

**STANDARD
FOR
GOOD FIELD COLLECTION PRACTICES
OF
MEDICINAL PLANTS**



National Medicinal Plants Board
Department of AYUSH, Ministry of Health and Family Welfare
Government of India, Chanderlok Building , 36 Janpath
New Delhi 100001

0. FOREWORD

0.1 India has a rich heritage of plant based healthcare systems like Ayurveda, Unani and Siddha with a very high degree of societal acceptance. The world is witnessing a change in the health seeking behavior as more and more people world over are seeking health remedies through the use of traditional and herbal medicines. There is a global upsurge in the use of traditional and complementary systems of medicine. This is primarily due to the fact that these systems of medicine, being largely plant based, are generally safe, efficacious and affordable. The increasing demand of natural/herbal products world over, therefore, creates a need not only for conserving medicinal plants but judicious utilization large potential in the service human kind as health care products. Over exploitation is leading to unsustainable collections from natural forests resulting in uncertain availability of a large number of medicinal plants species and their decline in the wild.

0.2 Forests have been the main source of the raw material used in the manufacture of Ayurveda, Siddha and Unani medicines. But concerns have been raised that unsustainable collection from the wild has resulted in a large number of species entering the red data book. Almost 90 percent of the raw materials of medicinal plants used by the manufacturing units are sourced from natural forests, often with little regard to environmental and social considerations, often resulting in harvest much in excess of sustainable limits.

0.3 The major challenges facing growth and outreach of the traditional/herbal medicinal products are their quality, safety and efficacy. This inter-alia is dependent on the quality of the raw material used in the manufacture of the finished product. It is for this reason that development of Good Field Collection Practices for medicinal plants will go a long way in improving the quality of the final products. The National Medicinal Plants Board (NMPB), Department of AYUSH has prepared India specific guidelines on Good Agriculture Practices (GAPs) on the pattern of Good Agriculture and Field Collection Practices (GACPs) developed by the World Health Organization (WHO) for medicinal plants.

0.4 In the preparation of this standard assistance has been taken from Good Agriculture and Field Collection Practices (GAFCPs) developed by the World Health Organization (WHO) in 2003 and Good Agricultural Practices enunciated by the GLOBALGAP Secretariat which is being implemented in over 80 countries.

0.5. The requirements given in this standard are subject to the following statutory and regulatory provisions:

- a) The Drugs and Cosmetics Act and Rules (as amended up through 30th June 2005. New Delhi: Department of Health. 2005. Schedule T: Good Manufacturing Practices (GMPs) for Ayurveda, Siddha and Unani Medicines.
- b) The Ayurvedic Pharmacopoeia of India, 5 Volumes, Ministry of Health and Family Welfare, Govt. of India, New Delhi, 1989-2005
- c) The Siddha Pharmacopoeia of India, Part I(1), Ministry of Health and Family Welfare, Govt. of India, New Delhi, 2007

- d) The Unani Pharmacopoeia of India, Part-I, Ministry of Health and Family Welfare, Govt. of India, New Delhi
- e) The Indian Forest Act, 1927
- f) Wild Life (Protection) Act, 1972
- g) Biological Diversity Act 2002

1. SCOPE

This standard covers Good Field Collection Practices for wild medicinal plants in sustainable manner and maintaining quality of produce used by all stakeholders.

This standard does not cover the requirements for Good Agricultural Practices (GAPs)

2. DEFINITIONS AND ABBREVIATIONS

2.1 Definitions-For common understanding by the stakeholder in uniform manner, applicable terms have been defined and are given in Annex A

2.2 Abbreviations- Abbreviations used in this standard are given in Annex G

3. REQUIREMENTS

3.1 The standard provides requirements for Good Field Collection Practices on different aspects for harvesting and post harvest management of medicinal plants. The details of requirements is given in Table 01

4. APPRAISALS AND ASSESMENT

4.1The requirements stated in Table 01 shall be evaluated to establish that collectors comply with those requirements. An appraisal and assessment system has been developed. On evaluation of deficiencies that may appear in evaluation need to be resolved to establish compliance to the requirements. These deficiencies have been classified as:

Critical:When evidence shows that the grower has not complied with requirements in its documentation and implementation and which raises doubts on the operation and practice of GAP calling for an early correction and corrective actions within the time frame.

Major: When evidence suggests major break down in the implementation in certain elements of the criteria calling for the early corrective actions within a time frame

Minor:When evidence shows an isolated non-compliance to the GAP criteria and has negligible impact on the operation of the system and its results.

Note: Multiple Minor NCs with related impact on the operation of the system in one particular area may result in major NC

4.2 To develop a self-assessment against the criteria, a checklist has been developed and is given in Table 02. This will bring uniformity in evaluation of the system. This also indicates when a violation of a particular criteria leads to critical, major or minor nonconformities.

TABLE 01 REQUIREMENTS AND EVALUATION CRITERIA

Paras	Control criteria	Compliance criteria	Level of compliance
1	SITE SELECTION		
1.1	The site for collection of medicinal plant produce should be free from toxic elements and from places not prone to contamination	Information on exposure of the collection place from insects, chemicals, toxic gases, sewage, automobiles etc., also from or near anthills, industrial areas, sewage lines, crematoria, hospitals, mining sites, public utilities, automobile workshops	Major
1.2	Are the sites close to road with heavy vehicular traffic?	Harvested/collected from plants close to roadside as perpetual exposure to vehicular exhaust renders the plant and its produce unsuitable for human consumption.	Minor
1.3	Does the site is known as a reliable source for the species intended to collect?	Site survey report from an authorized agency	Major
1.4	Does the site have gregarious populations of the intended species?	Site survey report from an authorized agency	Major
2	COMPLIANCE TO REGULATORY REQUIREMENT		
2.1	General		
2.1.1	Are the collection, processing, storage and sale of medicinal plant produce carried out in accordance with the existing laws	This needs compliance to laws enacted by both Central and local Governments (See Clause 0.5)	Critical
2.1.2	Are the collection, processing, storage and sale of medicinal plant produce carried out in accordance with the international treaties and conventions signed by India	The various international treaties and conventions related to conservation of biodiversity signed by India must be respected while collecting any medicinal plant produce from the wild.	Critical
2.2	International regulation and guidelines		
2.2.1	Are the provisions laid down in the CITES regulations adhered to while collecting any medicinal plant produce from the wild?.	The collection managers and collectors should be imparted on the provision of CITES and the regulation copy must be available on site	Critical
2.2.2	Are the collection managers and collectors of the medicinal plant produce meant for export, honour existing laws of the importing countries?	Besides the regulatory authorities in the country of import, local secretariats of CITES, IUCN and TRAFFIC may be consulted for such laws and regulations.	Critical
2.3	National regulations		
2.3.1.	Whether the provisions of Indian	A register of regulations (ROR)	Critical

Paras	Control criteria	Compliance criteria	Level of compliance
	Forest Act 1927, The Wildlife (Protection) Act 1972, The Forest (Conservation) Act 1980, The Biological Diversity Act 2002, The Scheduled Tribes & Other Traditional Forest-Dwellers (Recognition of Forest Rights) Act 2006 followed?	containing applicable provisions of various Acts and Rules should be available at site	
2.3.2	Whether collectors and collection managers keep themselves updated about the provisions in such Acts, Rules and abide by the conditions laid down in them	Training and awareness records of managers and collectors on regulatory requirements	Major
2.3.3	Whether managers and collectors are aware of Export-import policy and the negative list of export in order to comply with the provisions laid down in such policy documents?	Existence of negative list of export and policies on them	Major
2.4	Local regulations		
2.4.1	Are the collectors/collection managers aware of the local regulations governing the collection, transit and sale of the medicinal plant produce in specific areas and abide by them?	ROR of local regulations enacted by states such as The Madhya Pradesh Sustainable Harvesting Act 2005, The Andhra Pradesh Red Sanders Wood Possession Rules 1989, The HP Forest Produce Transit (Land Routes) Rules, 1977, The Tamil Nadu Sandalwood Transit Rules, 1967, and The Maharashtra Forest Produce (Regulation of Trade) Act, 1969. etc.	Critical
2.5	Permission for collections		
2.5.1	Have the collectors/collection managers taken prior written permission from the authorized agency for collection, possession, transit and sale of the medicinal plant produce, when required under law?	The documentary proof of such permissions must be kept in safe custody. Such medicinal plant produce, when traded, must be accompanied by appropriate documentation in accordance with the laws and regulations	Critical
3	HARVEST/COLLECTION MANAGEMENT Guidelines given in Annex B must be kept in mind		
3.1	Quality Considerations		
3.1.1	Botanical authenticity of species: Are the botanical identity (genus, species etc) established before a plant species are collected from the	The species collected should be the same as given in statutory documents (See 0.5). Where ever prior testing is done to authenticate the identity, the	Critical

Paras	Control criteria	Compliance criteria	Level of compliance
	wild. Is the identity of the plant from which the produce is being collected verified and records maintained?	voucher specimens should be preserved in an appropriate manner along with the test reports	
3.1.2	Botanical authenticity of new plants: How the identity of new medicinal plant species is collected, which does not have any monographs in any of the pharmacopoeias or reference books maintained?	The identity of new medicinal plant species should be established in consultation with BSI or FRI or any recognized national or regional herbaria.	Major
3.1.3	Is Field Collection Protocol available?	An operating manual/ collection protocol applicable for the botanical species should be made available at the site for the collectors/ collection manager. Such manual/ protocol should be drafted in the local language using simple & instructional text.	Major
3.1.4	Collection of healthy plants Are only healthy individuals of desired plant species harvested except when the medicinal value of the species comes from such associations as in the case of insect galls, agar wood etc?	Plants, which are infested with insects, pests, fungi, bacteria or virus, should be avoided Criteria for selection of healthy plants should be laid down well with specific reference to the species- in the Operation manual/ Collection protocol.	Major
3.1.5	Harvesting at right phenological stage: In order to ensure optimum quantity of biologically active substances in the medicinal plant produce, is harvesting done at the right phenological developmental stage?	The collection time in terms of phenological stage of plant species along with dates and months for each medicinal plant must be documented (See Annex F)	Critical
3.1.6	Weather conditions for collection: Is harvesting done under right weather condition? When harvesting in wet conditions becomes inevitable, do provisions exist to dry the water content as soon as possible from the produce? Is the collection avoided during early hours to avoid dew?	Harvesting should not be done during rain, mist or exceptionally high humid conditions, as this would encourage fungal attack. Collection should not be done during early hours to avoid dew, unless it is a specific need for any produce (e.g. floral parts like stigmas and anthers are better harvested under dew). The field collection protocol related to species should make a specific	Major Minor

Paras	Control criteria	Compliance criteria	Level of compliance
		reference on a need basis, to ideal weather conditions for collection. When such a reference is made in the protocol, appropriate records related to the weather conditions prevailing on the date of collection should be maintained at the site.	
3.1.7	Sorting of produce: Are the medicinal plant produce sorted out from any immature or over matured produce, which may downgrade the overall quality of the lot? When trading is based grades of produce, is parameter of sorting and grading defined objectively?	There should be sorting and grading procedure sort out from immature or over mature to maintain the overall quality of the lot. Where trading of different grades of produce is in vogue, grading should also be done in accordance with established parameters. The basis of such grade-wise sorting should be defined objectively (e.g. diameter of roots, size or weight of the fruit etc.) .	Major Major
3.1.8	Foreign matter: Is care taken to avoid any accidental mixing of foreign matter with medicinal plant produce such as soil particles, organic matters like leaves, stems, wood pieces or food articles being inadvertently mixed? Are collectors vigilant to avoid mixing and cross-contamination with other medicinal plant produce being harvested or processed simultaneously?	Procedure should exist to avoid any accidental mixing with soil particles, organic matters like leaves, stems, wood pieces or food articles during the harvesting and post harvest management. Also to avoid any mixing and cross-contamination with other medicinal plant produce being harvested or processed simultaneously	Major Major
3.1.9	Mixing of Toxic weeds: Are care taken to ensure that while harvesting, no toxic weeds growing in close vicinity get mixed with medicinal plant produce?	No toxic weeds growing in close proximity get mixed with medicinal plant produce while harvesting the produce. Collectors should know the phenotype of such weeds	Major
3.2	Environmental Considerations		
3.2.1	Conservation status of species: Are Regulators (e.g. forest and wild life field officials) and the collectors aware of the current conservation	The RET status of the plant species in the respective areas should be available and any existing regulation applicable in the area of collection to conserve such species should be	Critical

Paras	Control criteria	Compliance criteria	Level of compliance
	status of the desired plant species?	adhered to.	
3.2.2	Sensitive species: Are collection managers aware of endemic plant species available in the areas of collection?	The managers must adhere to the existing legal and ecological prescriptions to ensure that the species is not subjected to an increased threat.	Major
3.2.3	Distribution of species: Is quantity of collection of any plant species in proportion to the distribution of the species in the area of collection?	Collection of a species should only be done from areas where its frequency of occurrence is sustainable.	Major
3.2.4	Regeneration of species: Are medicinal plant species harvested within the limits of their capacity for regeneration?	For sustainability, certain percentage of medicinal plant population should be left so as to allow the natural regeneration. The population size to be left may vary from species to species, depending on the habit and intrinsic regenerative capability of the species. This information should be available	Major
3.2.5	Baseline Assessment& Monitoring:		
3.2.5 a	Is baseline assessment done of availability of medicinal plant produce in the wild?	Based on the baseline data available, the regular monitoring should be carried out of availability of medicinal plant produce in wild as a part of routine management plan. Baseline assessment should be done by adopting mathematical models including computer soft wares.	Major
3.2.5.b	Are assessments done on sustainable level of harvest?	The assessment should also be done for sustainable level of harvesting for each species at least for those likely to be threatened in short durations.	Major
3.2.6	Frequency of collection: Are enough gaps left irrespective of the demand of any medicinal plant produce, in its collection cycle to synchronize with the regeneration cycle of the plant species or the produce?	Enough gaps should be given for the plant to recoup the harvested parts. Data on regeneration cycle and collection cycle should be available.	Minor
3.2.7	Minimizing the harm to source plant: While collecting the desired plant parts such as leaves, fruits,	Cutting the branches to ease collection of its bearings (fruits, leaves, flowers	Minor

Paras	Control criteria	Compliance criteria	Level of compliance
	flowers, seeds etc. are efforts made to minimize harm to the plant from which these parts are being harvested?	etc.) should not be attempted. Proper guidelines should be available	
3.2.8	<p>Habitat management:</p> <p>While harvesting, do collectors ensure minimum damage to habitat of the species to ensure sustainability?</p>	<p>Guidelines should exist to minimize damage to habitat of species especially where roots or other underground parts are to be harvested which result in uprooting of the associated species of no interest to collectors.</p> <p>Care should be taken that climbers and twiners while harvested cause least disturbance to associated plant species. Certain species only occur in specialized habitats (e.g. <i>Acorus calamus</i> in waterlogged areas or <i>Bergenia ciliata</i> syn. <i>Bergenia ligulata</i> on rock crevices).</p>	Major
3.3	<p>Social Considerations:</p>		
3.3.1	<p>Local use of the species: Does the organized collection of medicinal plant produce from the wild affect the bonafide rights and availability of species for use by local people?</p>	<p>Local people enjoy certain bonafide rights over the wild resources for food, fodder, fuel wood, medicines, wild craft, agricultural implements etc. under the regulations.</p> <p>Further, local healers in India collect medicinal plant produce for use as raw materials for their medicinal recipes from forests. The organized collection of medicinal plant produce from the wild should not affect the availability of species for use by local people. (ISSC-MAP Criterion 4.1: Traditional use, access rights, and cultural heritage)</p>	Major
3.3.2	<p>Equity</p>		
3.3.2.1	Do the collectors of medicinal plant produce get returns commensurate with their efforts?	Provisions should be laid down for a fair price mechanism for all the species that are harvested in the area.	Major
3.3.3.2	Is there a mechanism evolved for a fair and equitable benefit sharing that are adhered to by all the stakeholders	Mechanism for a fair and equitable benefit sharing should be evolved and adhered to by all the stakeholders of medicinal plant produce as provided	Major

Paras	Control criteria	Compliance criteria	Level of compliance
	of medicinal plant produce?	for in The Biological Diversity Act, 2002.	
3.3.4	Cultural Considerations: Are the harvest and the post-harvest management of medicinal plant produce carried out in accordance with ethical codes and norms of local community and the region in which the activities take place and Due respect given to these values?	Some plant species like Tulsi (<i>Ocimum spp.</i>), Doorba (<i>Cynodon dactylon</i>), Bael (<i>Aegle marmelos</i>), Peepal (<i>Ficus religiosa</i>), Mango (<i>Mangifera indica</i>) etc. are attached with social and religious values. Local people may not allow these species to be harvested. Due respect should be given to such values during harvesting and post harvest management of medicinal plant produce.	Minor
4	POST HARVEST MANAGEMENT Guidelines given in Annex B must be kept in mind. In addition, the collectors / collection managers should be provided with a Manual/ Operative protocol for all stages of post-harvest management. The manual / protocol should be drafted in the local language using simple & instructional text. Efforts are to be made to carry out primary processing in the proximity of the source.		
4.1	Cleaning		
4.1.1	Are timely and right processing of medicinal plant produce after it has been harvested takes place to preserve the quality and enhanced shelf life of the produce?	Soil attached to the harvested produce should be washed with potable water. After preprocessing of scrapping, peeling or brushing, the produce should be washed with potable water before drying.	Major
4.2	Sorting		
4.2.1	Are unrelated material stuck with the produce removed?	Clean and remove any organic or inorganic matter stuck to it, any part of the mother plant that does not constitute official medicinal plant produce.	Major
4.2.2	Are the harvested produce which is morphologically thick, fleshy or of bigger size, cut or sliced into small/ thin pieces to ensure proper drying of the produce?	The produce should be cut into smaller pieces in a manner that enhances the drying while retaining the visual appearance of the produce.	Major
4.3	Drying		
4.3.1	Are the medicinal plant produce properly dried before packing for shipping or storage?	The optimum moisture content of medicinal plant produce should be documented	Major
4.3.2	Where the delicate plant parts and	Medicinal plant produce when in wet	Major

Paras	Control criteria	Compliance criteria	Level of compliance
	aromatic parts constitute the produce, are they dried only under shade?	condition requiring drying in shade, may be dried initially under sunlight to get rid of external moisture, before being transferred to shade.	
4.3.3	In case of open sun or air-drying, is the medicinal plant produce spread out in a thin layer?	The plant produce should be dried on either on drying frame or on sheet of cloth or tarpaulin and not on the ground. The produce should be stirred up or turned upside down at frequent intervals to allow even and complete drying and should be protected from rain.	Minor
4.3.4	During drying cycles (sun drying or shade drying), are care taken to move the materials into covered/ partially covered spaces during evening hours?	The produce during drying cycle should move under the covered space during evening hours. This practice prevents undesirable exposure to night fog, dew, unforeseen night drizzles etc.	Minor
4.3.5	When artificial means of drying like oven or hot air used, is the procedure standardized?	The procedures must be standardized and validated for their overall effect on the quality before introduction at field level. The temperature range and time duration in such drying should be recorded and documented.	Major
5	PACKAGING AND STORAGE		
5.1	Packaging		
5.1.1	Is the storage containers of medicinal plant produce provide protection from heat, humidity and temperature and not contaminate the produce?	Each category of produce requires specific packaging needs. The Packaging option given in Annex C should be adopted. Under no circumstances, used bags for food articles, construction articles such as cement, sand or that of fertilizers or other chemicals should be used for packing medicinal produce.	Critical
5.1.2	Is compaction/bale packing done while handling material in bulk (like Shankhapushpi, Bhringaraj, Bhumyamlaki etc) by using, manually/ mechanically operated compactors?	Bale packing should be done. This practice helps the communities in minimizing the storage area requirement and also reduce transportation cost. Compactors should be used where volume of produce is high.	Minor
5.1.3	Is each container of medicinal plant produce labeled properly?	The label should contain all the required information of medicinal	Major

Paras	Control criteria	Compliance criteria	Level of compliance
		plant produce. A prototype label given as Annex D should be followed.	
5.2	Storage		
5.2.1	Are medicinal plant produce stored in a dedicated storehouse, constructed in such a way as to avoid entry of pest, birds and other animals and are free from dampness, dirt and dust?	Medicinal plant produce should never be stored in open areas and in or near cattle sheds and storage area should be free from pests. The storehouse should have provision for keeping approved, rejected and untested lots separately with appropriate signboards.	Major
5.2.3	Are sealed and labeled containers/ packages of medicinal plant produce kept in cool and dry place and on wooden pallets?	Never stack the containers/ packages, especially gunny bags, jute bags, woven sacks, corrugated box etc. directly on the floor.	Major
5.2.4	Are storage management-receipt, storage and issue/dispatch- properly followed?	Dedicated areas for each species should be clearly earmarked and enough space should be left between two species and different parts of same species to ensure smooth movement of persons and machine and to avoid any cross-contamination. Containers of two or more medicinal plant produces should never be stacked one above the other	Major
5.2.5	Whether each lot contains month of collection on its label and FIFO (First in first out) is followed for its movement? .	Month of Collection of each lot of the produce must be marked on its label. The produce should be supplied/consumed on FIFO basis to minimize storage of old stock.	Critical
5.2.6	Is there a provision for separate climate (temperature and humidity) controlled facility to store hygroscopic material and volatile material?	There should be provision for separate climate (temperature and humidity) controlled facility to store hygroscopic material and volatile material?	Minor
5.2.7	Is inflammable produce like resins, gum-resins, oils etc. stored at isolated place in closed containers?	Inflammable materials should be clearly labeled on each container and stored at isolated place in closed containers	Major
6	MACHINERY AND EQUIPMENT USED IN DIFFERENT OPERATIONS		
6.1	Are the measuring equipments calibrated at prescribed schedules and calibration certificates / records maintained?	Calibration schedule should be available and calibration record in line with the schedule from the weights and measures department or from an accredited	Major

Paras	Control criteria	Compliance criteria	Level of compliance
		calibration agency	
6.2	Are equipment used for digging, cutting, sorting, peeling and any other activity suitable and made of nontoxic material?	The equipment used for digging, cutting, sorting, peeling must be made of a non-toxic material and should be maintained in proper working condition. Equipment that pose a risk of metallic contamination of the harvested crop should be avoided	Critical
6.3	Are equipment and tools, especially that come in contact with the produce clean and free from any potential contaminant like paint, lubricant etc., and are maintained in proper working condition to avoid cross-contamination?	A maintenance cleaning schedule of equipment and tools used should be followed to ensure that parts of the equipment coming 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.	Major
7	DOCUMENTATION FOR IDENTIFICATION AND TRACEABILITY		
7.1	Identification		
7.1.1	Are packages/containers legibly labeled with product name, plant part, month and year of harvest and the name of collection centre?	Each pack must be legibly marked with details following trade practices/legal requirements. Guidelines given in Annex D	Major
7.2	Traceability		
7.2.1	Is the plant produce traceable to collection center from where it has been grown?	There is a documented identification and traceability system that allows the produce to be traced back to the collection center and area from where harvested and tracked forward to the immediate customer. Harvest information must link a batch to the harvesting records	Critical
7.3	Documentation		
7.3.1	Is the basic information about the plant species, area of collection, and time of collection, regulatory information etc., captured?	Document containing information, to trace its identity, history, habitat, time of collection, grade etc should be available. An outline for recording such passport data is given as Annex E, which collectors can adopt.	Critical
7.3.2	Are all processes/events affecting quality of produce maintained?	All records of processes or events such as extreme conditions (e.g. drought) during the harvest time that affect the	Major

Paras	Control criteria	Compliance criteria	Level of compliance
		quality of the produce should be maintained.	
7.3.3	Are documents on different agreements maintained?	All agreements between collectors (e.g. co-operative society, village Panchayat etc.) with traders and manufacturers should be available.	Critical
7.3.4	Are records of drying conditions and temperature range for artificial drying maintained?	The record on drying conditions and temperature range for artificial drying available at the collection center.	Major
7.3.5	Are documents of all permissions taken from authorities maintained?	Proper records of permission/ permits from authorities taken for harvesting, processing or storage of plant produce, proper records of such permits should be maintained. These should be kept in safe custody and should be available for verification by regulators, traders and manufactures and certification agencies.	Critical
8	TRAINING AND MONITORING		
8.1	Training and capacity building:		
8.1.1	Are training on (i) medicinal plants in general, (ii) good collection procedure, and (iii) hygiene procedure to be followed imparted to the collectors for ensuring the quality collection produce without any negative impact on the environment.?	Provision should be made to train the collectors and maintaining records. The training should include identification of species and their produce, understanding of phenological stages of plant, broad internal (e.g. heart wood and sap wood) and external structures (e.g. rhytidome) along with some appreciation of natural processes like pollination, regeneration etc, which occur in nature.	Major
8.1.2	Are collectors aware of environmental impact of harvest of medicinal plant produce?	Collectors should be made aware of various situations of collections, which can be detrimental to the habitat and environment. They should be instructed on all the issues related to protection of environment and conservation of plant species.	Major
9	WORKERS HEALTH, SAFETY AND WELFARE		
9.1	Risk Assessments		
9.1.1	Do the collectors have a written risk assessment for safe and healthy working conditions?	The written risk assessment can be a generic one but it must be appropriate for conditions including risk from wild	Major

Paras	Control criteria	Compliance criteria	Level of compliance
		animals. The risk assessment must be reviewed and updated when changes in the geographical area	
9.1.2	Do the collectors have a written health, safety and hygiene policy and procedures?	The health, safety and hygiene policy must at least include the points identified in the risk assessment. This could include accident and emergency procedures, hygiene procedures, dealing with any identified risks in the working situation, etc..	Major
9.1.3.	Is the health Status of Collectors assessed?	Persons having allergies to natural ingredients such as pollens, plant exudates, and aromas should avoid collection from the wild. Those with open wounds, inflammations and skin infections should keep away from the areas, where primary processing is taking place.	Major
9.2	Training on health and safety		
9.2.1	Have collectors and staff received adequate health and safety training and are they instructed according to the risk assessment?	Collectors can demonstrate competency in responsibilities and tasks through visual observation. If at time of inspection there are no activities, there must be evidence of instructions.	Major
9.2.2	Is there always an appropriate number of persons (at least one person) trained in first aid present on each collection centre whenever collection activities are being carried out?	There is always at least one person trained in First Aid present on the collection centre whenever collection activities are being carried out.	Major
9.3	Hazards and First Aid		
9.3.1	Do accident and emergency procedures exist; are they visually displayed and communicated to all persons associated with the collection activities?	Permanent accident handling procedures must be clearly displayed in accessible and visible location(s). These instructions are available in the predominant language. The procedures must identify the following: - Collection center address - contact person(s) - An up-to-date list of relevant phone numbers (police, ambulance, hospital, access to emergency health care. - Location of fire extinguisher in the go down and office. - How to report accidents or incidents.	Major
9.3.2	Are potential hazards clearly identified by warning signs and placed where appropriate?	Permanent and legible signs must indicate potential hazards. Warning signs must be present in local language.	Minor
9.4	Protective Clothing/Equipment		

Paras	Control criteria	Compliance criteria	Level of compliance
	Are collectors provided with suitable protective clothing in accordance with legal requirements and/or label instructions or as authorized by a competent authority?	Collectors should wear appropriate personal protective equipments like safety shoes, gloves, and eye & nose protection while collecting produce from wild habitats which enable label instructions and/or legal requirements and/or requirements as authorized by a competent authority to be complied with are available, used and in a good state of repair.	Major
10	RECORD KEEPING AND INTERNAL SELF-ASSESSMENT/ INTERNAL INSPECTION		
10.1	Are all records requested during the external inspection accessible and kept for a minimum period of time of two years, unless a longer requirement is stated in specific control points?	Collection centers keep up to date records for a minimum of two years from the date of first inspection, unless legally required to do so for a longer period.	Major
10.2	Does the manager take responsibility to undertake a minimum of one internal self-assessment per year against the requirements of this standard?	There is documentary evidence that internal self-assessment under responsibility of the producer has been carried out and are recorded annually	Major
10.3	Are effective corrective actions taken as a result of non-conformances detected during the internal self-assessment?	Effective corrective actions are documented and have been implemented.	Major

TABLE 02 CHECKLISTS FOR SELF-ASSESSMENT

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
1	SITE SELECTION				
1.1	The site for collection of medicinal plant produce should be free from toxic elements and from places not prone to contamination	Major			
1.2	Are the sites close to road with heavy vehicular traffic?	Minor			
1.3	Does the site is known as a reliable source for the species intended to collect?	Major			
1.4	Does the site have gregarious populations of the intended species?	Major			
2	COMPLIANCE TO REGULATORY REQUIREMENT				
2.1	General				
2.1.1	Are the collection, processing, storage and sale of medicinal plant produce carried out in accordance with the existing laws	Critical			
2.1.2	Are the collection, processing, storage and sale of medicinal plant produce carried out in accordance with the international treaties and conventions signed by India	Critical			
2.2	International regulation and guidelines				
2.2.1	Are the provisions laid down in the CITES regulations adhered to while collecting any medicinal plant produce from the wild?.	Critical			
2.2.2	Are the collection managers and collectors of the medicinal plant produce meant for export, honour existing laws of the importing countries?	Critical			
2.3	National regulations				
2.3.1.	Whether the provisions of Indian Forest Act 1927, The Wildlife (Protection) Act 1972, The Forest (Conservation) Act 1980, The Biological Diversity Act 2002, The Scheduled Tribes & Other Traditional Forest-Dwellers	Critical			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
	(Recognition of Forest Rights) Act 2006 followed?				
2.3.2	Whether collectors and collection managers keep themselves updated about the provisions in such Acts, Rules and abide by the conditions laid down in them	Major			
2.3.3	Whether managers and collectors are aware of Export-import policy and the negative list of export in order to comply with the provisions laid down in such policy documents?	Major			
2.4	Local regulations				
2.4.1	Are the collectors/collection managers aware of the local regulations governing the collection, transit and sale of the medicinal plant produce in specific areas and abide by them?	Critical			
2.5	Permission for collections				
2.5.1	Have the collectors/collection managers taken prior written permission from the authorized agency for collection, possession, transit and sale of the medicinal plant produce, when required under law?	Critical			
3	HARVEST/COLLECTION MANAGEMENT				
3.1	Quality Considerations				
3.1.1	Botanical authenticity of species: Are the botanical identity (genus, species etc) established before a plant species are collected from the wild. Is the identity of the plant from which the produce is being collected verified and records maintained?	Critical			
3.1.2	Botanical authenticity of new plants: How the identity of new medicinal plant species is collected, which does not have any monographs in any of the pharmacopoeias or reference books maintained?	Major			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
3.1.3	Is Field Collection Protocol available?	Major			
3.1.4	Collection of healthy plants Are only healthy individuals of desired plant species harvested except when the medicinal value of the species comes from such associations as in the case of insect galls, agar wood etc?	Major			
3.1.5	Harvesting at right phenological stage: In order to ensure optimum quantity of biologically active substances in the medicinal plant produce, is harvesting done at the right phenological developmental stage?	Critical			
3.1.6	Weather conditions for collection: Is harvesting done under right weather condition? When harvesting in wet conditions becomes inevitable, do provisions exist to dry the water content as soon as possible from the produce? Is the collection avoided during early hours to avoid dew?	Major Minor			
3.1.7	Sorting of produce: Are the medicinal plant produce sorted out from any immature or over matured produce, which may downgrade the overall quality of the lot? When trading is based grades of produce, is parameter of sorting and grading defined objectively?	Major Major			
3.1.8	Foreign matter:				

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
	<p>Is care taken to avoid any accidental mixing of foreign matter with medicinal plant produce such as soil particles, organic matters like leaves, stems, wood pieces or food articles being inadvertently mixed?</p> <p>Are collectors vigilant to avoid mixing and cross-contamination with other medicinal plant produce being harvested or processed simultaneously?</p>	Major Major			
3.1.9	<p>Mixing of Toxic weeds:</p> <p>Are care taken to ensure that while harvesting, no toxic weeds growing in close vicinity get mixed with medicinal plant produce?</p>	Major			
3.2	Environmental Considerations				
3.2.1	<p>Conservation status of species:</p> <p>Are Regulators (e.g. forest and wild life field officials) and the collectors aware of the current conservation status of the desired plant species?</p>	Critical			
3.2.2	<p>Sensitive species:</p> <p>Are collection managers aware of endemic plant species available in the areas of collection?</p>	Major			
3.2.3	<p>Distribution of species:</p> <p>Is quantity of collection of any plant species in proportion to the distribution of the species in the area of collection?</p>	Major			
3.2.4	<p>Regeneration of species:</p> <p>Are medicinal plant species harvested within the limits of their capacity for regeneration?</p>	Major			
3.2.5	Baseline Assessment& Monitoring:				
3.2.5 a	Is baseline assessment done of	Major			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
	availability of medicinal plant produce in the wild?				
3.2.5.b	Are assessments done on sustainable level of harvest?	Major			
3.2.6	Frequency of collection: Are enough gaps left irrespective of the demand of any medicinal plant produce, in its collection cycle to synchronize with the regeneration cycle of the plant species or the produce?	Minor			
3.2.7	Minimizing the harm to source plant: While collecting the desired plant parts such as leaves, fruits, flowers, seeds etc. are efforts made to minimize harm to the plant from which these parts are being harvested?	Minor			
3.2.8	Habitat management: While harvesting, do collectors ensure minimum damage to habitat of the species to ensure sustainability?	Major			
3.3	Social Considerations:				
3.3.1	Local use of the species: Does the organized collection of medicinal plant produce from the wild affect the bonafide rights and availability of species for use by local people?	Major			
3.3.2	Equity				
3.3.2.1	Do the collectors of medicinal plant produce get returns commensurate with their efforts?	Major			
3.3.3.2	Is there a mechanism evolved for a fair and equitable benefit sharing that are adhered to by all the stakeholders of medicinal plant produce?	Major			
3.3.4	Cultural Considerations: Are the	Minor			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
	harvest and the post-harvest management of medicinal plant produce carried out in accordance with ethical codes and norms of local community and the region in which the activities take place and Due respect given to these values?				
4	POST HARVEST MANAGEMENT				
4.1	Cleaning				
4.1.1	Are timely and right processing of medicinal plant produce after it has been harvested takes place to preserve the quality and enhanced shelf life of the produce?	Major			
4.2	Sorting				
4.2.1	Are unrelated material stuck with the produce removed?	Major			
4.2.2	Are the harvested produce which is morphologically thick, fleshy or of bigger size, cut or sliced into small/ thin pieces to ensure proper drying of the produce?	Major			
4.3	Drying				
4.3.1	Are the medicinal plant produce properly dried before packing for shipping or storage?	Major			
4.3.2	Where the delicate plant parts and aromatic parts constitute the produce, are they dried only under shade?	Major			
4.3.3	In case of open sun or air-drying, is the medicinal plant produce spread out in a thin layer?	Minor			
4.3.4	During drying cycles (sun drying or shade drying), are care taken to move the materials into covered/ partially covered spaces during evening hours?	Minor			
4.3.5	When artificial means of drying like oven or hot air used, is the procedure standardized?	Major			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
5	PACKAGING AND STORAGE				
5.1	Packaging				
5.1.1	Is the storage containers of medicinal plant produce provide protection from heat, humidity and temperature and not contaminate the produce?	Critical			
5.1.2	Is compaction/bale packing done while handling material in bulk (like Shankhapushpi, Bhringaraj, Bhumyamlaki etc) by using, manually/ mechanically operated compactors?	Minor			
5.1.3	Is each container of medicinal plant produce labeled properly?	Major			
5.2	Storage				
5.2.1	Are medicinal plant produce stored in a dedicated storehouse, constructed in such a way as to avoid entry of pest, birds and other animals and are free from dampness, dirt and dust?	Major			
5.2.3	Are sealed and labeled containers/ packages of medicinal plant produce kept in cool and dry place and on wooden pallets?	Major			
5.2.4	Are storage management-receipt, storage and issue/dispatch- properly followed?	Major			
5.2.5	Whether each lot contains month of collection on its label and FIFO (First in first out) is followed for its movement?.	Critical			
5.2.6	Is there a provision for separate climate (temperature and humidity) controlled facility to store hygroscopic material and volatile material?	Minor			
5.2.7	Is inflammable produce like resins,	Major			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
	gum-resins, oils etc. stored at isolated place in closed containers?				
6	MACHINERY AND EQUIPMENT USED IN DIFFERENT OPERATIONS				
6.1	Are the measuring equipments calibrated at prescribed schedules and calibration certificates / records maintained?	Major			
6.2	Are equipment used for digging, cutting, sorting, peeling and any other activity suitable and made of nontoxic material?	Critical			
6.3	Are equipment and tools, especially that come in contact with the produce clean and free from any potential contaminant like paint, lubricant etc., and are maintained in proper working condition to avoid cross-contamination?	Major			
7	DOCUMENTATION FOR IDENTIFICATION AND TRACEABILITY				
7.1	Identification				
7.1.1	Are packages/containers legibly labeled with product name, plant part, month and year of harvest and the name of collection centre?	Major			
7.2	Traceability				
7.2.1	Is the plant produce traceable to collection center from where it has been grown?	Critical			
7.3	Documentation				
7.3.1	Is the basic information about the plant species, area of collection, and time of collection, regulatory information etc., captured?	Critical			
7.3.2	Are all processes/events affecting quality of produce maintained?	Major			
7.3.3	Are documents on different agreements maintained?	Critical			
7.3.4	Are records of drying conditions and temperature range for artificial drying maintained?	Major			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
7.3.5	Are documents of all permissions taken from authorities maintained?	Critical			
8	TRAINING AND MONITORING				
8.1	Training and capacity building:				
8.1.1	Are training on (i) medicinal plants in general, (ii) good collection procedure, and (iii) hygiene procedure to be followed imparted to the collectors for ensuring the quality collection produce without any negative impact on the environment.	Major			
8.1.2	Are collectors aware of environmental impact of harvest of medicinal plant produce?	Major			
9	WORKERS HEALTH, SAFETY AND WELFARE				
9.1	Risk Assessments				
9.1.1	Do the collectors have a written risk assessment for safe and healthy working conditions?	Major			
9.1.2	Do the collectors have a written health, safety and hygiene policy and procedures?	Major			
9.1.3.	Is the health Status of Collectors assessed?	Major			
9.2	Training on health and safety				
9.2.1	Have collectors and staff received adequate health and safety training and are they instructed according to the risk assessment?	Major			
9.2.2	Is there always an appropriate number of persons (at least one person) trained in first aid present on each collection centre whenever collection activities are being carried out?	Major			
9.3	Hazards and First Aid				
9.3.1	Do accident and emergency procedures exist; are they visually displayed and communicated to all persons associated with the collection activities?	Major			
9.3.2	Are potential hazards clearly identified by warning signs and placed where appropriate?	Minor			

Paras	Control criteria	Level of compliance	Compliance		Remarks
			Yes	No	
9.4	Protective Clothing/Equipment				
	Are collectors provided with suitable protective clothing in accordance with legal requirements and/or label instructions or as authorized by a competent authority?	Major			
10	RECORD KEEPING AND INTERNAL SELF-ASSESSMENT/ INTERNAL INSPECTION				
10.1	Are all records requested during the external inspection accessible and kept for a minimum period of time of two years, unless a longer requirement is stated in specific control points?	Major			
10.2	Does the manager take responsibility to undertake a minimum of one internal self-assessment per year against the requirements of this standard?	Major			
10.3	Are effective corrective actions taken as a result of non-conformances detected during the internal self-assessment?	Major			

DEFINITIONS OF THE TERMS USED IN THIS STANDARD

1. **Chemotype:** Plants of the same species that is chemically different but otherwise indistinguishable.
2. **Collector:** Any person who harvests the medicinal plant produce from any live or dead medicinal plant species as part of his livelihood or for trade.
3. **Contamination:** The undesired inclusion of impurities of biological or non-biological origin into or onto medicinal plant produces during harvesting, processing, drying, packaging, storage or transport.
4. **Cross-contamination:** Contamination of medicinal plant produce with any other produce during harvesting, processing, drying, packaging, storage or transport.
5. **Foreign Matter:** Any matter found with medicinal plant produce, other than the medicinal plant produce itself. This also includes parts of the same medicinal plant other than the officially accepted plant part or parts.
6. **Genotype:** The genetic constitution (the genome) of a cell, an individual or an organism or Phenotypically dissimilar species with minor mutation when identify through DNA profiling or genotypes.
7. **Good Field Collection Practices-** The Good field collection practices for medicinal plant produce are practices that ensure proper quality of the produce while maintaining sustainable collection of wild medicinal plants.
8. **Herbal Formulation¹:** Herbal preparation obtained by subjecting the medicinal plants produce to treatments like – extraction, distillation, fractionation, purification, concentration, fermentation and blending. These include comminuted or powdered herbal drugs, tinctures, extracts, essential oils, expressed juices and processed exudates. Herbal formulation may be food, dietary supplement, medicine or a cosmetic preparation.
9. **Manufacturer:** A company or individual producing herbal formulations or extracts or active compounds using medicinal plant produce as the source material for such products.
10. **Medicinal Plant:** Any plant species including fungi, algae, lichen, fern, which is entirely or partly used, either alone or in combination, for therapeutic benefit or maintenance of health in humans, animals or both.
11. **Medicinal Plant Produce:** Any plant material - whole, fragmented or cut, usually dried but rarely fresh, obtained from a medicinal plant species, used for further preparation of

products or sold commercially. This includes but is not restricted to - whole plant, root, leaves, stem, wood, bark, fruit, seeds, flower, floral parts, exudates, gum and resin.

12. **Phenotype:** The physical appearance of an organism as distinguished from its Genetic wake-up.
13. **Phenological Stage:** Various phases of growth and development of plant in relation to season and microclimate of the habitat.
14. **Post-harvest Management:** Handling of the medicinal plant produce after it has been harvested from the mother plant until it is ready for the sale or further use.
15. **Primary Processing:** Washing, cutting, sorting, peeling, squeezing, brushing, drying and grading or any other such activity performed in making the medicinal plant produce usable.
16. **Standard Operating Procedure (SOP):** A written document having instructions for performing any operation.
17. **Sustainable utilization of medicinal plants:** The use of wild medicinal plants, in a way and at a rate that does not lead to the long-term decline of the species, thereby maintaining its potential to meet the needs and aspirations of present as well as the future generations .
18. **Sustainable Harvesting:** The use of plant resources at such levels of harvesting and in such ways that the plants are able to continue to supply the desired produce in perpetuity.
19. **Wild Medicinal Plant:** Any medicinal plant growing in wild either on its own or as part of systematic propagation and any other resource management interventions.

GUIDELINES FOR COLLECTION AND POST-HARVEST MANAGEMENT OF VARIOUS CATEGORIES OF MEDICINAL PLANT PRODUCE

The whole plant is used as a medicinal plant produce only in a few cases. Often it is one or more part like root, bark, stem, leaves, flowers, fruits, seeds of the species, which constitute the officially accepted produce. While the general guidelines for harvesting and post-harvest management are applicable to any collected part, the specific plant parts need additional care, Annex E.

Ancient science, like Ayurveda, recommends collecting different parts of the plants in different seasons. This was perhaps done keeping in view the optimum activity of herbs when harvested at a specific season. Further, collecting the parts from the plant at a season when it causes the minimum harm to the plant is also important.

It is recommended that a detailed SOP should be written for each category of produce in order to minimize the harm to nature and to optimize the quality of the produce. Some of the important points, which need to be taken care of while harvesting various categories, are given below.

5.1. Underground parts

- 6.1.1 The roots of annual plants must be dug when the plants are well developed and mature.
- 6.1.2 Roots of perennials should be harvested late in the fall or early in the spring. Roots of biennial should be collected in either the fall of the first year or spring of the second year.
- 6.1.3 The root material that is rich in essential oils should be handled carefully to prevent bruising of the epidermis, where the oils typically reside, which could result in loss of essential oil or its degradation.
- 6.1.4 Unless otherwise required for any specific species, underground parts like roots and rhizomes should be collected only after the seed shedding. It also facilitates regeneration of species.
- 6.1.5 Where taproot is the desired produce and needs to be uprooted, harm to other plant species in the vicinity should be minimized. Underground parts should be collected with minimum possible digging by using appropriate tools.
- 6.1.6 When roots of species that are propagated vegetatively in nature are collected, enough underground part should be left at site to allow regeneration.
- 6.1.7 It must be ensured that underground parts are thoroughly washed and thereafter dried to reduce the moisture content before packing the produce.

6.2 Annual herbs/ Whole plants

- 6.2.1 When collecting whole herbaceous plant, or its aerial parts, the harvesting should be done at flower bud or flowering stage but prior to any visual decline in any of the plant parts.
- 6.2.2 Whole population in a given area should never be harvested. Adequate population should be left in nature for regeneration to facilitate future collections.
- 6.2.3 Use of mathematical procedures including computer software to estimate collection of individuals from a population may be resorted when target area is large to ensure even harvesting throughout the habitat.
- 6.2.4 Annuals, especially small herbs, creepers, grasses are more prone to contamination as well as cross-contamination. It is easier to sort the annuals immediately after the collection rather than after drying.
- 6.2.5 Aromatic plants and delicate parts like pistils or stamens of the other plants should not be dried in direct sunlight. If these are collected in wet conditions, they should be shifted to the shade as soon as the external moisture has been removed.

6.3 Stem Bark

- 6.3.2 Stem bark should not be harvested when the tree is under new growth (like spring season)
- 6.3.3 As far as possible, the bark should be collected from mature branches of the trees leaving the main trunk intact. Bark from entire branch or trunk should not be taken at one time.
- 6.3.4 Girdling of trees or branches by removing the bark all the way around should not be done, unless the tree is to be felled for other purposes like, timber. Bark should be stripped longitudinally (partially along the length of the stem) to allow smooth conduction of water and nutrients.
- 6.3.5 Stem bark should not be collected again from same tree unless adequate time has been allowed for it to be reformed completely. It should not be collected from immature trees or branches
- 6.3.6 The rhytidome (outer dead bark) should be removed except where it is the usable part of the produce
- 6.3.7 The bark should be split in pieces of appropriate size to ensure complete drying
- 6.3.8 Unless otherwise required in specific cases, barks should be dried in direct sunlight

6.4 Stem or wood

- 6.4.2 Only select mature branches of a tree or shrub should be harvested at a time. The branches from the same plant should not be harvested every year. Where the trunk is used as medicinal produce, the main axis should be harvested.

- 6.4.3 The produce should be cut in smaller pieces to facilitate faster drying, packaging and storage of the produce. In case of wood, the material can be made into small chips or shavings to facilitate drying and packaging.
- 6.4.4 Unless otherwise required in specific cases, stems and woods should be dried in direct sunlight.

6.5 Leaves

- 6.5.1 The leaves of herbaceous plants should be collected before their flowering, unless otherwise specified. As far as possible, leaves should be collected from mature trees. Where bio-active contents in the leaves do not fluctuate with age, the collection could be extended to later stage also.
- 6.5.2 The source plant should not be ripped off the leaves completely. Certain percentage of leaves should be left to ensure normal physiological processes of the plant.
- 6.5.3 Trees, shrubs or their branches should not be chopped to facilitate the collection of otherwise inaccessible leaves.
- 6.5.4 Tender leaves should not be harvested unless they constitute the officially recognized produce. Leaves turned pale, those infected, deficient and unhealthy should be discarded.
- 6.5.5 Generally leaves should not be dried in direct sunlight, unless they have external moisture, in which case they may initially be dried in direct sunlight for some time and be shifted to shade or indirect sunlight as soon as the external moisture is wiped dry. The produce should be turned periodically while drying to facilitate faster and even drying.
- 6.5.6 Packing of the leaves should be done after ensuring the complete drying. Even a small amount of moisture present in some leaves, may invite fungal contamination and spoilage of whole lot.
- 6.5.7 Leaf material rich in essential oil must be handled carefully to avoid bruising of the leaves that could result in loss of essential oil or its degradation.
- 6.5.8 The leaves should be harvested during the season when growth and leaf production is the highest.
- 6.5.9 When environmental conditions are stressful for the plants leaf harvesting should be postponed or should be harvested in less quantity.
- 6.5.10 If the leaf size is decreasing the rate of harvest should be lowered as it indicates stressful condition.
- 6.5.11 If the plant size in a population appears to be decreasing, even if vegetative sprouting is increasing (i.e. the population is becoming dense), the rate of harvest should be lowered.
- 6.5.12 The rate of harvest should be decreased if there is heavy pressure from grazing, fire or other incidents that may negatively affect the plants.

6.6 Flower and floral parts

- 6.6.1 Flowers must be harvested (or if specified, flowering tops) when they have just opened or shortly afterwards to capture its aroma.
- 6.6.2 The flower buds must be collected before the buds open and in early morning hours. In this case the departure of insects must be encouraged by shaking the materials.
- 6.6.3 The flowers rich in essential oils must be handled carefully to prevent bruising that could result in essential oil degradation.
- 6.6.4 All the flowers from perennials like shrubs, trees and climbers should not be harvested completely. Similarly, flowers from a complete population of annual plants should not be collected at a time. Enough flowers must be left over the plants to allow the natural process of pollination, fertilization, fruit/seed formation and dispersal.
- 6.6.5 Floral parts like stigma, anthers, petals etc should be collected at appropriate time of their maturity to ensure the availability of desired active substance.
- 6.6.6 The delicate flowers and floral parts should not be dried in direct sun light. Flowers that are fleshy (like *Madhuca indica*) may be initially dried in sun to get rid of surface moisture and shifted to shade or indirect sunlight afterward.
- 6.6.7 Medicinal plant produce consisting of flowers and floral parts should be packed in moisture resistant well-protected containers, away from direct sun light.

6.7 Fruits and seeds

- 6.7.1 Fruits and seeds should be collected only on maturity unless immature ones constitute the medicinal produce (e.g. *Embllica officinalis*, *Aegle marmelos*) except the fruit of family Apiaceae that dehisce on drying should also be collected before maturation .
- 6.7.2 In case of shrubs and trees, all the fruits from individual plant should not be collected at a time leaving behind a few healthy ones for further multiplication of the species. Similarly, the whole population of annuals should not be ripped off all the fruits and seeds at a time.
- 6.7.3 Trees, shrubs or their branches should not be cut for ease of collection of fruits and seeds
- 6.7.4 Immature, infected and deformed fruits should be separated and discarded appropriately
- 6.7.5 If the medicinal plant produce consists of fresh fruits (e.g. *Phyllanthus emblica*) the same should be transported to cold storage or pulping units immediately after harvesting.
- 6.7.6 Wherever required, seeds should be removed completely from the fruit rind before they are traded

- 6.7.7 As per the need of the produce, fruits may be split or cut into small pieces to facilitate drying and packaging
- 6.7.8 Complete drying of fruits should be ensured before they are packed. Randomly selected individuals fruits should be dissected to ensure that there is no inherent moisture left.

6.8 Gums and resins

- 6.8.1 Collectors/collection managers should ensure minimum harm to the mother plant while collecting the exudates. Only a few small longitudinal incisions should be made to collect the exudates and the exposed parts should be treated appropriately to avoid any fungal or bacterial infestation after the exudates has been collected.
- 6.8.2 Incisions, too close to the ground, easily approachable by the cattle and wild animals, should be avoided. The collection container should be designed in a way to prevent rain, bird droppings and any other such possible contaminations.
- 6.8.3 Where there is a likelihood of some foreign matter being mixed with the collect gums and resins, it should be carefully removed.
- 6.8.4 Source tree or shrub should be allowed appropriate recovery period before collecting the exudates again from them
- 6.8.5 Most of the gums and resins, being inflammable, should be packed in appropriate containers and stored at isolated places. The containers of resins like Damar (*Shorea robusta*) and Saral (*Pinus longifolia*) should be labeled as “Inflammable Material”, while on transit and storage.
- 6.8.6 No fire should be ignited near the base of the tree to increase gum/resin flow.
- 6.8.7 Younger trees should not be tapped. The girth of the trees has to be decided below which tapping of gum/resin will not be allowed.
- 6.8.8 Flow of gum is more in hot weather. Therefore, tapping in such species, should be done between June-October.
- 6.8.9 Long sharp cut blazes are best as they give pure resin/gum and the bark heals faster. Irregular cuts add impurities to the resin. Long cuts are better as they provide more area for exudation and heal faster. Square and round cuts take longer time to heal as the distance between the two walls is more.
- 6.8.10 Sharp knives or chisels can be used to make blazes.
- 6.8.11 Instead of letting the gum or resin solidify on the bark, it is better to fix a collection trough e.g. coconut shell, hollow bamboo etc.
- 6.8.12 On the same tree more than one blaze is made, these should be staggered for optimum exudation. After 3 years of tapping, sufficient rest should be given to the tree to rejuvenate from the injury.

6.9 Others (Galls, Lac etc.)

- 6.9.1 Galls should be collected only from stipulated species (Karkatshringi from *Pistacia intergerrima*).
- 6.9.2** Collectors must ensure that no live insects are present inside the galls Post harvest management of galls should be done at an isolated place and the content should be packed and stored appropriately so as to avoid possible infestation of other produce

RECOMMENDED PACKAGING FOR MEDICINAL PRODUCE

Type of the Produce	Packaging Options
Woody in nature – roots, stem, wood, woody bark etc.	<ol style="list-style-type: none"> 1. Gunny Bags 2. Jute Bags 3. Woven Sacks
Annual whole herbs, creepers, twiners, leaves, etc.	<ol style="list-style-type: none"> 1. Woven sacks with low density liner 2. Jute bags
Fleshy materials-fleshy rhizomes (e.g. Shatavari), fruit rinds (Kokum butter) of flowers (Mahua)	<ol style="list-style-type: none"> 1. Jute bags with high gauge polyethylene liners 2. Woven sacks with high gauge polyethylene liners
Delicate flowers and floral parts – Anthers, Stigma, Petals etc.	<ol style="list-style-type: none"> 1. Corrugated box with polyethylene liners 2. Card-board box with woven sacks
Gums and resins	<ol style="list-style-type: none"> 1. Air-tight Plastic drums 2. Corrugated box with polyethylene liners
Aromatic plant produces	<ol style="list-style-type: none"> 1. Air tight High Density Polyethylene (HDPE) containers 2. Fiber board drums with polyethylene liners

ANNEX D**INFORMATION ON CONTAINER LABEL**

The Label of the container of medicinal produce should bear following information

1. Name of the produce		2. Grade, if any	
3. Quantity		4. Date of receipt (from Collector)	
5. Month of collection		6. Collected from	
Signature of the Store Manager		Date:	

PASSPORT DATA SHEET FOR MEDICINAL PLANT PRODUCE

Name of Produce and grade, if any:		Plant Source:	
Part used:		Quantity harvested: (Dried produce)	
Collected by:		How was the produce dried:	
Collected from (give name of region/ forest/ community land, along with village, Taluka, District and State)			
Period during which the produce was collected		Moisture content at the time of packaging	
Does the species need prior permission to collect from wild		Name of the authority who has given the permission	
Phenological state of the plant when collection of produce was undertaken			
Any other information on produce:			

ANNEX F

HARVESTING TIME OF SELECTED MEDICINAL PLANTS

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
<i>Abies webbiana</i>	Talishpatra	Leaves		√	√	
<i>Acacia chundra</i>	Khadir	Wood				√
<i>Acacia nilotica</i>	Babool	Bark			√	
<i>Achyranthes aspera</i>	Apamarga	Whole Plant	√			
<i>Aconitum ferox</i>	Ativisha	Rhizome			√	
<i>Aconitum heterophyllum</i>	Atish	Rhizome			√	
<i>Acorus calamus</i>	Vacha	Rhizome		√		
<i>Adhatoda vasica</i>	Adusa	Leaves	√			
<i>Aegle marmelos</i>	Belgiri	Fruit	--	√		
	Belchhal	Bark	√	--		
<i>Alpinia galanga</i>	Kulinjana	Rhizome			√	
<i>Alstonia scholaris</i>	Saptaparni	Bark		√		
<i>Andrographis paniculata</i>	Kalmegh	Aerial Parts	√			√
<i>Aquilaria agallocha</i>	Agaru	Stem		√		
<i>Argyreia speciosa</i>	Vidhara	Root		√		
<i>Asparagus adscendens</i>	Safed Musli	Root			√	
<i>Asparagus racemosus</i>	Shatawari	Root			√	
<i>Azadirachta indica</i>	Neem	Leaves		√		--
		Bark		--		√
<i>Barringtonia acutangula</i>	Hizzal	Seeds			√	

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
<i>Berberis aristata</i>	Daruhaldi	Roots/Ste m			√	
<i>Blepharis edulis</i>	Utigan Beej	Seeds	√	√		
<i>Boerhaavia diffusa</i>	Punarnava	Aerial Parts Root		√ √	√	
<i>Boswellia serrata</i>	Sallaki	Gum-resin	√			√
<i>Butea monosperma</i>	Palash	Seeds	√			
<i>Calotropis procera</i>	Arka/Aak	Leaves	√			
<i>Calotropis gigantea</i>	Arka/Aak	Leaves	√			
<i>Carthamus tinctorius</i>	Kusum Phol	Floral parts	√			
<i>Cassia angustifolia</i>	Senna	Leaves Pods	√ √		√ √	
<i>Cassia fistula</i>	Amaltas	Fruit		√		
<i>Cedrus deodara</i>	Devdar	Wood		√	√	
<i>Celastrus paniculata</i>	Malkagini	Seed		√		
<i>Centella asiatica</i>	Mandookparni	Leaves			√	
<i>Cichorium intybus</i>	Kashni	Root Seeds	√			√ √
<i>Cinnamomum tamala</i>	Tejpatra	Leaves	√			√
<i>Cinnamomum verum</i>	Dalchini	Bark		√	√	
<i>Cissus quadrangularis</i>	HarhJORH	Stem			√	
<i>Clerodendrum serratum</i>	Bharangi	Bark			√	
<i>Commiphora wightii</i>	Guggulu	Gum-resin				√
<i>Crataeva nurvala</i>	Varun	Bark			√	√

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
<i>Crocus sativus</i>	Keshar	Stigma				√
<i>Curculigo orchioides</i>	Kali Mushli	Rhizome	√	√		
<i>Cyperus rotundus</i>	Mustaka	Rhizome			√	
<i>Desmodium gangeticum</i>	Shalparni	Aerial parts			√	
<i>Dioscorea bulbifera</i>	Varahikand	Tuber		√		
<i>Eclipta prostrata</i>	Bhringraj	Whole Plant		√		
<i>Embelia ribes</i>	Vidanga	Fruit				√
<i>Ferula asfoetida</i>	Heeng	Gum-resin	√	√		
<i>Ficus benghalensis</i>	Vata/Bargad	Bark			√	√
<i>Ficus carica</i>	Anjeer	Fruit		√		
<i>Ficus racemosa</i>	Udumbar	Bark			√	√
<i>Ficus religiosa</i>	Peepal	Bark			√	√
<i>Gmelina arborea</i>	Gambhar	Bark			√	√
<i>Gymnema sylvestre</i>	Gurmar	Leaves			√	
<i>Hedychium spicatum</i>	Karpoorkachri	Rhizome	√			
<i>Hemidesmus indicus</i>	Anantmool	Root	√			
<i>Holarrhena antidysenterica</i>	Kutaz Indarajava	Bark Seed	√			√
<i>Hyoscyamus niger</i>	Khursani Ajwain	Seed		√		
<i>Inula racemosa</i>	Pushkarmool	Root			√	
<i>Ipomoea digitata</i>	Kshir-vidari	Tuber			√	√
<i>Madhuca indica</i>	Mahua	Flowers	√			

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
<i>Martynia diandra</i>	Kakanasha	Fruits			√	
<i>Mesua ferrea</i>	Nagkeshar	Stamen	√			
<i>Mimosa pudica</i>	Lajwanti	Whole Plant	√			
<i>Mimusops elengi</i>	Vakula	Bark			√	
<i>Moringa oleifera</i>	Sahajana	Fruit	√			
<i>Mucuna pruriens</i>	Kaunch Beej	Seed	√			
<i>Myrica esculenta</i>	Kaiphal	Bark		√	√	
<i>Myristica fragrans</i>	Jaiphal	Fruit		√	√	
<i>Nardostachys jatamansi</i>	Jatamansi	Rhizome				√
<i>Operculina turpethum</i>	Nishoth	Root			√	
<i>Oroxylum indicum</i>	Syonaka	Barks				√
<i>Parnelia perlata</i>	Chharila	Ascolichen		√	√	
<i>Phyllanthus emblica</i>	Amla	Fruit/Seed				√
<i>Picrorrhiza kurroa</i>	Kutki	Rhizome			√	
<i>Piper longum</i>	Pippali	Fruit	√			
<i>Plumbago indica</i>	Chitrakmool	Root	√			√
<i>Plantago ovata</i>	Isabgol	Seed	√			
<i>Podophyllum hexandrum</i>	Bankakri	Rhizome		√		
<i>Premna integrifolia</i>	Agnimantha	Stem			√	√
<i>Psoralea corylifolia</i>	Bakuchi/Somraj i	Seeds				√
<i>Pterocarpus marsupium</i>	Vijayshal	Heart wood			√	
<i>Pterocarpus santalinus</i>	Raktachandan	Heart	√			√

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
		wood				
<i>Rauwolfia serpentina</i>	Sarp Gandha	Root		√	√	
<i>Rheum australe</i>	Rewandchini	root			√	
<i>Rubia cordifolia</i>	Manjishtha	Stem			√	√
<i>Santalum album</i>	Chandan	Wood			√	√
<i>Sapindus mukorossi</i>	Reetha	Seed				√
<i>Saraca asoca</i>	Ashoka	Bark			√	
<i>Saussurea costus</i>	Kutha	Root			√	
<i>Sida cordifolia</i>	Bala	Leaves	√			√
<i>Solanum anguivi</i>	Vrihati	Root & Stem	√	√		
<i>Solanum nigrum</i>	Makoy	Fruit Whole Plant	√ √			
<i>Solanum virginianum</i>	Kantkari	Whole Plant	√			
<i>Spheranthus indicus</i>	Mundi	Fruits	√	√		
<i>Swertia chirayita</i>	Chirata	Whole Plant			√	
<i>Syzygium cumini</i>	Jamun	Seed Bark		√	√	
<i>Syzygium aromaticum</i>	Lavanga	Floral buds				√
<i>Taxus baccata</i>	Thuner	Leaves			√	
<i>Tephrosia purpurea</i>	Sarpaunkha	Whole Plant			√	
<i>Teramnus labialis</i>	Mashparni	Aerial			√	

Name of the herb	Local Name	Part Used	Season for Collection*			
			February to April	May to July	August to October	November to January
		parts				
<i>Terminalia arjuna</i>	Arjuna	Bark	√			√
<i>Terminalia bellirica</i>	Vibheetaki	Fruit	√			
<i>Terminalia chebula</i>	Hareetaki	Fruit	√			
<i>Tinospora cordifolia</i>	Guduchi	Stem	√			
<i>Tribulus terrestris</i>	Gokharu	Fruit				√
<i>Uraria picta</i>	Prishniparni	Aerial Parts			√	
<i>Valeriana jatamansi</i>	Tagar	Root			√	
<i>Vetiveria zizanioides</i>	Khash/Ushir	Root			√	
<i>Vigna triloba</i>	Mudgaparni	Aerial parts			√	
<i>Viola odorata / V.serpens</i>	Vanafsha	Flower				√
<i>Withania somnifera</i>	Ashwagandha	Roots	√			
<i>Woodfordia fruticosa</i>	Dhataki	Flowers	√			
<i>Zanthoxylum armatum</i>	Timru/Tejbal	Fruits			√	√
<i>Zingiber officinalis</i>	Sunthi/Adrak	Rhizome				√
<i>Zizyphus fruticosa</i>	Vadari/Ber	Fruits	√			

*: Collection time may vary according to various geo-climatic conditions

Source: Dabur Research Foundation & TRAFFIC India, General guidelines for harvesting and processing Ayurvedic Medicinal Plants (AMP's)

INDEX OF ABBREVIATIONS

ASU: Ayurveda, Siddha & Unani

AYUSH: Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy

BfN: Bundesamt für Naturschutz

BSI: Botanical Survey of India

CBD: Convention on Biological Diversity

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

DFO: Divisional Forest Officer

FRI: Forest Research Institute (Dehradun)

GACP: Good Agriculture and Collection Practices

ISSC-MAP: International Standards for Sustainable Wild Collection of Medicinal and Aromatic Plants

IUCN: The World Conservation Union

(Formerly International Union of Conservation of Nature and Natural Resources)

MoEF: Ministry of Environment and Forests

NMPB: National Medicinal Plants Board

RET: Rare, Endangered and Threatened (Species)

SOP: Standard Operating Procedures

TRAFFIC: Trade Record Analysis of Fauna and Flora in Commerce

WHO: World Health Organization

WWF: World Wild Fund for Nature