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Drug Collection Methodology, Ancient View, Current Perspective-A Review

Mallya Suma V[1], Bingi Ashok[2]

[1]PG Scholar, Department of PG & Phd Studies in Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Kuthpady, Udupi, Karnataka, India
Corresponding Author Email: *sumamallya[at]gmail.com*

[2]Associate Professor; Department of PG & Phd Studies in Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Kuthpady, Udupi, Karnataka, India

Abstract: ***Medicinal plant collection is most discussed, scientific topic mentioned in texts of Ayurveda. Acharyas have given utmost importance for collection practices of herbal drugs from quality, preservation of chemical constituents, sustainable utilization, maintaining balanced eco system and many other facts. Around 80000 species of plants are in use in herbal medicine throughout the world. For the survival of herbal medicine plants are major tools either in the form of food or medicine. Sustainable harvesting and collection practices are most essential to perpetuate the tradition.***

Keywords: Ayurveda, chemical constituents, collection practices

1. Introduction

Ancient people were fully aware of rich potential of herbs for curing different types of ailments. Herbs belong to general botanicals of various types. Practice of herbal medicine has existed since prehistoric times as the primary form of medicine[1]. In this space age where technology has very much advanced herbal medicine still flourishes and is finding exceptional acceptance in both developing and developed countries due to its natural origin and lesser side effects. Around 80000 species of plants are in use in herbal medicine throughout the world[2]. All plants produce chemical compounds as a part of their normal metabolic activity, the secondary metabolites which are used as therapeutics in herbal science[3]. Herbal drug collection practices are most discussed, scientific topics mentioned in classics of Ayurveda. Advices to collect medicinal plants/ plant parts in particular time, season, nakshatra etc and different parts are also to be collected in different seasons, depending on their scientific observation's availability/ concentration of secondary metabolites[4]. Collection practices should ensure the long-term survival of wild populations and their associated habitat[5]. For the survival of herbal medicine plants are major tools either in the form of food or medicine. Sustainable harvesting and collection practices are most essential to perpetuate the tradition. Many researches are also essential in this regard to understand the scientific background behind this ancient wisdom. Detailed classical references on classical herbal drug collection practices, their rationality have been tried to present in this paper.

1.1 DravyaSangrahaKala (Time of drug collection)

a) General Rules

If any time particular time for drug collection is not mentioned ideal is to collect in the early morning (*brahmi muhurta*). In general *Sharad Ruthu* (October and November) is the best time for collection of herbs for all types of preparations however, for the purpose of purificatory procedure *VasanthaRuthu* (Feb and March) is the ideal. Reason behind this is that the drugs collected in the particular season will possess the optimum potency level and Prabhava. (Sa. Pra. Kha1/59). As a general opinion Acharya Sarangadhara says that all Ushna Viryadarvyas are to be collected from Vindhya Hills which is known for its hot temperature almost round the calendar. He also says that Sita viryadravya are to be collected from the vicinity of Himalayan Ranges during winter season[6]. (Sa. Pra. Kha1/55)

b) Specific time for Specific Plant part collection:

Many of our classics specified about the specific part of the drug to be collected in the specific season. This indicates the authentic knowledge about the drug potency concentration in various parts of the plants during specific season[7]. (B. R Paribhasaprakarna 4/59)

Table 1: Season of collection of different parts according to Different Acharyas

Sl. No	Parts of the plant (Prayojyaanga)	Season of collection According to Different Acharyas		
		Charaka	Susrutha	Raja Nigantu
1	Mula (Roots)	Sisirs and Grisma	Pravrat	Sisira
2	Patra (Leaves)	-	Varsa	Sisira
3	Shaka (Branches)	Varsa and Vasantha	-	-
4	Pusapa (Flowers)	According to Flowering Season	-	Vasantha
5	Kanda (Rizomes)	Sharad	-	Hemanth
6	Ksira (Latex)	Sharad	Hemanth	-
7	Phala (Fruits)	In their respective season	Grisma	Vasantha
8	Sara (Resin)	Heamantha	Vasantha	-
9	Tvak (Bark)	Sharad	Sharad	-
10	Panchang (Whole Plant)	-	-	Sharad

1.2 Place of drug Collection

Ayurveda advocates to collect all Usnaviryadravya form Vindhya Hills whereas sitaviryadravya from the vicinity of Himalaya Ranges. The drugs grow in fertile plane lands are to be collected but special consideration has to be given to collect the plants grown in hilly areas, as they are naturally more potent.

The land may be categorized on the basis of five *mahabhuta* predominance and drugs for different purposes are also advised to collect from few suitable lands. Virechanadravya are to be collected from prthivi and jalamahabhuta soil. Vamana dravya from agni, akashya and vayumahabhuta soil. Ubhayajadravya (used for both vamana and virecana) from soil of all mahabhuta predominance. Samanadravya from soil of akasamahabhuta predominance[8].

Plants grown near valmika (ant hill soil), kutsita (bad soil), anupa (marshy land), smasana (burial grounds), and ushanapradesa (saline soil), marga (walking lanes), jantu, agnidagdha and himavyapta (soil spoilt by insect, fire and snow) are unfit for therapeutic use[9]. (Sa. Pra. Kha.1/58).

Plants grown near temples, grown inappropriate season, grown from the roots of another plant, poorly grown or grown in excess, newly grown plant, plant spoilt by excess water, fire and insects is unfit for therapeutic use. Such plants should not be collected[10]. (V. P. Praprath khanda 64).

Stage of drug collection:
Condition or stage of drug collection like fresh one, dried one, matured leaf, dried bark etcis to be kept in mind before collection. Though the general rule speaks about the collection of the drugs in fresh from, there are exceptions to this, wherein the few of the drugs are to be used after few years (purana) [11].

The drugs, which should be used in purana state (One year old) are Vidanga (Embeliaribes), Pippali (Piper longum), Guda (jaggery), Dhanya (Coriander sativum), Ajya (Ghee) and Madhu (Honey). However Sushrutasamhita mentions that whether the drug is nava (new) or purana (old) it does not matter much, but taste, smell and other inherent properties of the drug are to be optimum[12]. (Sa. Pra. Kha.1/44). (Su. Su36/7-8).

Drugs which are to be collected in fresh stage are Guduchi (Tinospora cordifolia), Kutaja (Holarrhenaantidysenterica), Vasa (Adathodavasica), Kushmanda (Benincasahispida), Shatavari (Asparagus racemose), Ashwaghanda (Withaniasomnifera), Sahachara (Barleiraprionitis), Shatapushpa (Anethum graveolensis) and Parasarini (Paedariafoetida) [11]. (Sha. Para. Kha1/45-46)

b) The rule of duplication (Dviguna mana ganana):
In any compound preparation of dry and wet drugs together, dry drugs collected should be used in same quantity and the wet drugs are to be taken in double quantity of dry ones[13]. (Su. Su.36/15).

Collection time of animal origin drugs:
Animal origin drugs like Rakta (blood), Roma (body hair), Nakha (nails), Kshira (milk), Mutra (urine), Purisa (feces), are to be collected from young matured animals. Milk, urine, fecal matter for medicinal purpose is to be collected after digestion of food[14].

4) Method of drug collection (Dravyasangrahanavidhi):
After knowing time place and state of drug collection one should also know the method of drug collection which according to classics has to be carried out in most methodical and ritual manner. The drug collection is done with all methodical and religious rituals. In early morning hours after bath with calm mind the person should pray Lord Shiva facing the early morning sun. Later the drugs situated towards north should be collected with due prayers wearing white cloths and clean hands. Above concept is essential to have full involvement of the person collecting the drugs. Moreover, the works done with utmost care, pure mind and full concentration yield better result, so is the case with collection of drugs also[15]. (Sa. Pra. kha.1/56-57).

Quality of Drugs collected[16]:
Always nature, quality of drug is responsible for its appropriate action. Always matured whole plants are to be collected. Small plants are preferred to collect after flower and fruits which decide their maturity. Few instructions have been suggested to decide quality of drugs to be collected in classics.

Terms in classics	Quality indicators
KrimiAnupahata	Not affected or infested
VishaAnupahata	Not affected by Toxins
Sastra Anupahata	Not affected by weapons or should be fully grown plant
AtapaAnupahata	Not affected by extreme heat
PavanaAnupahata	Not affected by wind/storms
DahanaAnupahata	Not affected by fire
Toya Anupahata	Not affected by water/moisture
SambadhaAnupahata	Not affected by other problems
Margoranupahata	Not destroyed/damaged by rampage
Ekarasam (Utkrstaras	Best quality
Pusta	Well grown and nourished.
Prthu (PrthuValkalam)	Plant should possess abundant bark
Avagadhamula	Deep rooted.

Collection practices as per contemporary science:
Either single or various parts of plants are used in medicine. Natural drugs may be cellular or acellular organ of the plant. Cellular drugs are named as organized crude drugs whereas acellular drugs as unorganized crude drugs. Increased demand on herbal drugs led to many problems related quality, duplication scarcity etc. WHO guidelines on good agricultural and collection practices for medicinal plants are primarily intended to provide general guidance on obtaining medicinal plant material of good quality for the sustainable production of medicinal plants including certain post-harvest operations. As per guidelines collection of wild materials should ensure long term survival of species, quality of material collected, quantity of material to be collected etc. Hence it emphasizes on ecologically nondestructive system for collection of herbs. These vary from species to species. When collecting roots lateral roots can be selected, instead main/tap root. Drug collectors should have scientific

knowledge about plants, their phenology, propagation methods, post harvesting techniques, which matters sustainable utilization[17].

Few plant parts and their collection techniques[18]:

Leaves:
Procurement of leaves depend on several factors and varies from leaf to leaf. One should have thorough knowledge of chemical constituents of leaves and the chemical changes which might take place in normal atmospheric conditions. Medicinal leaves collected during flowering season of plants, when plants reach maturity and they are photosynthetically most active. If leaves contain volatile oil irrespective of other facts they are generally collected when the plant is rich in volatile oil content. Weather and time of collection is also very important for procurement of drugs. Dry weather with minimum humidity is ideal for plucking the leaves. Digitalis leaves are collected in dry weather, generally in the afternoon. Coca leaves are collected when they are nearly ready to fall from stem. Discoloration of leaves is undesirable, while the leaves of substandard quality fetch less value in the market.

Bark
Barks are collected when they contain maximum concentration or active constituent. Cinnamon is collected in rainy season, while wild cherry in autumn. Bark can also be collected through different methods like felling, up-rooting, coppicing etc.

Wood
Heart wood (duramen) consist of innermost central region which will be non-functioning, nonliving and dark coloured part due to presence of several chemical substances like tannins, pigments, gum, resin etc. Sap wood (laburnum) is the outer region of wood, which is the only functional wood conducting water and food material to plant. Both should be collected in winter.

Flower
Flower is a modified shoot; different parts of flower will be used medicinally like, petals, stamens, anthers, panicle, hypathodium etc. Usually flowers should be collected during flowering season, shade dried, parts can be separated and preserved. Clove buds are to be collected, whereas stigma of saffron is precious.

Fruit/seed
Ovules of flower after maturity converted to seeds while ovary develops into fruit. Fresh fruits, dry fruits, different types of fruits are used. Seeds of *Abrus* are used, whereas false fruit of marking nut. Fruits hairs of mallotus and mucuna are used medicinally.

Underground drugs
Commercially there is no clear demarcation between roots and rhizomes. Presence of nodes and internodes in rhizome differentiates them from roots. After collecting roots and rhizomes, should undergo several operations for their preparation for market, which include proper washing, drying and even certain cases scrapping and coating.

Un-organized drugs
Gum of acasia, resin of colophony, latex of rubber, dried juice of kino are few unorganized crude drugs. Gums are soluble or partly soluble in water, pathological products produced only when is growing in unfavorable condition. But mucilages are normal products, resultant of plant growth. Resins are un-crystallizable, semi-viscous materials found in plants and are end products of plant metabolism. Depending upon the occurrence of resins in plants various methods for their preparation are adopted. Pathological products are collected making incisions either into bark or trunk of tree.

Collection methods of few specific drugs[19, 20]:

Drug	Part used	Collection method
Madnaphala (Randia spinosa)	Fruit	Matured fruits should be collected in early summer, when fruits are about to turn from green to yellow.
Aragwadha (Cassia fistula)	Fruit	Whole matured fruits should be collected and kept in sand heap, later inner fruits pulp is to be separated.
Bhalltaka (Semicarpus anacardium)	Fruit	Purple colured, matured, intact, whole fruits are to be collected in the month late summer or rainy season.
Nagabala (Sida species)	Root	Plant which is grown in dry area, matured one, such roots are to be collected in late winter season.
Trivrit (Operculinaterpathum)	Root	Plant which is grown in wild habitat, deeply rooted, such roots are to be collected in bright fortnight period.
Harretaki (Terminalia chebula)	Fruit	Matured fruits with five ridges
Kantakari (Solanum xanthocarpum)	Root/whole plant	Whole plant having flowers and fruits along with roots
Khadira (Acasia catechu)	Heart wood	Well grown tree from desert land should be selected
Tuvaraka (Hydnocarpus laurifolia)	Fruit	Tree grown in coastal area, during fruiting season
Chandana (Santalum album)	Heart wood	Grown in western ghats, with granthi/kotare (matured)
Lashuna (Allium sativum)	bulbil	Undergound bulbils are to be collected when aerial parts dry up
Guggulu (Commiphoramukul)	Resin	During summer and winter season, making an incision in bark
Hingu (Ferula narthex)	Resin	Flowering shoot should be incised to collect resin

2. Discussion and Conclusion

Medicinal plant collection is most discussed, scientific topic mentioned in texts of Ayurveda. Acharyas have given utmost importance for collection practices of herbal drugs from quality, preservation of chemical constituents, sustainable utilization, maintaining balanced eco system and many other facts. Good collection practices emphasize

similar facts like quality, preservation of few endangered species, finally getting quality herb[21].

Increased demand on herbal products, decreased availability of natural products made everyone to think about these collection methods. Therapeutic efficacy of any drug depends strongly on the methods followed for its collection and storage. *Sharad Ruthu* (winter season) is the best time for collection of herbs for all types of preparations. However, for the drugs of purificatory measures best time is *Vasantha Ruthu* (summer). Many of our classics specified about the specific part of the drug to be collected in the specific season. This indicates the authentic knowledge about the drug potency concentration in various parts of the plants. Generally, all medicinal plants/parts are to be collected in early morning hours as per traditional texts.

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