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### Review Article

#### PHARMACEUTICAL CONSIDERATION OF PANCHAKARMA THERAPY

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#### ABSTRACT

*Panchakarma* therapy is a very important and essential part of Ayurvedic treatment. The efficacy of *Panchakarma* therapy depends on proper application of different elimination procedures as well as on the proper preparations of various formulations. Drugs play an important role to achieve the proper effectiveness of *Panchakarma* therapy. Along with the conventional Ayurvedic dosage forms, in *Panchakarma* therapy various modifications are made; even some unique dosage forms are also mentioned which are only applicable for *Panchakarma* therapy. It is inferred that these modifications of procedural pattern are for better absorption of drugs or essence of drugs with or without metabolism for elimination purpose. In this article, the dosage forms used for *Panchakarma* therapy; their preparation and specific modification made for *Panchakarma* therapy are mentioned and discussed.

**Key words:** *Vamana, Virechana, Nasya, Vasti, Rasaushadhi*, Modification.

#### INTRODUCTION

Appropriate application of any treatment depends on extent of its flexibility and quantum of extension in respect to its pharmaceutical preparation. *Panchakarma* is a complex and unique system of treatment, so its pharmaceutical preparations also should possess some special characteristics. There are various derivations in pharmaceutical preparations in Ayurveda, *Panchakarma* has got the influence of above, but it is different to a considerable extent especially modulated to be suited for *Panchakarma*. Considering the special feature of *Panchakarma*, various methods of preparations have been formulated. This has been done to make it acceptable to all persons irrespective of their age and constitution. Such sort of special feature in respect to pharmaceutical modulation has been dealt within this article. This will make the learning and teaching more palatable and comprehensible.

In Charaka Samhita, total 600 formulations are mentioned for *Vamana* and *Virechana Karma*, among these, 345 formulations are used for *Vamana* purpose and 255 formulations are used for *Virechana* purpose<sup>[1]</sup>. In *Panchakarma* therapy, different routes of administration are used to administer the drugs. Apart from the oral route and external

application, drugs are also applied through nostrils (*Nasya*) and rectal (*Basti*) route<sup>[2]</sup>.

Along with the conventional dosage forms of Ayurveda like *Swarasa, Kwatha, Churna Kalpana, Sneha Kalpana*, etc., some modified dosage forms like *Ghreya Kalpana, Pupa Kalpana*, etc., are also used in *Panchakarma* therapy. These modifications are made for easy administration, quick action and better bioavailability of the drugs (*Sukha-upaya* and *Samyaga-upa Kalpanarthya*)<sup>[3]</sup>. The present article deals with various conventional pharmaceutical procedures used in *Panchakarma* therapy along with the modified formulations, especially designed for *Panchakarma* therapy.

#### MATERIALS AND METHODS

An extensive search of the ancient Ayurvedic literatures was carried out to compile information about formulations used in *Panchakarma* therapy. The search includes the texts of 1500 BC to the recent texts. The electronic and internet media was done according to the guidelines for the use of electronic and internet media,<sup>[4,5]</sup> and a high quality and reliable medical information from the internet was retrieved only from the Health-on-Net (HON) conduct-certified and accredited websites like Entrez PubMed [Medline], CAM-

PubMed, Allied and complementary medicine database, Natural medicine comprehensive database, Embase and Cochrane library. The databases were searched from 1986-2013 using the search terms “drugs used in *Panchakarma* therapy, pharmaceuticals in *Panchakarma* therapy, importance of drugs in *Panchakarma* therapy, dosage forms used in *Panchakarma*, standardization of drugs used in *Panchakarma* therapy”.

## REVIEW

### Dosage forms used in *Panchakarma* therapy

#### Conventional dosage form

##### 1. *Svarasa Kalpana*

These are the expressed juice from the freshly collected plants. The fresh plants are collected, cleaned, made into paste form and the juice is expressed by the help of cotton cloth<sup>[6]</sup>. In *Panchakarma*, same procedure is followed to prepare *Svarasa* preparation. In most of the cases it is used in the preparation of other formulations. For *Vamana* and *Virechana Karma*, sometimes *Svarasa Kalpana* as the *Svarasa* of *Koshataki* (*Luffa acutangula* Roxb.), *Saptala* (*Acacia concinna* DC.), *Shankhini* (*Canscora decussate* Roxb.), *Devdali* (*Luffa echinata* Roxb.) and *Karavellika* (*Momordica charantia* Roxb.) has been advocated directly for use<sup>[7]</sup>. *Svarasa* is also used for *Avapida*, a *Virechana* type of *Nasya*.

##### 2. *Kalka Kalpana*

These are paste form of the freshly collected drugs. Fresh wet drugs are collected, cleaned with water and made into paste form by the help of mortar and pestle (*Khalva Yantra*)<sup>[6]</sup>. In *Panchakarma*, the procedure is slightly modified. Drugs are made into powder or paste form, then it is levigated by milky latex of other plants or *Kwatha* of other drugs. These are used for induction of *Vamana* or *Virechana*<sup>[3]</sup>. In *Basti* therapy, *Kalka* is used but is prepared by following conventional method<sup>[8]</sup>.

##### 3. *Kwatha Kalpana*

These are decoctions prepared by boiling with water. Fresh or dry drugs are collected, made into coarse powder form, mixed with sixteen times water and boiled until to reduction to one eighth and the prepared *Kwatha* is collected by straining with cotton cloth<sup>9</sup>. In some cases of *Panchakarma*, *Kwatha* of the main drug is being prepared by using decoction of other drugs as liquid media. Drugs are mixed with the decoction and boiled until reduction to desired volume, then

strained. These are used for induction of *Vamana* and *Virechana*<sup>[3]</sup>.

##### 4. *Hima Kalpana*

These are cold infusions prepared by keeping the drugs in cold water for longer duration (especially overnight). It is also named as *Sheeta Kalpana*. To prepare *Hima*, fresh or dry drugs are collected, made into coarse powder form, mixed with six times of cold water and kept as it is for over night and the prepared *Hima* is collected by straining with cotton cloth<sup>[9]</sup>. But, in *Panchakarma*, one type of *Hima* is prepared by soaking the drugs in *Sura* (alcohol) or *Sauviraka* (vinegar). Drugs are soaked in alcohol, kept for overnight, stirred and strained by cotton cloth; and in the other, drugs are made into coarse powder form, soaked in decoction of other drugs, kept for overnight, stirred and strained by cotton cloth. These are used for induction of *Vamana* and *Virechana*<sup>[3]</sup>.

##### 5. *Phanta Kalpana*

These are hot infusions prepared by keeping the drugs in hot water. To prepare *Phanta*, fresh or dry drugs are collected, made into coarse powder form, mixed with four times of hot water and allowed to cool down and the prepared *Phanta* is collected by straining with cotton cloth<sup>[9]</sup>. *Yastimadhu* (*Glycyrrhiza glabra* Linn.) *Phanta* is traditionally used for *Vamana* purpose.

##### 6. *Churna Kalpana*

These are the powder dosage form of dry drugs. Drugs are collected, allowed to complete dryness, made into fine powder form by grinding and collected by separation through cotton cloth<sup>[7]</sup>. In some *Panchakarma* therapies, the procedure is slightly modified. Drugs are made into fine powder form, then is impregnated with *Svarasa*, *Kwatha* or latex of other drugs. After the *Bhavana* procedure, again it is made into fine powder form. These are used mostly for induction of *Vamana*<sup>[3]</sup>.

##### 7. *Vati Kalpana*

*Vati* or pills, prepared by rolling the semisolid mass of drugs. Fresh or dry drugs are collected, made into fine powder form separately, mixed together, levigated by juice or decoction and are rolled into small pills manually. The same procedure is followed in *Panchakarma* also, but the size of *Vati* is made like the fruit of *Amlaki* (*Embelica officinalis* Gaertn.) or *Haritaki* (*Terminalia chebula* Retz.) or *Vibhitaki* (*Terminalia belerica* Roxb.). The mode of administration is also different;

generally paste of the *Vati* is prepared with decoction of other drugs and then administered. The other type of pill is prepared from *Swarasa* of the freshly collected drugs. *Swarasa* of the drugs are expressed, the juice is then dried to semisolid form and from the semisolid mass pills are prepared. These are used for induction of *Vamana* and *Virechana*<sup>[3]</sup>.

### 8. *Avaleha Kalpana*

*Avaleha* is semisolid dosage form prepared by further boiling of the decoction. Here decoction or juice of drugs is prepared, made into semisolid form by further boiling with sweetening agent; to make the dosage form palatable and powder of other drugs are mixed whenever the preparation remain hot, after complete cooling honey is added. For *Panchakarma* therapy, generally *Swarasa* or *Kwatha* of the drugs is prepared and made into semisolid consistency by further boiling. These semisolid preparations called as *Phanita* is indicated directly to the patients without adding any sweetening agent. In some preparations, honey and sugar are mixed together and heated to prepare sugar syrup; after cooling, drugs in powder form are added. These formulations are mostly used for induction of *Vamana* and *Virechana*<sup>[3]</sup>.

### 9. *Sneha Kalpana*

These are medicated oils or ghee. To prepare oil or ghee, these are heated with paste of drugs and liquid media like decoction, etc., until remaining of only oleaginous part. The ratio of paste, oil and liquid media is 1:4:16, and the prepared oil or ghee is collected by straining with cotton cloth. For some *Panchakarma* therapies, one type of medicated ghee is prepared from the butter collected from the milk boiled with the drugs. Then the collected butter is boiled with the paste and decoction of other drugs to prepare medicated ghee. Another type of ghee is prepared from curd. For that, *Ksheera Paka* of the drugs is carried out first, then curd is prepared from the prepared *Ksheera*, and finally form the curd, ghee is prepared<sup>[3]</sup>. This medicated ghee is used for excitation of *Kapha Dosh*. It is also used for induction of *Vamana*.

### 10. *Sandhana Kalpana*

*Sandhana Kalpanas* are the fermented liquids. *Swarasa* or *Kwatha* of the drugs are prepared; with the prepared liquid, fermentation initiator and sweetening agent

are mixed and kept for a period for proper fermentation, finally the prepared *Sandhana Kalpana* is collected by straining with cotton cloth. In *Panchakarma* therapy, the same procedures are followed for preparation of *Sandhana Kalpana*. The products of fermentation are used for various purposes like, for preparation of *Hima Kalpana*, for inducement of *Vamana Karma*, etc.

### 11. *Arka Kalpana*

These are the distilled essence, which contain the volatile constituents. Fresh or dry drugs are collected, made into coarse powder form, mixed with ten times water and kept as it is for over night. The soaked drug is then allowed for distillation. The volatile principles which are evolved admixture with water vapour are condensed and collected<sup>[10]</sup>. *Arka* of *Jyotishmati* (*Celastrus paniculatus* Willd.), *Dhattura* (*Datura stramonium* Linn.), *Nagapushpi* (*Couroupita guianensis* Jean.), *Svarnamakshika* (chalcopyrite) and *Devadali* (*Luffa echinata* Roxb.) may be used for *Vamana*. *Arka* of *Aragvadha* (*Cassia fistula* Linn.), *Kampillaka* (*Mallotus philippinensis* Muell.), *Katuki* (*Picrorhiza kurroa* Royle.), *Ankota* (*Alangium lamarckii* Thwaites.), *Danti* (*Baliospermum montanum* Muell.), *Trivrit* (*Operculina turpethum* Silva.), *Sannayamakshika* (*Cassia angustifolia* Vahl.), *Indravaruni* (*Citrullus colocynthis* Schrad.), *Jaipala* (*Croton tiglium* Linn.) and *Sugandha* (*Cryptolepis buchanani* R & S.) may be used for *Virechana*<sup>[10]</sup>.

### 12. *Ksheera Kalpana*

These are medicated milk prepared by boiling with the drug. One part of drug is mixed with eight times milk and thirty two times of water and boiled till remaining of only milk part, and then the prepared milk is collected by straining with cotton cloth<sup>11</sup>. Slight modification has been made for *Panchakarma* therapy. *Svarasa* of the drug is prepared, one part of this prepared *Svarasa* is mixed with three times of milk and boiled till remaining of only milk part, and then the prepared milk is collected by straining with cotton cloth<sup>[3]</sup>. The prepared milk is used for induction of *Vamana* in the patients of *Svarabheda*, *Pinasa*, and aggravated *Kapha* in chest. In case of *Basti* preparation, the traditional *Ksheerapaka* method has been advised to be followed<sup>[12]</sup>.

In a preparation of *Basti* for *Pitta*, *Yastimadhu* (*Glycyrrhiza glabra* Linn.) etc. are

said to be used as *Shrita*, though it should not prepared as *Shrita Kalpana*. *Yastimadhu* (*G. glabra* Linn.), etc., are to be boiled in eight times of water first and then should be reduced to one eighth. Then it should be boiled with equal amount of milk until the residue comes to just half of total amount. *Kwatha* preparation by directly adding milk in drugs is not recommended as it can not express out the extracts of drugs properly<sup>[13]</sup>. Though in the general rule of *Ksheerapaka Vidhi*, the ratio of drug : milk : water is 1:8:32, but in a preparation of *Chandanadi Niruha*, the ratio has been changed to 1:5:20.<sup>[8]</sup>

### 13. *Rasaushadhies*

These are mostly mentioned for the *Shamana* treatment of various ailments. Surprisingly an especial chapter namely '*Virechanadhaya*' is mentioned in Rasendra Sara Samgraha including the formulations, those can be prescribed for *Virechana* purpose. This chapter includes the formulations like *Ichhabhedi Rasa*, *Jaludarari Rasa*, etc., which are used for induction of *Virechana* most commonly.

These formulations contain the plant drugs like *Jayapala* (*C. tiglium* Linn.), etc., which causes *Virechana*<sup>[13]</sup>. These preparations are mostly prescribed for induction of *Virechana Karma*.

### 14. *Pathya Kalpana*

These *Kalpanas* are mentioned for the application in patients as diet regimen after procedures of *Panchakarma* therapy<sup>[1]</sup>.

a). ***Manda Kalpana***: One part of rice and 14 parts of water are taken and boiled, after proper boiling the liquid part is strained and prescribed as '*Manda*'<sup>[15]</sup>.

b). ***Peya Kalpana***: One part of rice is boiled in 14 parts of water. After proper boiling, the boiled rice is mixed with the liquid part properly to get '*Peya*'<sup>[15]</sup>.

c). ***Vilepi Kalpana***: One part of rice and four parts of water are boiled; after proper boiling, both are rubbed together to get a thick paste, is called as '*Vilepi*'<sup>[15]</sup>.

d). ***Yavagu Kalpana***: One part of drug is boiled in 16 part of water until reduction to half. In this decoction broken grains are added and thick gruel is prepared<sup>[15]</sup>.

In some cases, instead of water, many other liquids like butter milk, milk, etc., are used as liquid media for preparation of *Yavagu*.

e). ***Mantha Kalpana***: One part of powdered drug is put in four parts of cold water and churned well to give a thick consistence<sup>[15]</sup>. These are prescribed to the patients after *Panchakarma* therapy as diet regimen.

### Modified dosage form especially for *Panchakarma* therapy

#### 1. *Shaskuli / Pupa*

*Swarasa* or *Kwatha* of the main drug is prepared. It is mixed with oil and rice and cooked properly; from the semi-solid mass, *Shaskuli* or *Pupa* is prepared<sup>[3]</sup>. These preparations are used for induction of *Vamana*.

#### 2. *Tarpana*

It is a demulcent drink. The base is prepared by adding fruit juice, sugar and honey; then powders or juices of the drugs are mixed in the base<sup>[3]</sup>. These *Tarpana* are formulated as innocuous purgative or emetic<sup>[3]</sup> and used for *Virechana* in the patients having low digestive power, otherwise *Tarpana* is also used for post therapeutic regimen<sup>[8]</sup>.

#### 3. *Ghreya Yoga*

Drugs are made into fine powder form. *Bhavana* is given to the powder by juice or decoction of other drugs or by urine. Again it is made into fine powder form. This powder is sprinkled on garlands or garlands are impregnated with the water mixed with this powder. These garlands are advised to wear. The inhalation of these garlands lead to vomiting or purgation. These are used for induction of *Vamana* or *Virechana*<sup>[3]</sup>.

#### 4. *Bhavita Mamsa/Matsya*

Dry fish or dry meat is levigated by milky latex of the plant drugs, allowed to dry, and made into powder form. It is used for induction of *Virechana*<sup>[3]</sup>.

#### 5. *Basti* preparations

*Basti* is medicated enema, prepared by mixing, cooking and triturating of many dosage forms like *Svarasa*, *Kwatha*, *Sneha Kalpana* etc. *Basti* is of two types, i.e. *Niruha Basti* and *Anuvasana Basti*<sup>[16]</sup>.

##### a) *Niruha Basti*

Decoction of the drugs is prepared; with the prepared decoction, milk or meat soup or paste of other drugs is mixed and cooked well. Honey, jaggery, rock salt, oil, ghee and other drugs are mixed with the cooked decoction and triturated to form a homogeneous mixture<sup>[8]</sup>. The amount of decoction for preparation of *Niruha Basti* will be 5 parts, and the amount of oleaginous

material will depend on the vitiation of *Doshas*, for vitiation of *Vata*, *Pitta* and *Kapha Doshas*, the amount will be 1/4<sup>th</sup>, 1/6<sup>th</sup> and 1/8<sup>th</sup> part respectively<sup>[8]</sup>. The general ratio of rock salt, honey, oleaginous material, paste of drugs, decoction of drugs, and powder drugs for preparation of *Niruha Vasti* is 1 *Karsha*, 4 *Palas*, 6 *Palas*, 2 *Palas*, 8 *Palas* and 4 *Palas* respectively<sup>[16]</sup>.

- b) **Anuvasana Basti:** These are prepared according to the method of preparation of *Sneha Kalpana*. Paste of drugs, oleaginous substances and liquid drugs are cooked until remaining of only oleaginous part<sup>[16]</sup>.
- c) **Basti of Rasaushadhies:** Solution of *Shuddha Kasisa* in water is indicated to apply as *Basti*. For preparation of *Kasisa* solution, 5 *Ratti* (625 mg) of *Shuddha Kasisa* is dissolved in 2.5 *Tola* (60 ml) of water<sup>[17]</sup>. This is used in the treatment of *Arsha* and *Gudabhramsa*. A solution prepared by dissolving 6 *Ratti* (750 mg) of *Shuddha Sphatika* in 5 *Tola* (60 ml) water, is applied as *Basti* to treat *Gudankura* and *Gudabhramsa*. The solution causes contraction leads to haemostatic action.
6. **Nasya Kalpana:** These are the *Churna* (powder), *Svarasa*, *Kwatha*, *Kalka* or *Sneha* (medicated oil or ghee) type of dosage forms<sup>[2]</sup>. These are administered through nostrils. For this therapy fruits, leaves, roots, tubers, flowers, extracts and barks of the herbs are used<sup>[16]</sup> in *Churna*, *Kalka*, *Svarasa*, *Ksheera*, *Kwatha*, *Sara*, *Dhuma* form or along with *Mamsa Rasa*, *Siddha-taila*, and *Ghrita* etc. These preparations again are modulated into secondary or tertiary preparations according the nature of disease<sup>[19]</sup>. Solutions of minerals are also used for *Nasya* therapy. For example, solution of *Shuddha Sphatika* in cow's milk is prescribed to take as *Nasya* to stop *Nasika Rudhira Srava* (nasal bleeding).

#### Application of Panchakarma in Rasa therapy

One of the major objectives of *Rasashastra* is to make the body free from any diseases and ageing i.e. *Dehavedha*. It can be achieved by application of the processed (*Samskarita*) *Parada* into the body. Before administration of *Samskarita Parada*, the body should be made ready; the procedure is called as *Kshetrikarana* in the parlance of *Rasashastra*. For this *Kshetrikarana* purpose, procedures of *Panchakarma* therapy are to be applied.

#### Procedure

Firstly *Snehana Karma* is done with ghee and rock salt. Then person is advised to take *Kwatha* of *Ketaki* (*Pandanus odoratissimus* Roxb.) stem. *Swedana Karma* is performed afterward. After proper *Swedana*, *Virechana* is induced by *Katurorohini* (*Picrorhiza kurroa* Royle.) *Kwatha*. *Virechana Karma* is done until elimination of vitiated *Shleshma*. *Samsarjana Karma* is advised to follow for three days after *Virechana Karma*<sup>[20]</sup>.

It is also mentioned in the classics of *Rasashastra* that without *Kshetrikarana*, if the *Samskarita Parada* is administered internally, then it may cause various adverse effects in the body<sup>[20]</sup>.

#### DISCUSSION

Preparation of dosage forms for *Panchakarma* therapy can be considered as tertiary preparations. *Panchavidha Kashaya Kalpanas* (*Svarasa*, *Kalka*, *Kwatha*, *Heema* and *Phanta*) are considered as primary formulations of *Bhaishajya Kalpana*. Other dosage forms like *Avaleha Kalpana*, *Sneha Kalpana*, etc., are considered as secondary formulations as because these are prepared by further modification of the primary formulations. Drugs used in *Panchakarma* therapy are prepared from the secondary formulations like *Sneha Kalpana*, *Ksheerapaka Kalpana*, etc. so, may be considered as tertiary preparations.

It is advised in the classics of *Ayurveda* that hot honey is harmful and never be taken<sup>[1]</sup>. But in *Charaka Samhita Kalpa Sthana*, hot honey is indicated to prescribe for *Vamana Karma*. In *Basti Kalpana* also, honey along with hot decoction, etc., are administered into the body. Here the toxic effects of hot honey are used for beneficial purpose to induce elimination of morbid material<sup>[21]</sup>.

Various solvent systems rather than water are mentioned for extraction of the active principles, among those alcohol should be needed an especial mention. Drugs used in *Panchakarma* therapy are used for vomiting or purgation purpose, or administered through different routes, where quick absorption is needed for better affectivity of the therapy. Alcohol absorbs faster than water. This may be considered one of the causes behind uses of alcohol as media for extraction or an ingredient for preparation of medicines used in *Panchakarma* therapy.

Preparation of *Basti*, mainly *Niruha Basti* may be considered as unique and complex method of preparation. These can also be

considered as separate dosage form with unique method of preparation. That's why *Basti Kalpana* is included under the scope of *Bhaishajya Kalpana*.

Some *Rasaushadhies* are mentioned for induction of *Virechana*. These are very active and lead to easy *Virechana*. The need is of some *Rasa* formulations, those will cause easy induction of *Vamana*. This may be taken in account for planning of further research work.

Another very important observation is use of solution of *Rasaushadhi (Kasisa)* for *Basti Karma*. Many *Rasaushadhies* are there, which are water soluble. Trial may also be given by administering the solution of these *Rasaushadhies* through rectal route by *Basti Karma*. These trials may be helpful to explore newer indications of these *Rasaushadhies*.

Various studies have so far been carried out to standardize the procedures of *Panchakarma* [22, 23]. In those studies, the dose of the medicaments, number of elimination, etc., are studied and reported. But studies on standardization of the drugs used in *Panchakarma* therapy are few. A study carried out by Dave and Baxi reported standardization of *Bala Taila*, *Panchaguna Taila*, *Dhanvantara Taila* and *Mahamasha Taila* used in *Panchakarma* therapy. More such studies are required to achieve proper effectiveness of *Panchakarma* therapy[24].

## CONCLUSION

After the review and discussion it is clearly concluded that the pharmaceutical procedures used in *Shamana* or palliative therapy are modified in cases of *Shodhana* or *Panchakarma* therapy. Use of solvents as per *Doshahara* activities and modification of procedural pattern is for better absorption of drugs or essence of drugs with or without metabolism for elimination purpose.

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