

## NEED, CHALLENGES AND VALUE ADDITION METHODS IN CULTIVATION OF MEDICINAL PLANTS – A REVIEW

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### ABSTRACT

World needs eco-friendly system for sustainable to need develop agriculture technique, which is need of present era. It is very important that a system of standardization is established for every medicinal plant in market because the scope for variation in different batches of medicine is enormous. There is a global upsurge in the use of traditional and complementary systems of medicine. For conservation of medicinal plants one should consider a brief study in between cultivation or naturally available plants and its increased demand in pharmacy industry. The IUCN (International union for conservation of nature and natural resources) red list of threatened species included a total of 560 plants, in India out of which 247 species are in threatened category and on the other hand due to this a great advantage is there a lot of awareness has been created globally about herbal medicine. In this study describe the modern conventional agriculture farming system like Organic Farming, Biological Farming, Nature farming, etc. which included in sustainable agriculture. Crop management for cultivation like field preparation, sowing, transplanting, manures, fertilizers, irrigation, weeding, intercultural operations, crop protection, Harvesting, packaging, storage and transportation these methods are used which describe in this study. With the help of these techniques for obtaining more potent and authenticate Ayurvedic formulations as well as medicinal drugs. By using these techniques we can overcome challenges to improving good agricultural practices and yield the crop of medicinal plants in large quantity to enhance the potency of raw drugs.

**Keywords:** Standardization, Medicinal plant, Agriculture farming, Cultivation, Ayurvedic formulations.

### INTRODUCTION

The journey of Medicinal plants and their derivatives are thus looking upon not only as a source of affordable healthcare but also as an important commodity item of international trade and commerce. Guidelines for Good Agricultural Practices of medicinal plants traded and use in production of raw material that goes in to the

making of the ASU medicines and standardize the production processes from farm to factory. Primarily 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 in-situ but also their

cultivation outside the Forest areas in public and private lands. For conservation of medicinal plants one should consider a brief study in between cultivation or naturally available plants and its increased demand in pharmacy industry. Still today practitioners as well as pharmacy industries definitely depends upon traditional methods for collection of medicinal plants. So to balance its demand and need it is our duty to aware students, researchers as well as farmers for conserving herbal plants Due to this global demand and marketing the medicinal plant is on the verge of extinction. So now it is burning issue regarding medicinal plants. It is time to create awareness in the society as well as in the marketing sector to avoid its negative effect such as over harvesting of globally demand species of medicinal plants that result into extinction of medicinal species. [1-5]

**Aim:** Identify and highlights all such problems and issues from source raw material to finished product available in market.

**Objective:**

1. To identify various methods and techniques for cultivation of medicinal plants.
2. To find out techniques for standardization of raw material to finished product available in market.

**Material & Methods:**

Information collected from reference books, journals, practical experience and knowledge from Agricultural expert, botanist, farmer etc. Systematic arrangement based on applicability with view of marketing of medicinal plants.

**Observation & Result:**

Pharmaceutical study and nutrient profile should be obtained to decide the nature and quantity of soil amendments required usual quality for crop management. For standardization of raw drug management for cultivation like raw material, source identification, proper storage condition,

manufacturing, processed material, packaging and storage, finished product, marketing and lastly Value addition process these used methods describe as following

**I. Cultivation of Medicinal Plants:** Improving the varieties of medicinal plants and fast development of technology for increasing production without given due importance to the agro-ecosystem balance resulted in disturbed natural cycle of carbon, nutrient and food chain of flora, thus results are visible in form of decreasing yield and increasing unsustainability in agro-ecosystem There are many aspects of modern conventional agriculture farming system included in sustainable agriculture describe as below

**Organic Farming:** It is most widely alternative farming system, modern organic farming evolved as an alternative to chemical agriculture. Basically it is production system, which largely excludes use of synthetically compounded fertilizers, pesticides and growth regulators. In 1980, U.S.A. released a landmark report on organic farming.

**Biological Farming:** The Reams fertility system has become synonyms of biological farming as basis of crop production. Eco-agriculture is the term used to describe this system. This system is based on Lamotte –Morgan soil test and use of phosphate, calcium carbonate and compost to achieve nutrient ratio of 7:1 calcium to magnesium, 2:1 phosphorous to potassium etc. In this farming system the use of selected chemical fertilizers and adopts low inputs approaches to use of insecticides, herbicides, etc.

**Nature farming:** This method of farming for cultivation of medicinal plants was developed in 1930 by Mokichi Okada. In this method parallel to organic farming in many way but include special emphasis on soil health through compost without chemical fertilizers. In this methods use of microbial preparation in addition to traditionally, it is most active method for cultivation of medicinal plants now this period.

**Alternate agriculture farming:** The board on agriculture of the National Research Council of the United States in 1989 develops to this moment with the publication of a detailed study known as Alternative agriculture farming methods. It is not single system of organic farming, representative or sustainable farming. These systems share an emphasis on management practices and on biological relationship between organisms. This method of agriculture farming recognizes that a piece of land on which crop plants are grown is first and foremost an ecosystem.

**Ecological agriculture farming:** This agriculture farming methods based on gravity of the environmental degradation, arising from faulty practices has set several experts in the field to focus attention on ecologically sound, viable and sustainable farming systems. Scientific and policy conference on this issue, the sustainable farming methods are yet to get the approval of most agriculture scientists. In this technique at least two to three seasons will be needed for the transition and the farmers could build up sufficient organic base to fertilize the fields and improve the productivity of the soil. Ecological balance is attained and beneficial organisms to check the explosion of pests and pathogens, crop yields of high order ensured. <sup>[1-3]</sup>

#### **Crop and soil management in Cultivation of Medicinal Plants:**

The procedures like Field preparation, Sowing and transplanting, Manures and Fertilizers, Irrigation, Weeding, Intercultural operations, Crop protection, Harvesting, Primary processing, Packaging, Storage and Transportation are useful techniques for Crop and soil management in Cultivation of Medicinal Plants. The latest soil test report on physico-chemical parameters and nutrient profile should be obtained to decide the nature and quantity of soil amendments required. The site must be in proximity to a reliable source of irrigation water. The quality of irrigation water should have been adequately understood and classified in the context of both soil

type and the target crop in terms of total salt concentration, Sodium absorption ratio, Bicarbonate and Boron concentration etc. When the end-product is required to conform to standards of residual contaminants, the irrigation water must be analyzed for heavy metals and residual pesticides also. The grower should identify the best possible environment where the plant can express its full potential in terms of both quality and quantity during its entire growth period. <sup>[2-3]</sup>

#### **Value Addition methods in Cultivation of Medicinal plants:**

Value addition of the medicinal plants can be achieved directly by improving the quality of the cultivated or collected plant material and indirectly by quality assurance of the plant material or the semi-processing of the material to a value added product. The active principle contained in every medicinal plant consists of a number of compounds having specific action on organ. Value addition of the medicinal plants can be achieved directly by improving the quality of the cultivated or collected plant material and indirectly by quality assurance of the plant material or the semi-processing of the material to a value added product. Value Addition methods in Cultivation of Medicinal plants is essential for the medicinal value of the raw drugs and commercial exploitation. The raw material is liable to be rejected or accepted at very low price causing not only economic loss to the cultivators or collectors of the medicinal plants which is totally depend on to make use of its latent medicinal qualities by using different methods of value addition. Different methods having devised to extract these substances either individual or collectively depending on result, generally following procedures are used.

**Active constituents:** There are number of chemical tests are available for quantification of active ingredients, some of them are minerals, alkaloids, volatile oils, anthraquinones, coumarins, tannins, phenols, saponins, cardiac glycosides, flavonides,

mucilage etc. which are use for to recognize active principle in medicinal plants, it is very essential for improving value addition of cultivated medicinal plants. The quantification of active ingredients which is starting stapes for standardization of raw drugs.

**Extraction:** It is suitable methods for obtaining the active principles when the part of the plant is being used are such as leaves bud or flowers. In certain cases it is preferable except in certain cases to use herb that have been faintly dried, as the diminution of water content which having focus to the standard constituent. This procedures allows retention of numerous of the volatile principle with extensive knowledge of medicinal plants and their compound.

**Decoction:** The medicinal herbs whose active principle having thorny to extract for that types of herbs used this method because these are enclosed in woody parts of the herb, which required extend heating in arrange to pass into solution. Occasionally, the extraction by decoction need boiling whole part of plant or part of it in water for a specified moment and allowing it to macerate for extra time before filtering. In high mucilaginous content herbs this methods is very useful. A considerable deviation of this method is to immerse the plant earlier in cold water for a specific time which depending on the drug required thus, make extraction easier at the decoction stage.

**Maceration:** The medicinal herbs whose active principle having soluble in cold water for that types of herbs used this method because in cold water few hours during, which period all the values that do not require heat to release them and will be release in solution means that are not thermo labile. The yield of mucilage since definite herbs superior when extraction is carried out by means of cold maceration. This methods used in the pharmaceutical industries probably now this time.

**Dehumidifying:** It is costly but valuable method to dry herbs. In this method literary sucks water out of

the plant. The Dehumidifier should be placed in a more or less preserved small room in which the herbs are placed on mesh trays. With the help of this method quickly dry the herbs and there is no used heat.

[1-2]

### III. Standardization

In the pharmaceutical laboratories standardized raw drugs having tested for quality and quantity and the drug is liberate for use only if the quality control laboratories of the pharmaceutical house approve the batch in question. The system of standardization is very essential for every medicinal plant in the market because of scope for variation in various group of drug is massive. The medicinal raw material is prepared for consequent use, which is very important to carry out assessment to check that the values being maintain. The therapeutic effect of medicinal plant material according to different places of collection in different period in a year and with collection at same time and places but in different years and with different environmental factors, surrounding the cultivation of a particular medicinal plant. Due to these variability, the fact is that in herbal drug several plants may be used together in the same preparation to ensure quality of preparation. For standardization of medicinal plant macroscopic, microscopic, physiochemical and biological methods are used. It is necessary that the isolated plant useful parts, such as root, rhizome, tuber, bulbs, leaves, seed, etc procured from the market are to be identified through pharmacognostic standards for each herbal drug.

#### Macroscopic and Microscopic examination

The drug is evaluated by means of sense organs, it include odour, colour, shape, size, surface characteristics, texture, fracture and appearance of the cut surface. these characteristics are judged subjectively and substitutes or adulterants may closely resemble the genuine material, it is often necessary to substantiate the findings by microscopic analysis. It is essential for accurately

identification of drug also know their adulterant. Microscopic examination is of immense value in plant drug standardization. Microscopic assessment of medicinal plant materials is crucial for the identification of powdered materials.

#### **Moisture**

In medicinal plant materials excess of water will promote microbial expansion and also causes deterioration following hydrolysis. This is especially important for materials that absorb moisture or depreciate quickly in the presence of water. The test for loss on drying can be carried out either by heating in desiccators over phosphorus pentoxide for a particular phase of time.

#### **Foreign Matter**

Plant component other than drug is considered as foreign material. Plant material should also be free from soil, stones, dust, insects, and other animal contamination. For some medicinal plant materials where the foreign matter may closely resemble the material itself, it may be necessary to take a pooled sample of the plant material and apply a critical test, either chemical, physical or by microscopy. The proportion of foreign matter is calculated from the sum of portions that fail to respond to the test.

#### **Ash Content**

This is an essential character for drug evaluation. Different ash values are commonly useful for evaluation total ash value, acid insoluble ash and sulphated ash. This procedure describe in pharmacopoeias. Explosion of medicinal plant material yield total ash constitute from the plant tissue and irrelevant matter adhering to the plant ash. Acid insoluble ash represents sand and silicious earth.

#### **Extractives**

It is the amount of soluble constituents extracted with solvents like alcohol and water from a given amount of medicinal plant material. It is employed for materials for which as yet not suitable chemical or biological assay exists.

#### **Pesticide Residues**

Pesticide residues accumulate from biocidal agrochemicals and fumigants use for spraying and treating soil to control pests particularly insects and fungi during cultivation of economic plants and during storage. Since many medicinal preparations of plant origin are taken over long periods of time, which is recognized by Food and Agricultural Organization (FAO) and the WHO. There are many pesticides like DDT, BHC, toxaphene, etc are persistent in nature and remain inside the plant for long time and cause harmful effect after ingested.

#### **Microbial contamination**

Storage of plant material causes contagion and microbial growth. The poisonous microorganism Aflatoxins producing microbial contamination. It causes health hazards if immersed even in small amount, therefore plant material should be protected from microbial contamination and should be suitably cleaned before use. Current practices of harvesting, handling and production may cause additional contamination and microbial growth. The determination of *Escherichia coli* and moulds may indicate the quality of production and harvesting practices.

#### **Determination of Heavy metal**

Medicinal plant material with arsenic and heavy metals contamination like cadmium, lead, etc are generally attributed to environmental pollutions due to contamination of these heavy metals in medicinal plants should be avoided and it should remain within the prescribed specification.

#### **Radioactive contamination**

According to WHO guideline should be followed to limit the radioactive contamination level in herbal medicinal products. Particularly products are irradiated before packing sterilization is essential because of to protect finished products from radioactive contamination.<sup>[6-10]</sup>

#### **Need and areas for Improvement:**

Government authorities to develop effective strategies to support improved cultivation, quality controls systems, provision of high quality planting

materials, and then encouragement of investments in new technologies. Undertake a more in-depth global overview of the demand and supply of medicinal plants, herbal products and herbal drugs in order to clarify market issues, and consider more effective solutions. Developing countries should aim to cultivate their resources in a sustainable manner and enter markets at the early stages of the value chain by first supplying developed country manufacturers with unprocessed raw materials. Identify products which would be most amenable to sustainable commercial development and industrial processing in the supplying countries. Reduce the number of intermediaries involved in the distribution and marketing chain and increase the negotiating power of the producers and collectors. Improvements are needed in the areas of post collection handling, value addition and product presentation. Research and development on the chemical composition and the effect of poor practices on the active ingredients of the selected species. Value-addition through processing, and improved marketing of the medicinal plants. It is also important that the benefits of the expanded interest in medicinal plants be more equitably shared. Value-addition through processing, and improved marketing of the medicinal plants. It is also important that the benefits of the expanded interest in medicinal plants be more equitably shared.<sup>[4-5]</sup>

## CONCLUSION

With the help of these techniques for obtaining more potent and authenticate Ayurvedic formulations as well as medicinal drugs. A well-drained fertile soil with optimum level of water holding capacity and productivity status should be used for medicinal plants cultivation. By using these techniques we can overcome challenges to improving good agricultural practices and yield the crop of medicinal plants in large quantity to enhance the potency of raw drugs. Due to unavailability of raw drugs for collection in the natural environment of medicinal and aromatic plants can be expected to lead to increased costs for plant material until cultivation systems are in place.

Crop management for cultivation like field preparation, sowing, transplanting, manures, fertilizers, irrigation, weeding, intercultural operations, crop protection, Harvesting, packaging, storage and transportation these methods are used.

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