
- ***Rasnapanchak kashaya ghana*:** Dark brown coloured granules were converted into blackish coloured round shaped tablets.

Physico-Chemical analysis

The primary goal of analysis of pharmaceutical preparations is to examine their purity, quality and safety for obtaining desired therapeutic efficacy. With the globalization of *Ayurveda* there has been a rising trend of modification of classical dosage forms. With the newer innovations coming in the therapeutic efficacy of the ancient dosage forms should not be compromised. This is possible through Standardization of protocols. For standardizing a formulation, it is necessary to standardize 1. Raw material 2. Processes involved 3. Finished product. In this study, efforts have been made to establish analytical standards for *Rasnasaptak Kashaya Ghanvati* & *Rasnapanchak Kashaya Ghanvati*.

Analysis of *Rasnasaptak Kashaya Ghanvati* & *Rasnapanchak Kashaya Ghanvati*

A. Organoleptic characteristics

Table V: Organoleptic Characteristics of *Rasnasaptak Kashaya Ghanvati* & *Rasnapanchak Kashaya Ghanvati.*

S. No.	Parameter	*Rasnasaptak Kashaya Ghanvati*	*Rasnapanchak Kashaya Ghanvati*
1	Colour	Dark Black	Black
2	Shape	Round shaped uncoated	Round shaped uncoated
3	Smell	Characteristic *Kashaya* smell	Characteristic *Kashaya* smell
4	Touch	Hard, Smooth	Hard, Smooth
5	Taste	Bitter	Bitter

B. Physico-Chemical analysis

Table VI: Analytical Tests of *Rasnasaptak Kashaya Ghanvati* & *Rasnapanchak Kashaya Ghanvati.*

S. No.	Tests/Analysis Parameters	Results of *Rasnasaptak Kashaya Ghanvati*	Results of *Rasnapanchak Kashaya Ghanvati*
1.	Composition	Ingredients found present	Ingredients found present
2.	Colour	Black	Black
3.	Total Ash Value	16.61%	23.2%
4.	Acid Insoluble Ash	1.83%	2.66%
5.	Loss on Drying	4.16%	3.73%
6.	Average Weight	515 mg	511mg
7.	Disintegration Time	13 min	11 min
8.	Total Solid	8.4 %	8.84 %

DISCUSION

Kwatha Kalpana is a highly regarded *Ayurvedic* preparation due to its quicker absorption and faster therapeutic action. It is the most vital and widely used dosage form in *Ayurvedic* pharmaceutics. Even the hardest drugs which cannot be used in any other *Kalpana*, can be used in *Kwatha Kalpana*. Because of its high potential and its results, it is one of mostly used *Kalpana*.

According to classical texts *Kwatha* is indicated in many diseases and is lonely able to treat disease. But *Kwatha* has some demerits, to overcome these demerits, *Kwatha* is modified into many dosage forms. It acts as a primary source for many secondary preparations like – Granules, Syrups, *Rasa Kriya*, Tablet, Capsule with extract form, and *Pravahi Kwatha*.

Ghana Kalpana, a secondary derivative preparation of *Kwatha Kalpana*, is also one of the extraction methods in which maximum of water soluble as well as a little amount of water insoluble materials are extracted by *Kwatha* method which is then reheated till it attains solid form. Various references are found in *Ayurvedic* classics for the preparation of *Ghana Kalpana* along with their method of preparation and consistency. As the active principle of herbal origin, drugs varies geographically and seasonally, there is a need to have minimum quantity of active principle or marker compound in the extract for efficacy. Some of the advantages of this *Kalpana* are reduced dosage, increased shelf life and increased bioavailability. In recent times some modifications are also carried out and a wide range of new formulations are figured from the *Panchavidha Kashaya Kalpanas*. *Swarasa*, *Kalka*, *Kwatha*, *Hima* and *Phanta* have some drawbacks like in availability of drug, lesser shelf life, unpalatability, higher dose and chance of contamination. *Acharya Yadavji Trikamji* has

mentioned about *Ghanavatis* prepared from single herb in his book *Siddha Yoga Sangraha* in the context of *Guduchi Ghana* (*Samshamani Vati*) for *Jwara*. It is one of the most common dosage forms which has been employed in various disorders and is gaining popularity due to its easy administration, palatability and longer shelf life.

CONCLUSION

The Physico-chemical analysis of *Rasnasaptak Kashaya Ghanvati and Rasnapanchak Kashaya Ghanvati* showed that all the test parameters were within API limits. In the present study an attempt has been made to fix quality standards for the analysis of *Rasnasaptak Kashaya Ghanvati and Rasnapanchak Kashaya Ghanvati*, which can serve as a basis for the Standardization of *Ghanvati*. Standard Operative Procedures developed in this particular study can be implemented on pharmacy scale.

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