

# An Analysis of the Preservation of Medicinal Plants

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**Abstract:** *Indians have employed Ayurveda, or "traditional medicine of India" according to the WHO, for millennia. Medical herbs are getting more popular due to their global recognition. Ayurveda is used by most people in developing countries like India for basic medicinal needs. Due to excessive deforestation and cutting, medicinal plant demand depletes natural resources. Natural and man-made calamities decrease the range of medicinal plants. Conservation promotes sustainable development by managing biological resources without reducing species variety or ecosystems. It involves collecting, disseminating, analyzing, diagnosing, treating, storing, and dispersing illnesses. Conservation of medicinal plants and their genetic resources might be done in-situ or ex-situ. Ex-situ conservation takes medium-sized plants out of their natural habitat to avoid replacement, deterioration, or extinction. Ex-situ conservation includes seed preservation, DNA storage, field gene banks, botanical gardens, etc.*

**Keywords:** Biodiversity, Endangered species

## I. INTRODUCTION

Conventional pharmaceutical systems provide primary care to 80% of the world's population, according to WHO estimates. WHO estimates 21,000 plant species may be used as medicine. Thus, medicinal plants are worth more in India than elsewhere. [9] With over 8,000 species, medicinal plants are a valuable resource in India. The Government of India reports that 65% of Indians solely use traditional remedies. [6] There are little or no side effects, making medicinal plant therapy safe. The biggest advantage is that these treatments are natural. Herbal medicines work for all ages and genders, which is great.

The increased demand for medicinal herbs causes unnecessary deforestation, reducing wild plant populations. Natural and man-made calamities decrease the range of medicinal plants. Flora is vanishing at an alarming rate. According to UNEP/FAO, tropical wet forests, home to half of all plants, are under danger of losing 16.8 million hectares every year. This puts many therapeutic plants at risk of genetic degradation or extinction when paired with harvesting. To address health needs, several conservation techniques must be applied. Conservation involves intentional management of natural resources or medicinal plant environments. [8] It will protect their natural biodiversity and monitor authorized harvest.[3]

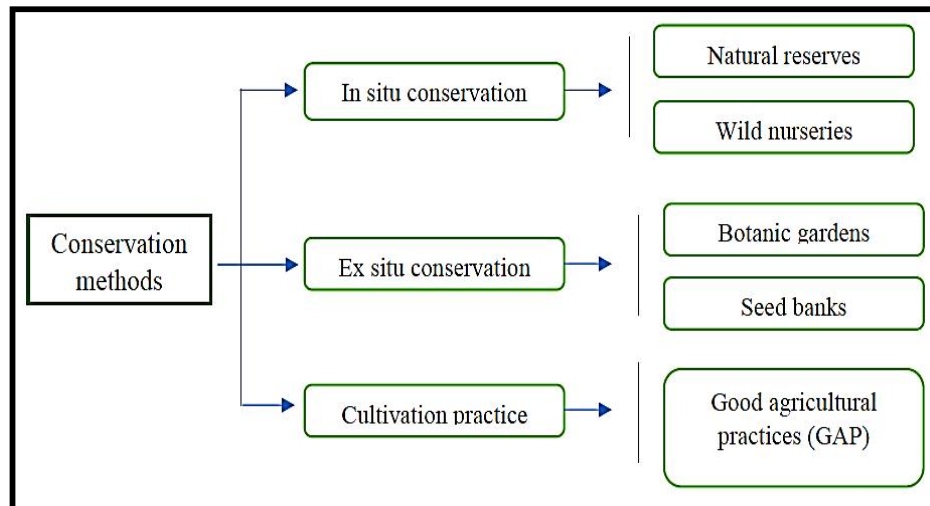
## II. DISCUSSION

### Need For Conservation

Conservation helps maintain development by preserving biological resources without depleting species or ecosystems. It includes collection, propagation, assessment, disease diagnosis and removal, storage, and distribution. Medical plant and genetic resource conservation may be done in-situ or ex-situ. To protect medium plants from destruction, replacement, or degeneration, ex-situ conservation is utilized. Seed, DNA, field gene banks, and botanical gardens are examples of ex-situ conservation. [1]

Traditions of Conservation: Rural residents rely on their surroundings for fuel, wood, and medication. Modern medicine and alternative fuel are too pricey for this people. Thus, environmental degradation and ecological loss need severe action. Discourage tree cutting and encourage people to cultivate fast-growing indigenous trees for household use to save medicinal herbs. This cannot guarantee conservation. Other new conservation measures must be designed and

implemented. The same biotechnological methods must be employed. (Fig. 1) Methodological methods for medicinal plant conservation



**Figure 1: Diagram of methodological systems involved in the conservation of medicinal plants**

Protecting medicinal plant species in situ involves "on-site conservation" of wild genetic diversity in its natural context. Forest protection in India begins with National Parks, Wildlife Sanctuaries, and Biosphere Reserves. The government must develop a nationwide medicinal plant preservation and utilization policy for protected areas. This is done by conserving certain sites as wild nurseries and nature reserves and ensuring that many wild species may survive in managed environments like plantation woodlands and farms. The government must assess the protected areas system's coverage of medicinal plants. Over collecting has eliminated several species, which should be returned to their natural habitats.

Natural Parks: Vital natural resources are protected in Natural Parks to preserve biodiversity. More than 12,700 protected areas exist globally. The ecological roles and contributions of diverse habitats must be assessed to supply medicinal plants in their original setting. Take Uttarakhand's Corbett, Rajasthan's Ranthambore, and Gujarat's Velavadar national parks. [14]

Wild nurseries: Overexploitation, habitat deterioration, and invasive species impact medicinal plant stocks. Wild nurseries may help conserve endemic, fragile, and in-demand medicinal plants in situ. Examples include the south Indian Dandeli Wildlife Sanctuary, Karnataka's Bandipur Wildlife Sanctuary, and Periyar Wildlife Sanctuary. [14]

Biosphere reserves: India has three of the world's 34 biodiverse regions: the Western Ghats, Eastern Himalayas, and Indo-Burma. Eighteen biosphere reserves in India. The Government Botanical Gardens in Tamil Nadu, the Garden of Medicinal Plants in West Bengal, and the Empress Garden in Maharashtra aim to protect the ecology from human mischief. [14]

Seed banks for conserving the genetic diversity of many medicinal plants ex situ, seed banks are preferred over botanic gardens. They are encouraged to preserve wild medicinal plant genetic diversity. Plant samples for property evaluation are readily available in seed banks. Seed banks must restore natural populations and reintroduce plant species, which is challenging. [15]

Ex situ medicinal plant preservation: Wild genetic resources are preserved in their natural habitats by "off-site conservation". Natural genetic resources are collected, protected, and preserved. Genetic variability may be preserved ex-situ, reducing burden on natural environments and increasing raw material availability. Many medicinal plant species are endangered, making in-situ conservation impractical. It may be utilized as field gene banks to encourage numerous parties to develop medicinal plants. [8]

Domestic medicinal plant seed banks are needed in botanical gardens. Botanical gardens must provide ex situ conservation strategies for species unsuited for seed bank storage. The Botanical Survey of India conducts ex-situ conservation via its regional botanic gardens. [15]

Seed-producing vegetatively propagated organisms may be preserved in vitro using several approaches. One of two categories:

Slow growth techniques, in which plantlets on nutritional gel or sterile plant tissue are used to store germplasm.

The process of cryopreservation involves storing plant materials in liquid nitrogen.[2]

### Germplasm Technique of Conservation

The preservation of forest species and vegetative propagated plants in life field gene banks necessitates the investment of both labor and land for replanting annually or perennially. However, in-vitro or reduced growth storage methods require minimal space in growth chambers, allow for the co-cultivation of thousands of genotypes, and mitigate the risk of insect infestation and disease in the culture vessels. Additionally, it obviates the necessity for protracted protocols when handling and transferring germplasm. [3]

This methodology also possesses specific drawbacks, which are as follows:

Potent spores may not be produced by particular plants.

Certain plant seeds degrade considerably as a result of pathogens transmitted by the seeds themselves.

Specific varieties of plant seeds are heterogeneous and therefore unsuitable for preserving true-to-type genotypes.

By utilizing cryopreservation technology, the aforementioned issues can be avoided.

### Cryopreservation Technique of Conservation

Cryopreservation refers to the process by which biological materials are effectively frozen and subsequently stored at an extremely low temperature (-196°C) through the utilization of liquid nitrogen. [3] [Fig. 2: Methods of Cryopreservation Diagram]

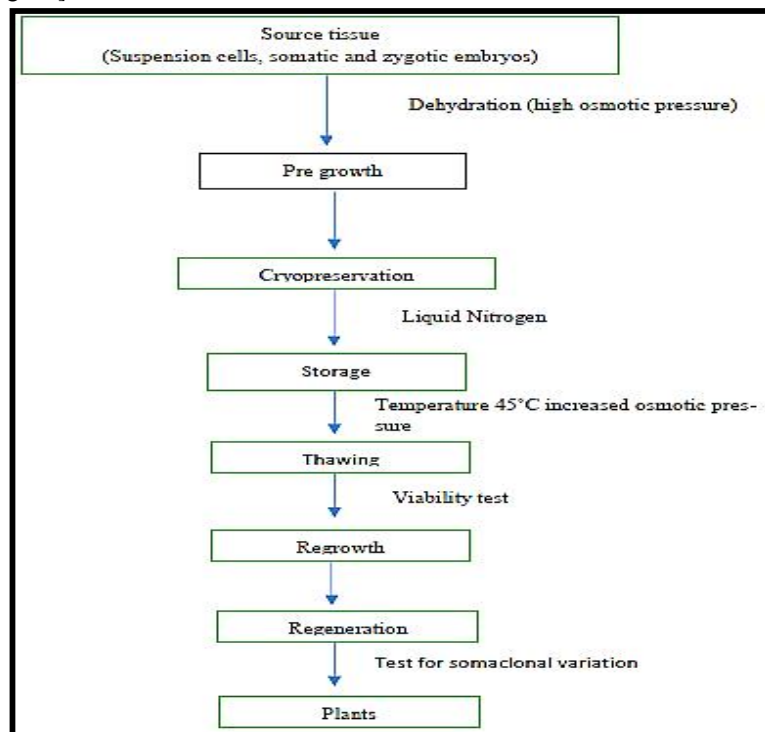


Figure 2: Methods of Cryopreservation

### New Cryopreservation techniques –

Encapsulation and dehydration.

Vitrification

Encapsulation and vitrification

Desiccation

Pre-growth

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Pre-growth and Desiccation  
Droplet freezing

#### **Tissue Culture Techniques Used For Conservation-**

Tissue culture of plants refers to the aseptic in vitro development of cells, tissues, organs, or entire plants in a controlled environment and with regulated nutrients. [23] Utilization of Tissue Culture and Cryopreservation Methods – When it is challenging to regenerate plant species using conventional methods, tissue culture is utilized to ensure their survival by propagating them.

Plant species that have experienced population declines as a result of excessive exploitation are amenable to preservation through tissue culture.

Plant species that demonstrate diversity in their therapeutic attributes with regard to the active ingredient.

Plants that produce a greater quantity of the active ingredient can be preserved through the use of tissue culture methods.

#### **Cultivation Practice -**

To satisfy the growing need, the preservation and cultivation of medicinal plants have assumed critical significance. As part of the conservation process, specific restrictions are placed on their removal from the environment. Such irrational collection practices will likely result in the extinction of numerous plant species that are presently widespread. Certain species may even extinct. Promoting the use of appropriate cultivation methods is crucial for their preservation. Wild-harvested medicinal plants typically exhibit variation in quality and composition as a result of environmental and genetic factors. With appropriate cultivation, this variation and the uncertainty surrounding their therapeutic value can be substantially diminished. Due to cultivation, the likelihood of misidentification and adulteration is also drastically diminished. Thus, the cultivation of medicinal plants can contribute to the preservation of natural populations and satisfy the demands of global health.[12]

### **III. CONCLUSION**

The exponential growth in daily demand for medicinal plants is leading to the depletion of naturally occurring resources. Hence, there is an immediate necessity to prioritize the conservation of medicinal plants in order to counterbalance the depletion of natural plant species and satisfy the growing demand for such plants. The aforementioned conservation techniques have the potential to instigate and facilitate sustainable conservation management and the provision of medicinal plants for human healthcare purposes. Ensuring that populations of plant species continue to undergo growth and evolution in their natural habitats is the most effective method of conservation.

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