

AYURVEDIC PHARMACEUTICAL DOSAGE FORMS-A REVIEW

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ABSTRACT

A wide range of pharmaceutical description is available in Charaka Samhita .The basic processing techniques which known as *Panchavidha Kasaya kalpana* are elaborately explained in this text. Drugs are used either as single medicine or as combination in various diseases considering the *prakriti* of the patient, condition of the disease. For this they are converted into different forms. This process of modification can be termed as *kalpana* and altered form of the *dravya* is called *kalpa*.Since the *panchavidha kasaya kalpana* are having potency for short period, unpleasant taste etc different derived preparation (different dosage form) are evaluate by different Acharya in different time according to need.Later on these new dosage forms are known as *Upkalpana*. All the difficulties which arise in basic *Kalpana* during their preparation are overcome by these new dosage forms like easy administration, pleasant taste, safe use, high therapeutic efficacy, economic and longer shelf life period. In Ayurveda Sarangadhara Samhita is consider as an authentic book for Ayurvedic pharmaceutic because it contain clear definition of pharmaceutical term and also explained method of preparation of different formulations in simple method .Derived preparation (different dosage form) are like *Churna*, *Vati*, *ghruta* & *Taila*, *Avaleha*, *Asava* & *Arista*, *Bhasma* etc are mentioned for different disease condition in different text.

Keywords: Ayurveda, *Panchavidha Kasaya kalpana*, *Upakalpana*, Dosage form.

INTRODUCTION: Ayurveda is serving the mankind since a long time with the aim to provide healthy status to healthy individual and to cure the disease. During this long time this traditional system undergone many problems but still it remain mainstay of health care system of India About 1000 single drugs and 8000 compound formulations are seen in various classical book of Ayurveda such as Charaka Samhita, Susruta Samhita, Astanga Samgraha, Astanga Hrudaya,Sarangadhara samhita and Nighantu granthas. A wide range of pharmaceutical description is available in Charaka Samhita (1000 B.C.) which devotes one chapter for pharmaceutics. The basic processing techniques which known as *Panchavidha Kasaya kalpana*¹ are elaborately explained in this text.

Swarasaka kalpana, *Kalka kalpana*, *kwath kalpana*, *Hima kalpana* and *phantaka kalpana* are called as *Panchavidha Kasaya kalpana* .Since the *panchavidha kasaya kalpana* are having potency for short period, different derived preparation (different dosage form) are evaluate by different Acharya in different time according to need. During the period from 8th century to 14th century may be considered as the golden period of Ayurveda pharmaceutics(*Rasasastra* & *Bhaisajya kalpana*).Acharya Sarangadhara was written Sarangadhara Samhita in 14th century A.D. Now it is consider as an authentic book for Ayurvedic pharmaceutic because it contain clear definition of pharmaceutical term and also explained method of preparation of different formulations in simple

method². Derived preparation (different dosage form) are like *Churna*, *Vati*, *ghruta* & *Taila*, *Avaleha*, *Asava* & *Arista*, *Bhasma* etc. are mentioned for different disease condition in different text.

MATERIALS & METHODS: There are four basic need required to make an effective dosage form such as 1) Safety 2) Efficacy 3) Stability 4) Palatability. Ayurveda also gives prime importance to these four basic requirements. In Ayurvedic therapeutics, the drugs have been used as single and compound form. It is necessary that the form of the drugs or formulations used by the patient should be not only effective but also easy for administration and acceptable by the patient. Mainly modification are done for increasing palatability, Shelf life, Adopting to market standards, Compatibility, Global acceptance, Easy administration, Dosage fixation. Modification can be done by improving appearance, form, increasing therapeutic utility or potency, by enhancing Shelf life, by simplifying Dispensing and portability and by increasing palatability³.

A. *Moulika Kalpana* (Basic Preparation) the basic processing techniques which known as *Panchabidhha Kasaya kalpana*¹ are elaborately explained in the Ayurvedic text. Such as *Swarasa kalpana*, *Kalka kalpana*, *kwath kalpana*, *Hima kalpana* and *phanta kalpana* which are called as *Panchabidhha Kasaya kalpana*. Since the *panchabidhha kasaya kalpana* are having potency for short period, different derived preparation (different dosage form) are evaluate by different Acharya in different time according to need². *Kashaya* means that which irritates and give pain the throat when taken but its special quality is it can able pullout the disease from the body.

1. Swarasa² (Fresh Juice): The evolution of liquid orals started at the administration of freshly obtained juices of plant material. To obtain fresh juices, green herbs are crushed and the juice expressed by squeezing the crushed materials. The outcome is referred to as *Swarasa*. If the wet drug is not available, dry drug powder added with two times of water and kept for one night and squeezed it through a cloth to obtain juice. For example, *Ginger juice*. In some condition like thick leaves and barks where *swarasa* cannot be squeezed directly, another procedure known as *putapakaswarasa* technique is advocated. In this technique under processed drug is made into round mass and covered by large leaves and tide with thread and externally covered with mud cloth. It will burn till the mass looks into red hot ball. Then after self cooling the under processed drugs are taken out and squeezed through a cloth to obtain *swarasa*. For example, *Vasa putapakaswarasa*, *Nimba putapakaswarasa*. Since the *swarasa kalpana* is *guru* its dose is half *pala* (approx. 24 ml.) where as *putapaka swarasa* dose is one *pala* (approx. 48 ml.). Acharya also mentioned some *Prakeshapa dravyas* to add in *swarasa* like *Madhu* (honey), *sharkara* (sugar), *guda* (jaggery), *kshara* (alkalies), *jiraka* (Cuminum szgium), *lavana* (rock salt), *ghruta*, oil and *churna* of one *Kola* each (6 gm.). *Swarasa* obtained by *putapaka* method is to be taken with one *Karsa* (approx. 12 gm.) of honey⁴.

2. Kalka(Paste)²: When the fresh drug or a dry drug made into paste(bolus) like mass form by with or without adding water, then it is called as *Kalka*. In this method, the crushed fresh plant material is administered as such, without expressing the juices for example, *Rasona kalka*².

3. Kwatha² (Decoction): This is technique of later ages wherein, the dried plant material is extracted as decoction. This method was probably adopted to derive more active constituents from the plant materials, by allowing the heat to act as catalyst to soluble the extractable. In this method one part of coarsely powdered drug is boiled with 4 part of water over mild fire till the volume of liquid is reduced to 1/8th part of its original volume. Then it is filtered .This filtrate liquid is *Kwatha*. Soaking raw materials result in softening, diffusion and osmosis of water into the raw materials helps softening raw material through osmosis. Due to the presence of hydroxyl group, the raw material swell, which results in the increased diffusion pressure inside the cells, there by ultimately bursting of the cell wall. Continuous heating and agitation during the preparation of decoction enhances the extraction process by weakening the bonds and there by separating the hydrophobic substances from hydrophilic substances. The water diffuses into the raw material, dissolves the water soluble constituents and discharges it to the liquid media due to collapse of the cell wall. Thus, transfer of water soluble principle into the solvent (Water) is achieved. The potency of *panchavidha kashaya's* are in increasing order from *phanta* to *swarasa*. Scarcity of raw materials in the fresh condition in each season and their varying distribution throughout the localities made them to think of other means. For preserving the fresh plant matter they dried and kept them for a long time without altering the efficacy of active principles. Expression of juice was found impracticable with some drugs and thus evolved the technology of extraction using water. By these methods,

they isolated the water soluble components in a successful way. *Kwatha*, *Sheetha* and *phanta kashaya's* were rapidly absorbed and onset of action was found to be quick. These *kashaya's* were prepared from single drugs or from a group of drugs. Therefore *kwatha kalpana* has more importance in clinical practice.

The term *kwatha* is basically derived from the root word 'kwathana' which literally means process of boiling. Word *kwatha* is derived from the root word 'kwath nishpake'.*Shritha*, *Sheetha*, *Kashaya*, *Niruha* are the synonyms of *Kwatha*.

Merits and demerits of *Kwatha kalpana*: *Kwatha* has got a versatile role among the various medicinal preparations in use. *Kwatha* plays an important role in Ayurvedic pharmaceutical technology because it is the primary formulation for other *kalpanas* like *Snehakalpanas*, *Sandhana Kalpana*, and *Rasakriya*. *Kashaya's* are one of the most commonly used *kalpana* in starting the treatment. It retains many of the water soluble portions present in raw materials.

Water is an ideal substance since body is constituted by more than 50 % of water. Water possesses the qualities like *deepana*, *tarpana*, and is considered as *amrithopamam*. Due to all these reasons, *kashaya's* have much more important role among *kalpanas* in Ayurveda. A major part of therapeutic preparations mentioned in the ancient texts are in the form of *kashaya's* which are in daily practice. *Kashaya's* are widely used as *bhavana dravya* in many of drug purifications. *Kashaya's* are indicated as *anupana* in many conditions. *Kashaya's* are used for *vrana prakshalana*, *niruha vasthi*, and in *netra kriyakarma's*.Uses of *kwatha* with examples:as a medicine,*bhavana dravya,anupana*,to

prepare other drugs, as a *sodhana dravya*, as *marana dravya*. Demerits of *kwatha kalpana*: Apart from all these merits, *kashaya*'s have some demerits also. *Kashaya*'s are prepared in aqueous media and this decreases the stability of the product. Since water has wide solvent action it dissolves wide range of substances. They may be medicinally inert and undesirable because they readily ferment or decompose. Water dissolves glycosides, albumin, pectin, colouring matters, sugar, tannin, mineral salts, and vegetable acids. In the case of hot water, starch is also dissolved. They are favorable for the growth of moulds and bacteria or bring about the decomposition of the product. The presence of sugars or other carbohydrates result in alcoholic fermentation with evolution of CO_2 while the presence of protein matter leads to nitrogenous fermentation, with liberation of ammonia.

Moreover, water promotes hydrolysis of many substances and allows enzymatic action to take place. Exposure to atmosphere and light accelerate spontaneous oxidation of the preparation. In *kashaya*, oxidation results in unpleasant odour and taste and it becomes rancid. Moisture accelerates the oxidation of volatile oils producing changes in quality of the odour and increasing viscosity of *kashaya*. High humidity in tropical regions contribute to the easy decomposition of contents, contamination, mould growth, fungal growth. So for a good result freshly prepared *kashaya* should be used to get intended efficacy. Another demerit of *kashaya* is that a part of volatile contents present in the raw materials are lost in course of preparation of *kwatha*. Moreover alcohol and fat soluble contents cannot be extracted by these methods.

Preservation of *kashaya*: Generally *kwatha* are to be consumed on the same day as if kept for more than one day its natural smell, colour and taste are found altered because of decomposition. Hence in ancient times either decoction are made solid by further evaporating the liquid or moisture content or making other types of preparations like *sharkara* and *Asasva Arishtas*. It means ancient scholars used either sugar or self generated alcohol for the preservation of decoction in liquid form or removing their moisture content by evaporation.

In modern science few chemical preservatives like benzoic acid, sodium benzoate, are used in pharmacies for preservation of various *kashaya*'s⁵. But the result is a substantial reduction of original medicinal and nutritive value of drugs. There are many brands of preservatives used to enhance shelf life and quantity of addition in prepared medicine often surpasses the permissible limits. This would cause deleterious effects on patient instead of being beneficial to him.

4. Hima² (Cold Infusion): The basic concept for this *kalpana* is that drugs having *sheeta veerya* (cold potency) and volatile principles may lose their active principles by heating, hence for such type of drugs the *hima kalpana* is mentioned, by which active ingredients can be collected in cold infusion form. This *kalpana* should be consumed within 24 hours of preparation, but however with advancement in preservatives technologies its shelf life can be increased. The methodology of preparation of *hima kalpana* mentioned that the plant material is firstly dried and is converted into coarse powder. As and when required, the same is soaked in water for a defined period, the mass is squeezed and filtrate is

administered. In this process one part of powdered drug is added with eight part of cold water and kept for one night. Then it is filtered. This filtrate liquid is *hima*. In day to day clinical practice these formulations can be used for prescription and also based on this number of other formulations can also be prepared depending on disease and patients condition. It can also be used as in various diseases⁶. For example, *Dhanyaka hima*

5. Phanta² (Hot Infusion) : As a further advancement of this technique, *Phanta* method was adopted. This method requires using boiled water for obtaining the infusion (hot infusion). In this process one part of powdered drug is added with four part of hot water and filtered through cloth after some time. This filtrate liquid is called as *phanta*. For example, *Panchakolaphanta*.

B. Upakalpana (Derived Preparation):

1. Churnas⁷ (Powders): Among solid dosage forms, *Churna* is probably, the most ancient one. The dried herb is pulverized into powder form. To obtain a better fineness, it undergoes a phase of sifting through a piece of fine cloth (*Vastragalana*). Apart from the powders obtained from single herbs, a number of Ayurvedic multiple ingredient compound preparations occur in this dosage form. As a rule, in a compound preparation, all the ingredient herbs are to be washed, dried, powdered and sifted individually and then blended in requisite proportions. For example, *Triphala churna*, *Sitopaladi Churna*, *Maha Sudarshan Churna* etc.

2. Vatti⁸ (Pills and Tablets): These are somewhat more stabilized and compact form of *Churnas*. The end product of this process, is in form of a pill. To make the compact, there are at least three methods. Firstly, the dry charge of herbs (blend of

Churnas) is added to sugar syrup to form a dough. This mass is rolled into pills of desirable size. In the second method, the blend of powders undergoes a prolonged process of *bhavana* and *mardana*- which is trituration using an extract or juices of herbs, to obtain a fine dough with good bind properties. This mass is then relied into pills. The third group of products, have *Guggulu* anoleoresins of *Commiphora wightii*) as a prime ingredient, This active ingredient itself acts as a binder to make pills. For example, *Chandraprabha vati* *Yogaraja guggulu*, *Kanchanara Guggulu* etc.

3. Ghruta⁹ (Medicated ghee): Pharmaceutics in Ayurveda realize the need of lipid media for drug administration. The process of *tailapaka* or *ghrutapaka* is a characteristic of Ayurvedic dosage forms. A base lipid like ghee, sesame oil or mustard oil is processed with the aqueous extract of herbs for long durations at a suitable temperature till the water content is fully evaporated. Medicaments processed by this method are normally used for external use in case of oil based products and for oral route if it is a ghee based preparation. *Ghrutas* are preparations in which *Ghruta* is boiled with prescribed *kasayas*(decoction)and *kalka* of drug according to the formula. This process ensures absorption of the active therapeutic properties of the ingredients used in formula. For example, *Bramhi ghruta*, *Phalakalyana ghruta*.

4. Taila¹⁰ (Medicated ghee): *Tailas* are preparations in which *Taila* is boiled with prescribed *kasayas*(decoction) and *kalka* of drug according to the formula. This process ensures absorption of the active therapeutic properties of the ingredients used in formula. *Taila kalpana* may be

defined as a process, where various materials like *Taila*, *Kalka*, *Kwatha*, *Ksheera* and *Gandha dravyas* are employed for the preparation of oleaginous medicaments. Fat/Water soluble active principles of drugs are extracted into *Taila* in this method. Medicated *Taila* are having more extra power and shelf life than crude *Taila*. Formulations prepared from the *Taila* enhance life, complexion, strength and anabolism of body. The water soluble as well as fat soluble active principles can be transformed into oil media and this addition of properties of material made the *Taila* potent and effective. Scientist concern with Ayurvedic Pharmaceuticals should give interest to develop the ancient pharmaceutical method without violating the fundamental principle for the preparation of medicated oil. For example, *Nirgundi Taila*, *Saindhavadi Taila*.

5. Sandhana Kalpana¹¹ (Fermented Syrups): It included formulations like *Asava* and *Arist*. The method probably was evolved at later ages, to overcome these disadvantages. These are medicinal preparations made by soaking the drugs either in powder form or in the form of liquid substance like decoction, cold infusion etc are mixed with a defined amount of jaggery and allowed to ferment for a significantly longer time, to attain a particular level of self-generated alcohol content, thus facilitating the extraction of the active principles contained in the drugs. This process represents a dynamic phase of pharmaceutical evolution in ancient India. The method speaks of using herbs such as *Woodfordia fruticosa* and *Madhuka latifolia* to initiate or accelerates fermentation process. The self-generated alcohol content acts as an effective preservative for the extract initially

obtained. The process also speaks of selective flavoring the liquid orals. Each of *Asavas* or *Arishtas* contains certain flavoring herbs such as cardamom, cinnamon etc. Composition of flavoring herbs differs from product to product. Possibly, there was a scope to alter the kinetics of the product by virtue of alcohol content and selective flavoring agents. Over and above, it offers a scope for hydro-alcoholic extraction of flavoring herbs, since they are added at the time of fermentation or during maturation. For example, *Dashmoolarishta*, *Ashokarishta* and *Aravindasav*.

6. Avalehas² (Cooked Jam): An intermediate category between liquid and solid oral dosage forms. These are primarily sugar based semi solid palatable preparations. It is a semi solid preparation of drugs, prepared with prescribed *swarasa* or *kasaya* boiled with jaggery to make it concentrate. Then *praksepa* drugs are added in it which having flavoring agents. For example, *Chyawanprash*, *Awaleha*, *Vasawaleha* etc.

7. Satwa¹¹ (water extract): *Satwa* is a water extractable solid substance obtained only from plants having more starch/carbohydrate content. The fresh drug is cut into small pieces and crushed. Then macerated in water and kept for over night. After that it is filtered and allowed the liquid for sedimentation. The sediment part is washed by repeating the process by adding water and decanted. The sediment part is allowed to dry and it is called as *satwa* for example, *Guduchi satwa*.

8. Bhasma¹² (incinerated ash) : Powder of a substance obtained by calcinations is called *Bhasma*. It is prepared from minerals, metals, and marine and animal product. Initially the material undergoes an elaborate process of purification. After

purification the materials is keep in closed crucible and incinerated in *putapaka* process or in a furnace. The characteristics of *bhasma* are , *nischindritwa*(metallic luster),*rekhapurna*(it should be so fine as to get easily into the finger lines),*varitara*(it should be so light as to float on the surface of water) and *apurnabhava*(it should not revert to the original state). For example, *swarna bhasma*, *sukti bhasma*.

9. Pisti¹³: *Pisti* is a preparation prepared by triturating the drug with the specified liquids, plant juice and exposing to sun or moonlight for example, *praval pisti*, *mukta pisti*.After purification the drug is triturated with rose water,unless otherwise mentioned for a day and dried in the sun for another day. This process is generally

Self life/Expiry Period¹⁵:

Sl.No	Name of the dosage forms	General dose	Self life/Expiry Period with effect from the date of manufacture
1.	<i>Churna</i>	12 gm	Two year
2.	<i>Vati</i>	500 mg-1 gm	Three year
3.	<i>Ghruta</i>	6-12 gm	Two year
4.	<i>Taila</i>	External application	Three year
5.	<i>Asava/Arista</i>	12-24 ml	10 year
6.	<i>Avaleha</i>	50 gm	Three year
7.	<i>Satwa</i>	500mg -1 gm	Two year
8.	<i>Bhasma(except Naga, Vanga and Tamra Bhasma)</i>	125-500 mg	10 year
9.	<i>Naga, Vanga and Tamra Bhasma</i>	125-500 mg	5 year
10.	<i>Pisti</i>	125-500 mg	10 year
11.	<i>Sindoora</i>	60 mg- 125 mg	10 year

DISCUSSION: Ancient Acharyas were mentioned different dosage forms and their method of preparations according to need. Herbal drugs were seen from Vedic period itself, in its crude form, In ancient era Ayurvedic medicines were prepared by the physician himself for the use of his patient,

continued for seven days or more till fine *pisti* in powder form is obtained.

10.Sindoora¹⁴ : The process of making *sindoora* may be correlated with the process of sublimation product in chemistry. This classical procedure is known as *sindura kalpana* or *kupipakwa kalpana* and the product is called *kupipakwa rasayana* or *sindoora*.In this process , after sublimed mineral or metallic compound the drug is available in the neck of the sublimation bottle.Generally the colour of the drug is red ,so it is called as sindoor. These preparations are considered to be more potent than bhasma preparation. For example, *Rasasindoora*, *Makaradhwaja*. They are given in a very small dose.

but in present scenario because of increased population and growing demands, it becomes practically impossible for a physician to prepare medicine by himself. The advent of commercialization in Ayurvedic medicines at national and international levels lead to

large scale manufacturing. So today modification becomes indispensable in a bulk manufacturing unit and therefore done to make different formulations from the *Panchavidha Kashaya Kalpana*. Since the main aim of modification is to retain the therapeutic efficacy of the dosage form, improved shelf life and increased palatability the various dosage forms serves their purpose¹⁶.

CONCLUSION: There are many more dosage forms of Ayurvedic medicines like *Kshara & Lavana* (plant based alkali & salts), *Panak* (Syrups), *Snehlepa* (ointments), *Karna bindu* (ear drops), *Aaschyotna* (eye drops), *Doopana* (fumigation material), *Kshar Sutra* (medicated alkaline thread) etc .are mentioned in Ayurveda classics. For better therapeutic effect and ensure its efficacy, these needs to standardize quantitatively as well as qualitatively Without violating the fundamental principle of *bhaisajyakalpana*, Ayurvedic researchers should invent new dosage form for the benefit of patients

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