



ISSN 2456-3110

Vol 2 · Issue 4

July - Aug. 2017

Journal of
**Ayurveda and Integrated
Medical Sciences**

www.jaims.in

JAIMS



Charaka
Publications

Indexed

Role and rationale of *Kaala* in the field of Ayurvedic Pharmaceutics - A Conceptual Approach

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ABSTRACT

Samskara is defined as a process of bringing about a desired modification or establishing a change of property in a drug or group of drugs. In the process of *Aushadhi Nirmana*, varied number of procedures (*Samskaras*) are adopted to inculcate the desired dosage form and efficacy to the medicine. Among all *Samskaras*, *Kaala* plays a vital role in *Ayurvedic* pharmaceutics. *Kaala* is a constant factor which follows incoherently in every step of *Aushadhi Nirmana*. Active principles of plants vary in every season and at different quarters of the day. After the collection of drugs for a pharmaceutical preparation, *Kaala* plays its role during *Paka* of various formulations. The definition of pharmaceutics does not end with mere production of a dosage form but also includes its safety and efficacy. *Kaala* has the potential to influence both these factors. Thus, our *Acharyas* have provided meticulous information on Ayurvedic pharmaceutics giving prime importance to a minute, yet very significant aspect called "*Kaala*".

Key words: *Kaala*, *Samskara*, *Aushadhi Nirmana*, *Pharmaceutics*.

INTRODUCTION

Charaka says *Naasti Dravyam Anoushadham*. Ayurveda believes that there is no such drug which cannot be considered as a medicine. Every drug's potential can be made acceptable to the body with the help of appropriate *Samskara*. *Samskaras* can bring a total transformation in pharmaco-therapeutic credentials of a drug. Charaka says a drug could be modified or transformed into a safe and potent drug by the influence of the following *Samskaras*.^[1] viz.

1. *Toya Sannikarsha* / Influence of water (Eg: *Hima*, *Phanta Kalpana*)
2. *Agni Sannikarsha* / Influence of heat (Eg: *Putapaka*, *Lehya Kalpana*)
3. *Toya Agni Sannikarsha* / Influence of both (Eg: *Kwatha*, *Arka Kalpana*)
4. *Shoucha* / cleaning (Eg: *Swedana*, *Prakshalana*)
5. *Manthana* / churning (Eg: *Satva*, *Takra Kalpana*)
6. *Desha* / place (Eg: *Brahma Rasayana* inside a heap of ash)
7. *Kaala* / Time (Eg: Collection of *twak* in *Sharath Rtu*)
8. *Vasana* / Flavouring (Eg: *Taila*, *Ahara Kalpana*)
9. *Bhavana* / Trituration (Eg: *Khalvi Rasayanas*)
10. *Kala Prakarsha* / Duration of time (Eg: *Aasavarishta*)
11. *Bhajana* / Vessel (Eg: *Ghrita* must be stored in *Lauha Patra*)

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Submission Date : 11/08/2017

Accepted Date: 25/08/2017

Access this article online

Quick Response Code



Website: www.jaims.in

DOI: 10.21760/jaims.v2i4.9346

Among all these *Samskaras*, *Kaala* has an influence on different aspects of Ayurvedic pharmaceutics. Hence, in the present article, an effort is made to unravel and establish the “Role and Rationale of *Kaala* in the field of Ayurvedic Pharmaceutics” with the help of different textual references and research works.

MATERIALS AND METHODS

Kaala is the constant factor which is the basic cause for *Parinama* of immature substances into their matured form and finally to their destruction. In Ayurvedic pharmaceutics, role of *Kaala* is clearly appreciable in three stages-

- Collection of raw drugs
- Preparation of medicines
- Preservation of medicines

Role of *Kaala* in the collection of raw drugs

This can be sub divided into three different phases,

- *Maasa* or season
- *Nakshatra* and *Paksha* or constellations and lunar phases
- *Muhoorta* or diurnal variations

Maasa/ Season

Table 1: Parts of plants to be collected in different season according to different authors.

Parts	Sushruta ^[2]	Charaka ^[3]	Bhaishajya Ratnavali ^[4]
<i>Shaakha</i>	<i>Varsha</i>	<i>Varsha</i> and <i>Vasanta</i>	-
<i>Patra</i>	<i>Varsha</i>	<i>Varsha</i> and <i>Vasanta</i>	<i>Varsha</i> , <i>Vasanta</i>
<i>Moola</i>	<i>Praavrit</i>	<i>Shishir</i> and <i>Grishma</i>	<i>Shishira</i> and <i>Grishma</i>
<i>Twak</i>	<i>Sharad</i>	<i>Sharad</i>	-
<i>Khanda</i>	<i>Sharad</i>	<i>Sharad</i>	<i>Sharat</i>
<i>Ksheera</i>	<i>Hemanta</i>	<i>Hemanta</i>	<i>Sharat</i>

<i>Saara</i>	<i>Vasanta</i>	<i>Hemanta</i>	<i>Hemanta</i>
<i>Pushpa</i>		As per fruiting season	

Sharangadhara has classified the collection of drugs based on their pharmacological properties^[5]

Table 2: Collection of drugs according to their pharmacological action.

Season	Pharmacological Action
<i>Vasanta Rtu</i>	For <i>Vamana</i> and <i>Virechana</i>
<i>Sharad Rtu</i>	For other purpose

According to Sushruta and Sharangadhara, *Ushna Veerya Dravyas* are to be collected in *Ushna Kaala* from *Agni Pradhana Bhoomi* and *Sheeta Veerya Dravyas* in *Sheeta Kaala* from *Sowmya Bhoomi*.^[6]

Nakshatra or constellations

It is recommended to collect raw drugs on auspicious constellations like *Pushya*, *Hastha*, *Mrigashira*, *Ashwini Nakshatras*. During these *Nakshatras*, drugs are supposed to possess highest percentage of active principles.^[7]

Collection of drugs in abnormal conditions of stars, planets, moon, sun etc might cause improper manifestation of *Rasa*, *Veerya*, *Vipaka* and *Prabhava* in *Aushadhis*.

Paksha or lunar phases

Every *Maasa* is divided into *Shukla Paksha* and *Krishna Paksha* viz. waxing and wanning period of moon respectively. Researchers have observed that the sap flows upwards during waxing period and downwards during wanning period^[8] substantiating the reason behind collection of raw drugs during *Shukla Paksha*.

Muhoorta or diurnal variation

Prataha Kaala is an ideal time for the collection of herbal drugs because, in the morning hours, the plant circadian rhythm, influences gene regulation, enzyme activity, leaf movements, flower opening and stomatal opening.^[9]

Role of Kaala in the preparation of medicines

In Shodhana and Maarana of Rasa Dravyas

Purification and incineration of *Rasa Dravyas* involves different procedures like *Swedana*, *Mardana*, *Bhavana* etc. Stipulated time duration is emphasised by our *Acharyas* to all these methods. It varies from three hours to three days and so on. Such specific time is imposed based on the type of *Dravya*, media used and change to be brought about. The following reaction can take place within this time duration.

- Elimination of physical and chemical impurities
- Neutralisation of toxins
- To induce and enhance therapeutic qualities.
- To impart organic qualities
- To make metals and minerals suitable for administration.
- To facilitate further pharmaceutical processes.^[10]

In Sneha and other Kalpanas

Time plays an important role during the preparation of different *Kalpanas* like *Parpati*, *Avaleha*, *Khanda Paka*, *Sneha Kalpana* etc. *Govind Das Sen* says, *Paaka* of *Ghrita* and *Taila* is not to be completed within a day. To make the preparations highly potent, specific time duration is said to be fixed based on the nature of the *Drava Dravyas* used. They are as follows,

Table 3: Duration of days for different *Drava Dravyas* used in *Sneha Kalpana*^[11]

<i>Drava Dravya</i>	Time duration
<i>Vrihi</i> and <i>Mamsa rasa</i>	1 day
Milk	2 days
<i>Swarasa</i> of different plants	3 days
<i>Takra</i> and <i>Aranala</i>	5 days
<i>Moola</i> and <i>Valli</i>	12 days

Role of kaala in the preservation of medicines

As mentioned earlier, *Kaala* is not only responsible for the existence of a drug but is also responsible for its destruction. By the influence of *Kaala*, the medicines are made unfit for consumption with least to last potency. Knowing this, *Sharangadhara* has vividly visualised the shelf life period of different dosage forms.^[12]

DISCUSSION

Our *Acharyas* laid down certain concepts in the name of '*Samskaras*' to bring about desired changes in different medicaments. But with the passage of time, few of the crucial practices were neglected due to inconvenience. Nowadays, for the sake of globalisation, several research works are being conducted on different concepts of Ayurveda. Among them, few affirmative works available to us are on *Kaala*.

Even though, our *Acharyas* have given a general rule for collection of plant part with regard to the season, researchers have carried out their work, specifically on active phyto constituents in different parts of the plants, in different season. To our surprise, the percentage of active principles varied profoundly, proving the hypothetical concept of seasonal variations. Here are few examples.^[13]

Table 4: Parts of different plants showing highest quality or activity in different season.

Drug	Part	Highest Quality or Activity	Season
<i>Vaasa</i>	Leaves	Vasicine	August (Varsha)
<i>Vaasa</i>	Roots	Deoxyvasicinone	December (Shishira)
<i>Patola</i>	Fruit	Total cucurbitacin	February (Vasanta)
<i>Brahmi</i>	Shoots	Saponin	Monsoon (Varsha)

<i>Chitraka</i>	Roots	Plumbagin	Winter (<i>Shishira</i>)
<i>Dhatura</i>	Fresh leaves	Alkaloid	Rainy season (<i>Varsha</i>)
<i>Karavellaka</i>	Fruit	Anti-diabetic and hypolipidemic activity	Spring (<i>Vasanta</i>)

According to Rohit Sharma et. al., the total alkaloid content of *Guduchi Satva* was slightly high (0.34%) in *Vasanta Rtu* and it was minimum (0.30%) in summer season. But there was significant difference in the total yield of *Satva*. It was maximum (37.8 g) in *Shishira Rtu* and minimum in *Grishma Rtu* (22.3 g). This is in support to the statement of *Sayana Madhava* and *Shatapatha Brahmana* that plants undergo maturation in *Vasanta Rtu* and lose their water content and dry up in summer season.^[14]

Research related to *Paksha*

Pull of moon is stronger than the Sun as it is more nearer to earth. Earth experiences strongest effect when moon and sun pull the earth from opposite sides. This happens at "full moon phase". These forces affect the water content of soil, creating more moisture in soil at new and full moon days. This increase in moisture encourages the seeds to sprout and grow and thus they contain high nutrients.^[15] According to Tavhore et. al., the root weight, pith diameter and internodal distance of 14 small crops of *Ashwagandha* which were taken for the study were found to be increased on full moon days as compared to other phases of moon.^[16] In another study, the rhizome of *Acorus Calamus* contained more percentage of oil, total constituents, osmotic pressure in root and increased plant growth during full moon days.

Research related to *Muhoorta*

Studies on *Virola Surinamensis* showed daily circadian fluctuations in the constituents of essential oil distilled from the leaves, specifically levels of monoterpenes

dropped by 50% from 6 am to noon.^[17] Daily fluctuations were also seen in the essential oil of wild basil herb (*Ocimum gratissimum*), where levels of Eugenol in the essential oil were observed to drop from 98% at 12 am to 11% at 5 pm.^[18]

Research related to duration of *Sneha Paka*

Prashanth BK et. al. analysed *Nirgundi Taila* chemically, prepared in one day, two days and three days. There was a significant decrease in the iodine value in *Taila* prepared in three days (78.37) from that of one day (87.45). Lower the iodine value, better the shelf life. It also increased the saponification value from 186.155 to 188.240 on third day. Higher the saponification value, faster the absorption of low molecular weight fatty acids.^[19]

CONCLUSION

A Pharmaceutical preparation is the result of more than one *Samskara* collectively. Each and every procedure has its own importance. Among them *Kaala* is eternal and shows its impact on every atom of the universe. Simple plain water when kept in open undergoes various chemical changes. A small amount of CO₂ dissolves in it, forms carbonic acid and initiates complex changes ultimately leading to its destruction. Such is the power of *Kaala*. Thus a dosage form must be prepared meticulously in order to produce an effective medicine.

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How to cite this article: Vrinda, Shobha G. Hiremath, Surekha S. Medikeri. Role and rationale of Kaala in the field of Ayurvedic Pharmaceuticals - A Conceptual Approach . J Ayurveda Integr Med Sci 2017;4:168-172. <http://dx.doi.org/10.21760/jaims.v2i4.9346>

Source of Support: Nil, **Conflict of Interest:** None declared.
