



A Conceptual Review On *Pathyadi Kwath* Granules As A New Dosage Form

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Abstract:

Ayurvedic dosage forms hold a unique place in pharmaceuticals and therapeutics. *Kashtaushadhis* are predominantly plant - based drugs that are used in the preparation of medicines and are mainly dealt with under the subject of *Bhaishajya Kalpana*. Among the various categories of *kashtaushadhi* formulations, *Kwatha kalpana* is the one which is a widely used dosage form. *Sharangdhar Samhita* highlights the importance of combining different herbs in a particular proportion to minimize toxicity and increase therapeutic efficacy. Reference of *Pathyadi Kwath* is found in *Sharangdhar Samhita* and it is indicated in *Urdhvajatrugat vyadhi*. *Kashaya* or *Kwath* is a widely used *Kalpana* in the treatment of many disorders. However, the shelf life of *kashaya* is very less. It also becomes a less preferred form by patients due to its bitter taste, difficult transportation and tedious preparation. To overcome these problems, Granules prepared from *Kwath* using *Guda* will be a better solution. Thus, the *Pathyadi Kwath* can be converted into a new dosage form i. e. Granules, which could be easy to carry and palatable form with increased shelf life. This study aims at conceptual study of *Pathyadi Kwath* Granules as a new dosage form of *Pathyadi Kwath* and to know its physicochemical properties. In present study, review of *Pathyadi Kwath* and granules has been done. Also the necessary physico-chemical tests to be carried out for Granules are reviewed. This study would be beneficial for preparing Granules of *Pathyadi Kwath* effectively.

Keywords- *Kwath Kalpana, Pathyadi Kwath, Ayurveda, Granules*

Introduction:

Ayurveda means knowledge of life. In *Ayurveda*, diseases are formed due to imbalance of doshas, so *Ayurveda* encourages certain *dincharya* and therapies to maintain balance between *dosha, mana, sharir and aatma*. *Ayurveda* has been given the most importance to detail knowledge of drug.

Ayurvedic drugs are obtained from natural sources i.e. plant, mineral, animal. Ayurvedic formulations are broadly divided into two groups- *kashtaushadhi* and *rasaushadhi*. Out of these, *kashtaushadhi* are mainly plant origin drugs and they dealt with *bhaishajya kalpana*. There are several categories of *kashtaushadhi* formulations such as *kashaya, aasava, aarishta*, etc. By mixture of multiple drugs in particular proportion in Ayurvedic formulations, the toxicity becomes lesser and therapeutic efficacy increases.

In *Sharangdhar Samhita Madhyama Khanda*, *Dwitiyoadhyaya*, *Pathyadi Kwath* is described. The ingredients of *Pathyadi Kwath* are *Amalaki* (*Phyllanthus emblica* Linn.), *Bibhitaki* (*Terminalia bellirica* Roxb.), *Haritaki* (*Terminalia chebula* Retz.), *Bhunimba* (*Andrographis paniculata* Nees), *Nisha* (*Curcuma longa* Linn.), *Nimba* (*Azadirachta indica* A.Juss.) and *Amruta* (*Tinospora cordifolia* Willd.).

According to *Sharangdhar Samhita*, *Kashaya* or *Kwath* is the filter decoction obtained after boiling a mixture of herbs with 16 times water under low flame for a prolong period till the volume is reduced to $1/8^{\text{th}}$.

Pathyadi Kwath is an *Ayurvedic* preparation mentioned in *Sharangdhar Samhita* prescribed in diseases such as *Shirashool*, *Bhru-Shankh shoola*, *Karnashool*, *Ardhavybedak*, *Suryavarta*, *Shankhak*, *Dantpatan*, *Naktandhyayta* and *Netra roga*¹. The ingredients of this *Kwath* are mainly *Tikta Kashaya ras*, *Ushna virya*, *Katu vipak* and *Laghu*, *Ruksha Guna* in nature.

Pathyadi Kwath is commonly used preparation containing easily available herbal drugs². This formulation is mainly used in *Urdhvajatrugat Vyadhi*. As mentioned in the reference, *Guda* is said to be used as *Anupana* of *Pathyadi Kwath*. As the shelf life of *Pathyadi kashaya* is very less and it is less agreeable to patients in terms of preparation, dose and bitter taste. To overcome these problems, *Pathyadi Kwath* can convert to new palatable solid dosage form i.e. *Pathyadi Kwath Granules*. For the preparation of *Pathyadi Kwath Granules*, *Guda* its *Anupan dravya* can use as a base of Granules. As *Guda* itself acts as preservative, there is no need to add any other preservatives.

According to *Acharya Vagbhata*³, *Purana Guda* is *Pathyakar* while *Nav Guda* increases *shleshma* and creates *agnimandya*. So, *Puran Guda* can use for the preparation of Granules. The *Pathyadi Kwath* granules can study for its physic - chemical properties to establish its standard values.

Materials and Methods:

Kashaya⁴- '*Kashaya*' means those substances or formulations which helps in removing the *dosha* from the body and regulate the normal body functioning.

Types of kashaya kalpana -

According to *Acharya Sharangadhara*⁵, 5 *Kashaya Kalpanas* – The succeeding ones have more *laghu gunas*.

- According to *Acharya Kashyapa*⁶, 7 *Kashaya Kalpanas* - Sequences are not according to *guru* and *laghu gunas*.
- According to *Acharya Sushruta*⁷, 6 *Kashaya Kalpanas* – Succeeding ones have more *laghu gunas* i.e. *Ksheera* is more *guru*.
- According to *Arkaprakasha*⁸ – Succeeding ones have more *guru guna* i.e. *Arka* is having more *guru guna*.
- Classification of *kashaya* according to different *acharyas* is described below -

Table No. 1- Classification of kashaya according to different acharyas

<i>Charak Samhita & Ashtang Hrudaya</i>	<i>Sushrut Samhita</i>	<i>Kashyapa Samhita</i>	<i>Sharandhar Samhita</i>	<i>Arkaprakasha</i>
<i>Swarasa</i>	<i>Rasa</i>	<i>Swarasa</i>	<i>Swarasa</i>	<i>Rasa</i>
<i>Kalka</i>	<i>Kalka</i>	<i>Kalka</i>	<i>Kalka</i>	<i>Kalka</i>
<i>Shruta</i>	<i>Shruta</i>	<i>Kwatha</i>	<i>Kwatha</i>	<i>Churna</i>
<i>Sita</i>	<i>Sita Kashaya</i>	<i>Sheeta</i>	<i>Hima</i>	<i>Taila</i>
<i>Phanta</i>	<i>Phanta</i>	<i>Phanta</i>	<i>Phanta</i>	<i>Arka</i>
-	<i>Ksheera</i>	<i>Abhishava</i>	-	-
-	-	<i>Churna</i>	-	-

Jala Pramana

The drug and water ratio plays an important role for the preparation of a *Kashaya* and to extract the active principles of the drug completely. It is based on, Quality of the drug Quantity of the drug

Table No. 2- Water ratio according to Drug Quality (Acharya Sharangdhara⁹)

Quality of drug	Water to be added	Reduced to	Examples
<i>Mrudu</i>	4 times	$\frac{1}{4}$	<i>Guduchi</i> etc.
<i>Madhyama</i>	8 times	$\frac{1}{4}$	<i>Aragwadha</i> etc.
<i>Kathina</i>	8 times	$\frac{1}{4}$	<i>Dashamoola</i> etc.
<i>Atyantakathina</i>	16 times	$\frac{1}{4}$	<i>Padmaka</i> etc.

Table No. 3 - Water ratio according to Drug Quality (According to Ksharpani)

Sr.	Quality of Drug	Water added	Reduction
1.	1 Karsha - 1 Pala (12gm-48gm)	16	$\frac{1}{4}$
2.	1 Pala - 1 Kudav (48gm-192gm)	8	$\frac{1}{4}$
3.	1 Prastha - 1 Khari (768gm-196kg)	4	$\frac{1}{4}$

Different *acharya* mentioned the procedure of *Kwatha* in various ways; these are as follows,

Manufacturing process:

<i>Acharya Chakrapani</i>	<i>Ghata rasatva</i>
<i>Aacharya Sushrut</i>	8-16 times of water and reduced to $\frac{1}{4}$ th
<i>Aacharya Vagbhata</i>	Vessel should be coated with mud, continuous stirring of <i>Kashaya</i> and water ratio according to drug hardness.
<i>Aacharya Kashyapa</i>	4-8 times of water reduces to $\frac{1}{4}$ th
<i>Aacharya Sharangdhara</i>	1 pala of drug 16 times of water reduces to $\frac{1}{8}$ th

Preparation of Kwatha-

The whole procedure can be divided into 3 stages-

1. *Purva Karma*
2. *Pradhana Karma*
3. *Paschat Karma*

Purva Karma:

Collection and arrangement of essential equipments for preparation of *Kwatha*: Source of energy, Clay pot or Tin coated metallic vessel, Clean cloth, Clean vessel for filtration of *Kwatha*, Pincer to hold the vessel.

Kwatha dravyas which are to be taken should be cleaned with water and should dry in sunlight. Later, these drugs should be made into coarse powder.

Pradhana Karma:

The *Kwatha dravyas* could keep in water about an overnight or a period of time. Then the drugs could transfer to the big and wide vessel in which *Kwatha* is to be prepared. In case of too hard substances, it should be immersed in appropriate amount of water for whole night for easy extraction of therapeutic. Then it can be boiled on *mruduagni* so that the complete potency of the drugs can obtain in the water and only the desired amount of water could remain.

Paschat Karma:

Once the *Kwatha* can prepare, it can filter through cloth to the other vessel and measure.

Granulation¹⁰- Granulation is the process utilized to produce the big granules that are produced when powder particles stick together. Depending on the purpose for which they are designed, they might have sizes from 0.1mm to 5.0mm. These are formed by grouping particles and strengthening their connection. Either compression or the use of binding agents is used to create the bonds. Granules are a specific formulation made up of aggregates of powdered, dried solid particles that may or may not also contain other components called excipients and one or more active medicinal substances. Granules include two different sorts of bonds, slugging and employing binding agents. The pharmaceutical sector used the granulation process in antiquity, but in the current era; most of the pharmaceutical industries have adopted this technique. The Latin term "granulatum," which means grain, is the root of the English word "granulated." Agglomeration procedures are used in several sectors to increase material utility, ease handling, and reduce dust. The process of creating the particles is called granulation. Granulation is necessary to enhance compaction, enhance flow characteristics, and prevent segregation.

Need for granulation:

The key points highlighting the need for granulation are listed below:

- To improve powder flow.
- To prevent weight fluctuation.
- To create a consistent combination.
- To prevent homogeneity with weak content.
- To make compactions better.
- To create an environment free of dust.

- To avoid segregation of the powder.
- To enhance the product's appearance.
- To enhance the tablet's compressing capabilities.

Ideal properties of granules-

For any formulation; some minimum ideal characteristics or properties are required. In the case of granules, the ideal properties include:

- For improved flow, it should be spherical;
- For content uniformity, it should have narrow particle size dispersion.
- It should be sufficiently dense and moist to fend off cracking and dust build up during processing.
- It should have a good flow.
- It should have good compatibility.

Excipients used in granulation methods-

Granules are to be prepared for solid dosage forms. The excipients commonly used are diluents, binders, lubricants, glidants, and disintegrants.

Diluents-

Diluents are also called filler or bulking agents. They may be water soluble or water insoluble. There are no separate diluents for any type of granulation method. Diluents are used in that case when a dose of active pharmaceutical ingredient is very small or the drug dose itself is not sufficient to produce in bulk. Diluents are inert ingredients that are added to enhance the bulk of a tablet to make it the right size for compression. Example: Micro crystalline cellulose, Lactose, corn starch, dicalcium phosphate, Kaolin etc.

Ideal properties of diluents:

- It must be physically and chemically stable and medically inert.
- It ought to work well with the medication.
- It shouldn't impact the drug's bioavailability
- It must not be harmful.
- It needs to be inexpensive.

Binders:

Binders are materials that are used to produce granules when the binder is added to the powder mixture; it holds the powder together and form granules. They are available in dry or liquid form. By creating desired size and hardness granules, they improve the granules' ability to flow freely. The type of tablet formulation affects the choice of binder. For instance, lozenges need a lot of binding agents; but tablets that need to dissolve fast utilize binders in lower concentrations. Examples: Gelatin, PVP, Starch paste, Povidone, Hydroxy propyl cellulose, etc.

Lubricant:

The lubricant of granules is an equally important step of tablet manufacturing. Lubricants are used to lessen friction between the die chamber wall and the tablet as tablets are expelled from the tablet machine. They aid in preventing tablet formulation from adhering to dies and punches.

Lubricants are mixed with granules basically for the purposes:

- To improve the granule flow property.
- To eject intact tablet from die without friction.
- To avoid ticking the tablet to the punch.
- To reduce weight variations during compression.
- To avoid excessive wear of punches and dies. Examples: Talc, Magnesium stearate, Calcium stearate, Stearic acid etc.

Disintegrants:

When a tablet is placed in an aqueous solution, a disintegrant is added to the tablet formulation to speed up the disintegration process. These substances are added to tablet formulations so that tablets get broken up into small fragments after administration in the GIT. Examples: Starches, Croscarmellose sodium, Crospovidone etc.

Glidants:

The materials which can decrease the friction between particles and increase their flow characteristics are called glidants. When the flow property of the particle increases, the particle can flow easily from the top of the die cavity.

The effectiveness of glidants depends on:

- The chemical interaction between the glidants and the powder or granules.
- The physical characterization like particle size, and shape of the components of granules. Examples: colloidal silicon dioxide, Talcum etc.

Advantages of granules:

- Due to the direct compression's minimal operation requirements, it is more economical.
- A better fit for medicines that are susceptible to heat and moisture.
- Direct compression tablets dissolve notably more quickly, need fewer equipment requirements and processing processes, and have a lower risk of contamination.

Disadvantages:

- Direct compression is not suitable for high-dose drugs if it is not easily compressible by itself.
- Low-dose drugs may be uniformly blended.
- Air entrapment during direct compression is sometimes linked to capping, laminating, breaking, or layering of tablets.

Characterization/evaluation of granules:

- The granules are characterized by their morphological characteristics. Granules morphology can be analyzed conveniently with the help of computer supported imaging system.
- There is a good correlation between the compressibility of granules and their shape, flow property, packing property, frictional property, and coat ability. Some of these correlations are volume shape factor, shape coefficient, and morphological descriptors.

Application of granules:

- In the development of sustained - release dosage forms like tablets and capsules.
- In the development of micro - encapsulation.
- In gene therapy by targeting transgenic proteins.
- Applicable in food industries' formation of egg yolk granules.
- In the manufacturing of polyherbal *Ayurvedic* preparations, granulation methods and technology have advanced throughout time. However, pharmaceutical businesses have always had a strong interest inefficient and economical manufacturing techniques, which has accelerated the interdisciplinary scientists of pharmaceutical corporations across the globe in the search for new and improved technologies. During the formulation development process, each drug material presents a unique problem that the formulation development scientists must consider at the method selection stage.

Ingredients of Pathyadi Kwath-

Haritaki, Bibhitaki, Aamalaki, Bhunimba, Nimba, Haridra, Guduchi. Each of above 7 ingredients can be taken in same proportion.

Table No. 4 – Quantity of raw drug used for preparation of kwath

Name of ingredients	Quantity as per text
<i>Haritaki</i>	1part
<i>Bibhitaki</i>	1part
<i>Amalaki</i>	1part
<i>Nimba</i>	1part
<i>Bhunimba</i>	1part
<i>Haridra</i>	1part
<i>Guduchi</i>	1part

Method of preparation of Pathyadi Kwath-

- All raw drugs require for *Pathyadi Kwath* should be procured from market.
- The drugs should be first identified taxonomically and the genuinely of all drugs should be tested and approved authentic laboratory.
- Bharad* of all *dravya* are mixed together.
- The *bharad* of all *dravya* are taken in a steel container and soaked insufficient quantity of water for overnight.
- Next day morning, all *dravya* will completely soak in water. $1/8^{\text{th}}$ water can be taken in container and marking

should be noted.

- vi. Remaining quantity of water can be added. Water is added and should boil over low flame till the water reduces its $1/8^{\text{th}}$.
- vii. Then the container is taken out from the stove and filtered to another container through fine cloth. Thus, *Kashaya* can be prepared.

Ingredients of *Pathyadi Kwath Granules* – *Pathyadi Kwath*, *Guda*.

Name of ingredients	Quantity as per text
<i>Pathyadi Kwath</i>	1part
<i>Guda (Jaggery)</i>	4parts

Preparation of *Pathyadi Kwath granules*-

- i. Prepared *Pathyadi Kwath* can be taken in stainless still container.
- ii. *Guda* (4times of *kwath*) can be added in *kwath*.
- iii. *Guda paka* have to be prepared on low flame. After the preparation of *Gudapaka*, it should sieve through mesh size 10. Prepared Granules must be stored in a food grade container for further use.
- iv. These Granules would be termed as *Pathyadi Kwath Granules*.

Precautions for *Kwath* preparation:

- i. Heat should be given with low flame.
- ii. Regular stirring should be done to avoid carbonization of the material used in the practical.
- iii. The vessel should not close with a lid during the practical.

Precautions for granules preparation:

- i. Heat should give with low flame.
- ii. Regular stirring should be done to avoid *ektaripak* of *Guda*.
- iii. Container should be taken away from gas stove and still stirred regularly for making granules.

Therapeutic uses of *Pathyadi Kwath granules*:

Shirashool, Karnashool, Bhru-shankhshool, Ardhavbhedak, Naktandhyata, Suryavarta, Shankhak, Dantapatan and Netrarog. Pathyadi Kwath granules can be used in Urdhvajatrugat Vyadhi.

Table No. 5 - Ingredients and therapeutic action of *Pathyadi Kwath*-

DRAVYA	RASA	VIPAKA	VIRYA	DOSHAGHNATA	ROGAGHNATA
<i>Haritaki</i>	<i>Madhura, Amla, Katu, Tikta, Kashaya</i>	<i>Madhura</i>	<i>Ushna</i>	<i>Tridosahara</i>	<i>Chakshushya, Deepana, Hridya, Medhya</i>
<i>Bibhitaki</i>	<i>Kashaya</i>	<i>Madhura</i>	<i>Ushna</i>	<i>Kaphapittahara</i>	<i>Swarbheda, Netra roga, Kasa</i>
<i>Amalaki</i>	<i>Amla, Kashaya, Madhura, Tikta, Katu</i>	<i>Madhura</i>	<i>Shita</i>	<i>Tridosahara</i>	<i>Raktapitta, Amlapitta, Prameha</i>
<i>Bhunimba</i>	<i>Tikta</i>	<i>Katu</i>	<i>Shita</i>	<i>Kaphapittahara</i>	<i>Ajirna, Arsha, Atisara.</i>
<i>Nisha</i>	<i>Tikta Katu</i>	<i>Katu</i>	<i>Ushna</i>	<i>Kaphapittahara</i>	<i>Kushta, Vrana, Prameha</i>
<i>Guduchi</i>	<i>Tikta Kashaya</i>	<i>Madhura</i>	<i>Ushna</i>	<i>Tridosahara</i>	<i>Jwara, trushna, daha</i>
<i>Nimba</i>	<i>Tikta</i>	<i>Katu</i>	<i>Sheeta</i>	<i>Kaphapittahara</i>	<i>Kushta, Vrana, Jwara</i>

Organoleptic examination for *Pathyadi Kwath* granules -

1) Physical tests of *Pathyadi Kwath* granules -

- i. *Shabda*
- ii. *Sparsha*
- iii. *Roopa*
- iv. *Rasa*
- v. *Gandha*

2) Physicochemical examination of *Pathyadi Kwath* granules –

- i. Loss on drying
- ii. pH
- iii. Water soluble extractive
- iv. Alcohol soluble extractive
- v. Total ash value
- vi. Acid insoluble ash
- vii. Reducing sugar
- viii. Non reducing sugar
- ix. TLC

Discussion-

In *Ayurveda* classics, various types of *kalpana* are mentioned. *Kwath kalpana* is one of them to treat various diseases. *Kwath* are prepared by boiling of water (16th part of drugs) with mentioned drug's *bharad* until it reduces upto 1/8th or 1/4th. Patient is less agreeable to *kwath* because of palatability, difficult methods of preparation. To overcome these problems granulation of *Pathyadi Kwath* could be done.

In present study, the reference of *Pathyadi Kwath* is taken from *Sharangdhar Samhita madhyama khanda*. For preparation of granules, first of all *Pathyadi Kwath* is prepared and then *Guda* is added as its *Anupan dravya* for making granules.

The ingredients of *Pathyadi Kwath* are *Amalaki* (*Phyllanthus emblica* Linn.), *Bibhitaki* (*Terminalia bellirica* Roxb.), *Haritaki* (*Terminalia chebula* Retz.), *Bhunimba* (*Andrographis paniculata* Nees), *Nisha* (*Curcuma longa* Linn.), *Nimba* (*Azadirachta indica* A.Juss.) and *Amruta* (*Tinospora cordifolia* Willd.).

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Based on the *Rasa*, *Guna*, *Virya* and *Vipaka* - On examining the *Gunas*, it is observed that most of the drugs possess *Laghu* and *Ruksha Guna*. *Laghu Guna* helps in increasing *Jatharagni* and doing *amapachana*, further breaking the *dosha dushya samprapti* and showing its anti-inflammatory, anti-pyretic effect disease mentioned in uses of *Pathyadi Kwath*.

In present study, the new dosage form i. e. granules have been studied. While preparing granules, *Guda* can be included as it facilitates the granulation of the *kwath* as seen in traditional *avaleha kalpana* or the *sharkara kalpas* which are developed widely over the years in *Ayurvedic* pharmaceuticals.

By considering such importance of *Pathyadi Kwath*, its new dosage form viz. granules could be very beneficial for the patients. This form could have its different properties and potency. So the standardization of this form is necessary.

Conclusion:

Pathyadi Kwath can be used in new dosage form like granules. Different formulations are mentioned in the name of *Pathyadi Kwath*. In present study, review of *Pathyadi Kwath* granules is carried out along with its analytical parameters. *Pathyadi Kwath* granules would be most common dosage form and would gain popularity due to its easy administration, palatability and longer shelf life. However, to prove its effectiveness and doses, various clinical studies and trials should be conducted.

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