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A critical review of popular ayurvedic dosage form *Vati* (tablet) and its analytical evaluation

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Abstract

Vati Kalpana is the outcome of Kalka Kalpana, one of the five basic Ayurvedic pharmaceutical preparations. *Vati Kalpana* is an essential component of Ayurvedic pharmaceutics because of its various benefits, including ease of administration, palatability, and ease of dispensing and transportation. *Vati Kalpana* is a pharmacological method in which the powder of raw drugs (herbal or Herbo minerals) is triturated with *Kasayam*, juice, or even honey, and the medicines are prepared as pills or tablets. The process of defining and agreeing on technological standards is known as standardization. Raw drug collection, in-process standardization, and final product are all extensively inspected in this standardization process, which is then completed by different analytical tests. So we'll talk about *Vati* Kalpana and its analytical parameters in this article.

Keywords: Standardization of drugs; Analytical parameters of *vati*; *Vati Kalpana* in ayurveda; Kalka Kalpana

1. Introduction

In present scenario of covid pandemic, with increasing demand of different types of immunomodulators the oldest medical science in the world i.e., Ayurveda starting gaining popularity among the common peoples. As the first principle of Ayurveda is to maintain the health of a healthy person, to keep them away from any form of disorder, thus a lot of immunomodulators are properly explained in ayurvedic literature.

The main part of any system of medicine is its drugs in fact success of any treatment greatly depends on the quality of drugs and the formulation in which the drug is administered. An ideal drug formulation is the one that gives quick response, easy to administer and retain its potency for a longer period. That's why time to time Acharyas had mentioned different types of formulations and method of preparation of these formulations or *Kalpanas* which are still in practice and still as effective as mentioned in ayurvedic literature.

In ayurvedic pharmaceutics, *Vati* Kalpana is one of the most admired and prescribed formulation due to its easy administration, palatability, better self-life and convenience in its dispensing & transport. In Ayurveda, different acharyas had mentioned *vati* Kalpana in many contexts, but the detailed description regarding Vati Kalpana in a separate chapter was first mentioned by Acharya *Sharanghadhara*. Powdered raw drugs (Herbal or Herbo-mineral) are triturated along with water, certain *swarasa, gomutra, godugdha*, jaggery, *guggulu* or honey as binding agents and then molded into spherical form by hands or machine, the final product is known as *Vati, Vatak* or *Gutika*. Binding agents used also have their own medicinal values. Present work mainly focuses on the details of this ancient formulations i.e., *Vati Kalpana* as transcript in Ayurveda.

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1.1. Kalpana

"Kalpana means Yojna"

According to Acharya *Vagbhatta Vati* Kalpana is a derived form of *Kalka Kalpanas. Panchvidha kasaya kalpana* are the fundamental preparation [1]. All other formulations are derived from *Panchvidha kasaya Kalpana*. Ayurvedic preparation are divided into two part.

primary kalpana	secondary kalpana
• swarasa • kalka • kwath • hima • phanta	• avaleha • vati • taila • madya • asav-arista etc.

1.2. History of *Vati Kalpana* (formulation of tablet)

Since the Vedic period, Vati Kalpana has been considered one of the most ancient dose forms. It is referred to in the Rigveda as the word "*Mani*." *Mani*, like suppository, *Pindi, Modaka*, and *Vataka*, is circular, ovoid, and large in size. All of these dose formulations can be found in Vedic literature. Another Vedic literature in which *vati* is referred to as "*Ravdir Mani*" is Vedic *Yamsukta.*

1.3. Origin of *Vati* in classics

Vati Kalpana is the result of *Kalka Kashaya Kapana* in Ayurveda. The pharmaceutical methods, according to Acharya *Vagbhata*, can totally convert all *Vanaspatika Dravyas* (herbal medications) into paste form, i.e. Kalka Kalpana with a certain shape like *Varti, Gutika*, and so on. The Kalka Kalpana is the primary Kalpana, and the same principle applies to the Vati Kalpana (practical size reduction as per requirement, Kalka should be prepared in that specific shape). Various synonyms of Vati have been listed in the *Madhyamakhanda* of the *Sharangadhara Samhita*, such as *Gutika, Vati, Vatika*, *Pindi, Modaka, Guda*, and Varti [2].

1.3.1. Different types of Vati with their probable contemporary correlation

- **Gutika:** It is made by rolling in the shape of small circular masses. Can be compared with pills.
- **Vati:** Vati is made in the form of flat circular masses. It is similar to tablet.
- **Gud:** *Kasthaushadhi Churna* (herbal drugs in powder form) is mixed with *Gudapaka* (liquefied Jaggery by heating) and organized manufactured goods are called *Guda.* Found to be similar with coated tablet.
- **Modaka:** If the drug is changed into circular shape having large size and possessing weight around 20 g, 50 g, 100 g like big lemon fruit rolled into circular mass, then it is called *Modaka*
- **Verti:** If the *Gutika* or *Vati is* modified into a long and oval shaped solid form, then it is called as *Varti Kalpana*. This is usually used for local administration by following routes viz. *Guda* (anus), *Yoni* (vagina), *Shisna* (penis), *Netra* (eye) etc. According to the specific routes of drug administration, the length and diameter of the *Varti* can be modified.
- **Pindi:** If the drug powder is mixed with *Sharkara* and medicine is molded like *Pinda* then it is called as *Pinda* or *Pindi Kalpana*.
- **Vatak:** If medicine is molded in the form of big circular mass then it is branded as *Vataka.*

1.3.2. Type of Vati

In the Ayurvedic Pharmaceutical text two types of *Vati* preparation methods are mentioned - S*agnisadhya Vati* and *Anagnisadhya Vati*.

Sagni Vati Nirmana [3]

Sagni vati nirmana is the name given to the process of preparing *vati* with the help of *Agni*. *Guda, Guggulu,* Sugar, and other ingredients are boiled with water until they resemble *Leha,* at which point fine drug powder is added to produce a paste for *vati nirmana. Yogaraj Guggulu, Chandraprabha Vati*, and others are examples.

Niragni Vati Nirmana [4]

If preparation of *vati* is made without the help of Agni that is called as *Niragni vati nirmana*. In this method *vati* is made without help of Agni. If honey is used, then fine powder of drugs is properly mixed in honey after this *vati* should be made. Eg- *Eladi Gutika, Shilajatwadi Vati*. If *Gomutra,Swaras, Kwath* are used in the formation of *vati,* then fine powder of drugs should be given bhavana by these liquids and after this *vati* should be made. Eg- *Sanjeevani vati.*

1.3.3. General Principal of Vati Nirmana

- The drugs of plant origin are dried and made into fine powders separately.
- These drugs are put into a *Khalva* and ground to a soft paste with the prescribed fluids.
- When more than one liquid is mentioned for *lavigation* they are used in succession.
- When sugar or Jaggery is ingredient, *paka* of these should be done on mild heat. The fine powders of remaining ingredients are added to the *Paka* and then briskly mixed.
- This mass is properly grounded and the final stage of pill making is checked by rolling it in between two finger and it should not stick to it.
- Pills can be dried in shade or hot air oven.
- When sugar is added, it should be taken four times to the quantity of churna.
- When *guggulu* / Honey are added, it should be taken in equal quantity to that of *churna*.
- If liquid Substance like *Swarasa, Kwatha, gomutra* etc. is required in *vati* preparation, its double quantity is taken.
- When jaggery is added in preparation of *vati*, it should be taken double quantity of *churna*.
- In case where Parada and *Gandhaka* are mentioned, *Kajjali* is made first and other drugs are added in it, one by one according to the formula.
- *Bhasma* or *sindura*, of mineral, metals and gems are made unless otherwise mentioned, purification of animal products is mandatory.
- In case *guggulu* is one of the ingredients, then no binding material is needed.
- If *tikshna dravyas* used like *Vatsanabha, Raskarpura* and *Rasapushpa* etc., then they should be grounded into micro powder form in *Khalva yantra* then mixed well with other ingredients.

1.4. Ingredients used in Vati

- In the preparation *vati* three ingredients are necessary
- Fine powder of drugs.
- Binding substance/ Sweet substance.
- *Bhavana dravya.*

1.4.1. Drugs in the form of fine powder

In *Churna Kalpana* drugs are dried *separetly*, pulverized and sieved through sieve no 85.

Binding Substance/ Sweet Substance

Table 1 Quantity of *Ayurvedic* binding agents in relation to *Churna* (powder) for preparation of *Vati* [5]

Sr. no.	Name of substances	Quality of adding substances in the reference to Churna Dravya
1	*Sita* (sugar)	Four times
2	*Guda* (jaggery)	Two times
3	Guggulu (*Commiphora wightii*)	Same quantity
4	*Madhu* (honey)	Same quantity
5	Drava *padarth* (liquid sub.)	Two times

In the pill formation, jaggary, *sarkara* and honey are used they are called as binding substance. These substances remove foul smell and bitterness of the drugs and make *vati* palatable.

Drug for Bhavana

The liquid added should be optimum in quantity so as to form soft or soggy mass and to keep the material wet throughout grinding. Quantity of liquid should be sufficient to fullfill the following criteria. Criteria- *ardrata, kardmabha* (clay like consistency), *samplavana* (immersion) and *ekibhoot (*becoming homogenous). The process is carried out till it attend *subhavit lakshan* [6]. If in the formation of *vati, Kwath* is used then bhavana should be given to principal drug *churna, Kwatha* made with eight times water and reduced to 1/8th part and filter through cloth.

2. Precautions for Vati Nirmana

2.1. Before preparation of vati

- Drugs for *vati nirmana* should be free of dust, insects, and worms, among other things.
- Preparation of *vati*, fine *churn*a must be used (Mesh size No.-85).
- *Swarasa* and *Kwatha* should be utilized according to their descriptions.
- *Guggulu* should only be used after purification.
- Any metal or mineral utilized must be in the form of *bhasma.*
- If *Parad* and *Gandhaka* used they should be used in *Kajjali* form.

2.2. During Preparation of Vati

- Fine powder (*Churna*) of all ingredients must be properly mixed before preparation of *vati nirmana*.
- *Vati* should be the same size, shape, and appearance.
- The preparation of the *vati mardana* should be implemented properly.
- After preparing the *vati*, it should be dried in the shade.
- The *vati* should be stored in an airtight container.

2.3. General dose of vati

- *Vati* dose is determined based on the patient's body, strength, disease, and other factors.
- One *Karsha* (12 g) is the standard dose of *vati*. It is determined by *kostha* and Agni [7].

2.4. Shelf Life of vati

According to Acharya *Sharangdhar*, the shelf life of vati is one year [8]. it is given two years under the regulations of the Drug and Cosmetic Act 161B if it is stored free of moisture.

2.5. Purpose of *vati kalpana*

Pills are an ideal form of treatment for the following reasons:

2.5.1. Dosage accuracy

In the trituration process, the pharmaceuticals and excipients are uniformly mixed, resulting in active ingredient content within the permitted limits. When liquid medicines are measured in domestic spoons of varied capacities, the patient obtains the appropriate dose, which isn't always the case.

2.5.2. Stability

Drugs in solid form are usually more chemically stable and have a longer efficacy. The date of manufacturing should be noted on the container if there is a chance of gradual loss of effectiveness. It aids in the preservation of volatile components in medications such as Kasturi, Amber, Camphor and a variety of herbal fragrant plants.

2.5.3. Patient acceptance

To hide the flavor of nausea medications, protective coatings can be applied to the pills. Bulk pills, due to their small size, may be carried by the user without causing discomfort, allowing for consistent dose, which is difficult to achieve with liquid medications.

2.5.4. Economy

Pills are created using a mass production process on high-efficiency and output machines. They're also a quick and cost-effective way to dispense.

2.6. Characteristics of Good Pill/Tablet Quality

- It must contain the specified dose within permissible limits.
- It should be tough enough to resist normal handling from the time of manufacture to the time it reaches the consumers.
- It should be the right size for convenient administration and free of physical flaws and foreign materials that would detract from their overall appearance.
- It should be disintegrated readily.
- It is preferable to use micro fine powder for the preparation of *Vati.*

2.7. Analytical Study

To evaluate the quality of the finished product obtained after a detailed pharmacy method, many pharmacopoeias define certain standard criteria that a tab/pill should first meet, such as uniformity of weight, hardness of the pill/tab, disintegration time, water soluble extract, alcohol soluble extract, ash value, and loss on drying, among others.

2.7.1. Determination of uniformity weight of pills/Tablets

To determine the uniformity of weight of pills/tablets, twenty pills are chosen at random and weighed separately in a precision weighing balance. The average weight of each pill is then calculated by dividing the total weight of 20 pills by the number of pills in each group. Each group of tablets' highest, lowest, and average weights are kept track of.

2.7.2. Determination of pills hardness

Placing a pill in a tab/pill hardness tester and rotating the knob to fix the pill in place is how the hardness of the pill is determined. After adjusting the scale to zero, the pressure is increased by twisting the knob further. When a pill is broken down, the hardness is measured on a scale. During this procedure, ten pills from each group are examined, and the average hardness of each tablet is calculated.

2.7.3. Determination of disintegration time

The disintegration time of a pill is determined by placing three pills in a tube of the disintegrator apparatus, then adjusting the apparatus so that the complete up and down movement of both the tube in the beaker containing distilled water was repeated 30 times per minute until the particles remained above the screen, which was easily passed through.

2.7.4. Determination of water- soluble extract

The water-soluble extract of a pill is determined by mixing 5 gm of correctly weighed air dried pills with 100 ml. of water in a conical flask and allowing it to stand for 18 hours, stirring it occasionally. This mixture is filtered after 18 hours, taking care not to lose any water. Then 20 mL of filtered material is placed in a previously weighted porcelain evaporating dish and dried in an oven over a hot water bath. The extract-filled porcelain evaporating dish is next weighed, and the amount of water-soluble extract obtained is determined in percentage.

2.7.5. Determination of the ash value

To determine the ash value, a porcelain crucible is weighed first. In that weighed porcelain crucible, two grammes of sample are taken. This porcelain crucible containing samples is placed in an electric furnace and the temperature is steadily increased (550-700°C) until the sample is carbon-free. Following that, it is cooled and weighed, and the Ash value in percentage of both experimental medications is calculated.

2.7.6. Determination of loss on drying

To determine loss on drying, a watch glass is carefully weighed, then 1 gram me of sample is placed in the weighted watch glass and dried for 6 hours in an electric hot air oven at 100°C. After that, it is chilled before being weighed and calculated once more. The percentage loss on drying of the sample due to the difference between the two weights.

2.7.7. Friability test

A set of tablets is weighed and placed in the apparatus, where they will be subjected to rolling and repeated shocks as they fall 6 inches in each rotation. The pills are weighed after 4 minutes of therapy or 100 revolutions, and the weight is compared to the initial weight. Tablet friability is measured by the amount of material lost owing to abrasion. a % representation of a value.

2.8. Equipment's for Tablets/Pills

2.8.1. Manufacturing

In earlier days, Ayurvedic practitioners created medicine in their homes and gave it to their patients, but today, sophisticated equipment has been invented to develop the pharmaceutical sector and to meet public demand by manufacturing large quantities of medicine at once. Rapid Mixer Granulator, Double Cone Blender / Mechanical Shifter Spray Coating Machine, Rotary Tablet Press, Tablet Counting Machine, Tablet Polishing Machine, Automatic Tablet Printing Machine, Strip Packing Machine are the equipment necessary for tablet/pill manufacturing

3. Conclusion

Vati kalpana (Tablet/Pills) plays a vital part in Ayurvedic pharmaceutics, owing to various advantages such as ease of administration, palatability, suitable form for distributing and transportation, ability to keep the medicine potent for a long time, and fast action. Tablets can be made in a variety of methods, and product performance can be influenced by the formulation's content. Several tablet/pill products have been popular in the pharmaceutical market due to the availability of varied formulation techniques, strong patient compliance, and great potential. Newer scientific and technological advancements should also be pursued in order to provide a promising and versatile dosage form with novel performance and attributes.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to disclose.

References

[1] Edited and translated by Prof. P.V. Sharma, Charaka Samhita, 1st Edition, Varanasi, Choukhamba Orientalia, 1983; 4/7.

[2] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016;Madhyam Khanda,Sloka no.1/7;p.195.

[3] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016; Madhyam Khanda, Sloka no.2/7,p.195.

[4] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016; Madhyam Khanda, Sloka no.3/7,p.195.

[5] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016; Madhyam Khanda, Sloka no.4/7,p.195.

[6] Sadanand Sharma, Rasa Tarangini, 11th Reprint edition, New Delhi: Motilala Banarsidas; 2009.p. 21.

[7] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016; Madhyam Khanda, Sloka no.5/7p.196.

[8] Shailja Shrivastava, vyakhyakarta, Sharangadhar Samhita, 1st edition,Varanasi, Choukhamba Orientalia,2016; Pratham Khanda, Shloka no.52/1,p.12