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Good collection practices: An Ayurvedic perspective

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Abstract

Introduction: Plants are important natural resources of India. Utility of plant and its various parts are being used by mankind since time immemorial. Awareness of safety and merits in using herbal drug source in medicine, cosmetic and nutrient, has led to increased demand in trade resulting in over exploitation of plants. Crude method of plant collection is followed to meet the huge demand. As these methods destroys or disturbs propagation of plant, a thorough review of literature is essential to apply scientific methods in plant collection. Charaka samhita and Sushruta samhita are medical literatures that have not only explained plant utility in maintenance of health and curation of disease but have also mentioned the methodology of plant collection. Few important points mentioned are proper collection method in general to all plants and with specificity to plant part and season. Adopting appropriate collection methods with rational usage of medicinal plants bring out a considerable change in the plant threat status.

Materials and methods: A thorough review will be done in Charaka samhita, Sushruta samhita for references on collection. Pharmacognosy text book for recent techniques adopted for drug collection. Research articles on prevalent collection methods and their rationale.

Result: Literature review in Ayurveda texts reveal the emphasis on part of the herb, season, place of collection. In addition lucid explanation on collection methods are available. These corroborates with the results of recent research works. Researches also reveal area of research work which may help for better commercial herbs and conservation of medicinal plants.

Conclusion: Scientific method of plant collection developed by methods mentioned in ancient texts and new techniques is a significant step towards plant conservation. Plant propagation is also sustained by standardized protocol of plant collection method.

Keywords: dravya sangraha, drug collection, season, parts of the plant, charaka samhita, sushruta samhita

Introduction

Ayurveda is a life science that preaches maintenance of health and curing of disease using the plants, animal and mineral origin drugs. Even though synthetic products have gained popularity due to its production cost, time effectiveness, easy quality control, stringent regulation and quick effects but their safety and efficacy has always remained questionable, resulting in the dependency on the natural products. More than 80% of the total world population is depending on the natural products. About 65% of the Indian population is dependent on the traditional system of medicine^[1]. A huge number of natural product-derived compounds in various stages of clinical development highlighted the existing viability and significance of the use of natural products as sources of new drug candidates^[2]. Adding to this there is a vast utility of plants in different sector like pharmacy, dye, food industries. Most of the pharmaceutical companies do not have a strategic method for collection of raw materials and depend on the trade person for raw drug supply; the standard guidelines for drug collection are often compromised. As resultant of this, clinically the efficacy herbal preparations are compromised. Geographical and nutritional factors-altitude, soil composition, microbial load, climate, temperature, etc. seasonal changes (rainfall, drought, water stress, etc.), seasonal variation influences the phyto – chemical profile of the raw drug. This necessitates a thorough review on methodology of drug collection.

Materials and methods

A thorough review of texts of *Ayurveda* like *Charaka Samhita* and *Sushruta Samhita* is done

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For references on drug collection. Data thus obtained was analysed with the information available in text books of Pharmacognosy and research articles to have a comparative understanding and to see the feasibility for current practices.

Results and Discussion

Texts of Ayurveda have prescribed certain guidelines for the collection which are as follows –

Ideal land area for drug collection (*Dravya sangrha*): It should not have been damaged by presence of burrows (*shwabra*), potsheds (*sharkara*), stones (*ashma*), uneven (*vishama*), anthill (*valmika*), sand dunes (*sikata*). Place should be either dry land forest (*jangala*) or a land with common characteristics features of dry and marshy land forest (*Sadharana desha*). Plants grown on plains (*Sama*), clean (*shuchi*) and surrounded by water reservoirs (*pradakshina udaka*)

Temples (*devatayana*) and Places of cremation and slaughtering (*shmathana*, *ghaatana*) should be avoided. Plants grown near sacred tomb (*chaitya*) assembly place of people (*Sabha*). Plants should be collected from land that is non alkaline (*anushara*), non-fragile (*bhangura*), with unctuous sprouts of plants (*paroha*). Soil being soft (*mrudu*), stable (*sthira*), even (*sama*). Plants should have been exposed appropriate seasonal cold, sun, wind, and rain (*yathaa kaala shishira atapa pavana sevita*) The soil should be unctuous snigdha, red colour (*lohita*), black in colour (*Krishna*) and sweet (*madhura*) in taste or golden (*gouri*) in colour and sweet in taste (*madhura*). Land having enormous growth of grass like plants Ex: *Desmostachya bipinnata* L, (*kusha*), *Cymbopogon martini* Roxb (*Rohisha*). The land should not have been ploughed and there should not be other big trees in the vicinity over shadowing the medicinal plants^[3,4] with the objective of plant conservation quality herbal product, National Medicinal Plant Board has provided good collection practises based on different criteria. Collection from right places is one criteria which very well co relates with the classical reference. Collection of medicinal plant produce should be done only from places, which are clean and free from any possible exposure to insects, chemicals, toxic gases, sewage, automobiles etc. Collection from or near anthills, industrial areas, sewage lines, crematoria, hospitals, mining sites, public utilities, automobile workshops and any other places, which are likely to contaminate the medicinal plant produce, should never be done. Medicinal plant produce should not be harvested from plants close to roadside as perpetual exposure to vehicular exhaust might have rendered the plant and its produce unsuitable for human consumption. Plants grown in places such as industrial area, roadside are to be avoided as these plants may be toxic due to emission of toxins. Places in and around where usage of pesticides is observed should not be considered for medicine preparation. Microbial contamination is possible in plants found around drainage or waste dump^[5].

Rituals to be followed: On the day of drug collection one should take bath, wear white clothes, should be on fasting and keep sanctity of body and mind. One should offer prayers to God, *Ashwini* (Diety representing divine gods in Hindu mythology), Cow and Brahmin. Specific direction like facing north or south direction have been mentioned for collecting^[6,7].

Bathing is the daily ritual to be followed to attain both internal and external purity. These rituals have a lot of significance in enhancing the effect of herbs for the purpose which it is taken. Various studies have established this fact

and it is said that they reduce the *Raja-Tama* predominant particles in the body of a person and assists it in absorbing *sattvik* (*Sattva*-predominant) waves from the atmosphere with ease. Bath helps in stabilizing the external environment of a person. That is why, while performing *puja* (Ritualistic worship), the person can become introverted, become one with the atmosphere quickly and absorb waves of the Deity based on the conduciveness of the atmosphere^[8].

Worshipping god is a routine before any auspicious activity. In this context particular puja offering to be done to God *Ashwini Kumaras*, who are two Vedic gods, divine twin horsemen in the *Rigveda*. They symbolise the shining of sunrise and sunset, appearing in the sky before the dawn in a golden chariot, bringing treasures to men and averting misfortune and sickness. They are the doctors of gods and are *devas* of *Ayurvedic* medicine^[9].

Places from where drug to be collected: Ideal features to be observed before collecting drug. It should not be infested (*krimi anupahata*) with insects, pests, fungi, bacteria or virus as infestation by any of these may deteriorate the whole lot of produce. It can be an exception if the medicinal value of the species comes from such associations as in the case of insect galls, agar wood and specified parts developed due to pathogens^[6,7]. Drug should not be come in contact with toxic materials (*Visha*). In nature, the desired medicinal plant may be growing in close vicinity with some toxic weed. While harvesting the produce, care should be taken to ensure that no such toxic weeds get mixed with medicinal plant produce^[5]. The herb should not be injured by weapons (*shastra anupahata*) which is very practical point as the equipments used for digging, cutting, sorting, peeling and any other activity must be suitable for the purpose they are used. Equipment should be made of a non-toxic material and should be maintained in proper working condition. It is particularly important to ensure that parts of the equipment, which come in direct contact with the produce, are clean and free from any potential contaminant like paint, lubricant etc. Tools that are used for activities like cutting, shearing, spilling or peeling must be thoroughly cleaned after use to avoid cross contamination with the remaining residues^[5]. The herb should not have been exposed to extreme heat / wind / storm / fire / water / moisture (*aatapa, pavana, dahana, toya*). Abiotic stress leads to a series of morphological, physiological, biochemical and molecular changes that adversely affect plant growth and productivity. Drought, salinity, extreme temperatures and oxidative stress are often interconnected, and may induce similar cellular damage.¹⁰ Drug should possess its taste only (*ekarasa*) and not possess bad odour. Natural and unique odour of a drug is one of the criteria for its identity. Herbs should be grown under appropriate climatic condition with good nourishment (*pushta*). During appropriate season, plant parts attain their proper size, weight, taste and potency. Hence the collected parts should be deep rooted and thick (*Prithu, Avaghada*). There are two main types of potency observed. They are cold potency and hot potency drugs. Drugs having specific potency to be collected from specified region during particular season. Drugs with cold potency should be collected from Himalayan mountain regions during rainy, early and late winter. Drugs with Hot potency should be collected from from Vindhya mountain regions during late autumn, Rainy, Summer. The plant materials collected from different regions revealed that in all the plants selected for the study, the highest concentration of the marker compound was observed in plants collected from the high altitude area; ie., from the hilly areas^[11]. A study on *Ashwagandha* collection

reveals that *Aśvagandhā* being *uṣṇavīrya* drug should be collected in *grīṣma* on full moon days for better therapeutic potency^[12].

Apart from region and features of plant part collection, *Charaka* and *Sushruta Samhita* have also explained the collection of particular plant part with specific season^[6, 7]. Tender leaves and branches to be collected in Rainy and spring season. Pharmacognostic review reveals following points for leaf collection. Leaves to be collected when the flowers are just beginning to expand or the flowering is just arriving at its height. At this time it is reasonable to assume that the whole plant has arrived at its condition of maximum vigour and that leaves are the most healthy state and contain an optimum of the products of the plant metabolism and therefore should be at this period of their development suited to exert the most desirable therapeutic action. Leaves to be collected preferably during dry weather since those collected in wet deteriorate in quality and are apt to become discoloured during drying. Apart from consideration to these general points, leaves in particular will have specific time of collection. Example: Tea leaves are collected when still unfolded in the bud, Cherry laurel leaves are gathered while still young, but fully formed and in the first year of their duration, Coca leaves, when they are nearly ready to fall from the stem. Aloes should be sufficiently thick leaf^[13]. Root of trees to be collected in summer, between summer and rainy season. Tubers should be collected in late autumn. The same is substantiated by present texts as Roots and Rhizomes tissues are fully stored with reserve foods, it being assumed that medicinal constituents will be also most abundant at autumn season. As the roots are major parts of plant anatomically and physiologically non-destructive system of collection to be adopted. Ex: to collect root of a tree, lateral roots to be taken and thus main tap root will be retained. Bark collection is advised during late autumn. For collection of bark, tree should be allowed to grow to an age varying from one and half year to eight years. Bark collection is preferred in spring / early summer when the sap is rising in the stem and the cambium is active and therefore more easily torn than at other seasons. Exceptionally few barks are collected during other season if they are found to have good amount active constituents during particular season. Ex: wild cherry bark in rainy season. For the removal of bark, longitudinal incisions are made at intervals round the circumference of the stem and only these strips are removed thus saving the tree from destruction^[13]. Heartwood should be collected in winter or spring. Wood must be seasoned (dried) before it will burn properly. It seasons most quickly during the hot, dry days of summer, and only after it has been cut from the stump. The wood that you plan to use in late fall should therefore be cut no later than the previous spring^[14]. Flowers should be collected as per season of flowering because flowers when collected in fine dry weather as the petals which are damp when gathered become badly discoloured during drying. Since the flowers must be obtained in good condition, they must be gathered at precisely the correct time and consequently the process of collection may extend over several days or weeks. The collection is usually made by picking or cutting the flowers by hand. Cutting the branches to ease collection of its bearings (fruits, leaves, flowers etc.) should not be attempted. Example: Saffron collection is done in autumn, morning during sunrise. Clove bud collected before the white corolla expands and the crimson buds are picked by hand. Chamomile collection is done during rainy season, only capitula is picked which are just fully

expanded.¹³ Fruits as per season or during summer. Fruits are to be collected during its season either fully ripe or nearly ripe depending on the fruit. Ex: Specific collection method has been highlighted in classical text to obtain fruit pulp from the pod of *Aragvadha*. It has been advised that ripe fruit should be collected during appropriate season of fruiting. Fruits endowed with good qualities should be taken in large quantity and kept covered with sand for seven days. Thereafter, these fruits should be taken out of the sand and pulp of these fruits should be collected and preserved for use. Cassia fistula fruit pulp should be buried under sand for easy removal of its pulp. A marked difference in the physicochemical parameters and quantitative estimation of total and reducing sugar were observed in buried and non-buried samples of Cassia fistula fruit pulp. It is concluded that only fully ripen pods should be collected and seven days are sufficient for the burring process^[5]. Late autumn, early winter is ideal season for collection of latex. Un - organised plant parts like gum, resin, oleo resin, oleo gum resin and latex are to be collected during dry season and when they ooze out of the tree. Ex: Research standardization of gum collection method of *Boswellia serrata* revealed that the gum can be extracted throughout the year but April-May is the most ideal period of the year when the gum yield is at its maximum. The study also revealed that a wound made up to a depth of $\frac{1}{2}$ the thickness of the bark of size 20 Å— 30 cm as recommended by Shiva (2008) is the most appropriate for extraction of gum. The Apart from this it was observed that gum production starts in *Boswellia serrata* when it attains a girth size of 38 cm. The gum producing ability gets stabilized when the plants of *Boswellia serrata* attains a girth of 86cm^[16].

Conclusion

Harvesting method of plants parts plays a vital role in conservation of plant species, habitat management and thereby balancing ecosystem. Collection protocol starts from the individual purity, auspicious rituals followed by selection of place of drug collection. Ideal features in general to be observed in a drug and particular part collection with respect to season are well explained. Collection methods explained for plants in *Charaka samhita* and *Sushruta samhita* are relevant to the current times but a thorough research performed by integrating the new techniques will bring out a fruit full result.

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