



## REVIEW ON THE ORGANIC CULTIVATION OF MEDICINAL PLANTS

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### ABSTRACT

Pharmaceuticals, cosmetics, and drug industries rely heavily on medicinal and aromatic plants for raw materials. It is crucial to increase biomass production without using harmful chemicals due to the importance of medicinal plants in a variety of industries. As a result of the inappropriate use of chemical fertilizers and pesticides, organic farming has become an effective way to address bio-environmental sustainability issues. The organic farming process increases soil organic carbon, phosphorus availability, and microbial diversity and enzyme activity, which make organic crop production more sustainable. Organic fertilizers and microbial symbiosis with medicinal and aromatic plants can improve the yield and quality of organic crops. In recent years, however, organic and conventional farming systems have garnered significant attention for their relative benefits. Since organic components have a positive influence on medicinal plant cropping systems, it is reasonable to assume that organic farmers have been able to improve or at least stem the deterioration of their soil, ensuring the future productivity of their crops. This review highlights the environmentally friendly and modern aspects of organic medicinal plant farming. By these means, the agricultural sector is becoming more economic. The purpose of this review is primarily to review and compare the studies done so far to figure out how organic farming systems influence medicinal and aromatic crop yields and growth.

**Keywords:** Organic farming, Medicinal plants, biofertilizer, alternative farming, sustainability.

### INTRODUCTION

Organic farming focuses on soil, environment, animals, and human health when it comes to farming. Chemical residues are not present in the produce produced under organic farming. As opposed to that, chemical-based farming harms the soil, animal and human health, and the environment. A number of modern preventive methods are used by OA as an alternative to these means, such as not using chemicals to control weeds, pests, or diseases such as:

- Alternate crop planting (including leguminous crops)
- Manure is used in an appropriate manner
- Increasing the numbers of beneficial insects (entomophages and pathogens for pests)
- Groups of plants grown on the same plot (commonly known as vegetable associations).
- Controlling weeds mechanically
- Breeding livestock and plants that are well adapted to the environment
- As mentioned above, these eco-friendly processes ensure soil life, soil structure, and a suitable balance of beneficial microorganisms by following natural cycles.

The use of artificial fertilizers and chemicals is limited or nonexistent during the production process, which makes them by default organic. There are many horticultural crops that can be grown in these areas organically.



However, it is hard to change the mind set of grower farmers in the commercial production pockets to adopt complete organic agricultural practices. The milk, meat, fish, etc. food commodities produced within a cluster of organic farms become organic because no chemicals are used in their production.

Researchers are constantly uncovering additional information about how plants and man interact, dating back thousands of years. The vast majority of people in the world use medicinal plants to treat their health problems. Many medicinal herbs have been used for centuries in the indigenous systems of medicine developed in India. Other indigenous practices include Ayurveda, Siddha, and Unani. The pharmaceutical, cosmetics, and drug industries use thousands of higher plants as raw materials [1]. A versatile approach is being used in current research on pharmacological innovation from medicinal plants [2]. The use of organic fertilizers and biological processes results in maximum yield and quality for medicinal plants. By establishing an organic system of crop management, it is possible to improve the quality of medicinal and aromatic plants globally and sustainably. This review provides information to guide future research and development in organic medicinal plant cultivation. There have been very few studies comparing organic and inorganic fertilizers on medicinal plant growth and yield [3]. The aim of this review is to provide information to aid in future research and development.

### **Principles of organic farming**

The climate and soil conditions are considered to be two of the most important factors affecting the physical and chemical characteristics of medicinal plants. The climatic conditions under which these plants grow depend on the natural origin of the plant. Sunlight and aerated conditions, protected from strong winds and late winter frosts, are key requirements for medicinal plants. [4] indicate that crops must grow in soils that are fertile and contain the necessary amounts of minerals, organic matter, Na, P, Cu, and other elements.

It has also adversely affected soils' physical properties, nutrient levels, and organic matter. Organic materials have also been shown to improve the physical, chemical, and biological properties of soils, which contributes to agricultural sustainability. A long history of research has demonstrated that organic amendments enhance soil fertility and structure [5].

### **Certification of organic cultivation**

Farming systems that are organic are based on the farmer's attitude or behavior regarding the maintenance of environmental balance, the use of natural/organic ingredients and the avoidance of synthetic chemicals (fertilizer, pesticides, and others), and non-use of genetically modified organisms. Using local resources (local wisdom) in order to maintain ecological balance, environmental health and human health. Several audits are conducted on documents and production processes in

the field and storage area prior to the issuance of organic certificates, which guarantee the integrity of the material produced. There are no conflicting regulations relating to the production of raw materials in the health care industry that have been enforced so far by the application of organic cultivation.

### **Effect of Organic farming on yield of medicinal & aromatic plants**

A variety of natural products can be extracted from medicinal and aromatic crops in modern civilization. Various pharmaceutical companies and fragrance companies around the world are interested in using it. Organically grown medicinal and aromatic crops have superior physical and chemical properties (quality) in comparison with traditional systems. The process of integrating sustainable farming practices with productivity principles is complex with these crops. Rotations, pest and weed management, and soil health are all components of organic farming that must be considered to maintain profitability and productivity. Crop rotation is the cornerstone of any successful organic farming system, regardless of where the farm is located or what the region is. In addition to soil conservation and building soil organic matter, cultivating weeds and pests, conserving water, increasing biological diversity, and creating habitat for wildlife, and ensuring economic profitability for the farming system are all objectives to be achieved. A well-planned rotation is more than its parts, addressing the relationships between weeds, pest insects, soils, and crop production as the main management tool for the entire farming system. To develop a profitable and successful organic system, a healthy soil must be ensured in addition to a successful rotation system [6].

In the tropics, it may provide a number of advantages, as it takes a holistic perspective [7] viz., better yield stability in tropical ecosystems, a higher yield in traditional farming systems once they are improved and adapted with the necessary technologies, a more fertile soil and a more sustainable farming system over the long haul, a reduction in farmers' dependence on external inputs, as well as the restoration of degraded and abandoned lands, strengthening farmer confidence and autonomy, and creating new partnerships across the entire value chain.

### **Role of Organic Nutrients in Medicinal and Aromatic Crops**

Agricultural production has been transformed by the green revolution, particularly in Asia. A world population of six billion would be able to consume enough food to satisfy their nutritional needs if cereal harvests tripled between 1950 and 2000 [8]. During the past thirty years, a multitude of issues have arisen in relation to food production, such as exploitation of natural resources, loss of soil fertility, strong decline in agrobiodiversity, pollution of waters [9, 10] indicates that today there is a fundamental problem of destroying the environment and biological balance due to the misuse of

natural resources and use of explosives, such as mineral fertilizers, in order to produce and expand agricultural lands. It is therefore very possible to make organic fertilizers in situ, such as compost, using naturally available materials, and add value to them as a management method or a method of removing superfluous solids. As a tool for controlling different types of debris, it is widely used and is used by medicinal and aromatic crop plants to reduce fertilizer consumption and mineral absorption elements [11, 12] state that vermicompost is highly nutrient dense (phosphorus, potassium, calcium, magnesium). Using compost as a recycling technique is the most successful way to reuse food chain remains, even in the smallest places like soil. The resulting material, vermicompost, has a completely different appearance and condition than the original materials [13]. As observed [14] Senna (*Cassia angustifolia*) produced dry leaves and pods more efficiently with Azospirillum seed treatment.

In the main and ratoon mint crops, conifers and menthol mint were mulched with 180 kg N after menthol mint rhizomes sprouted, resulting in higher yields. Based on the results of the research, vermicompost could improve seed germination, plant growth, and development by increasing water-holding capacity, nutrient supply, and plant hormone production. Increasing the availability of plant water, as well as the increased physical properties of the soil, appears to improve consumption of fertilizers among organic cattle as well as increase the growth of power plants, as well as raising the number of umbrellas in the crucible and seed in umbrellas, consequently increasing the number of seeds in the crucible. A higher seed weight is found in organically grown cumin plants than in organically grown cumin plants [15]. The application of vermicompost lowers soil PH, increases soil microbial population, and encourages soil enzyme activity, thereby altering compound biosynthesis. An important group of secondary metabolites in plants is the phenolic compound [16].

### Bacterial fertilizers

There have been very few studies on medicinal plants that investigate the symbiotic relationship between

bacteria and plants. As a result of inoculating low phosphorous soils with mycorrhiza, the medicinal plant *Scutellaria integrifolia* grew longer roots [17]. The concentration of plant essence increased when Azotobacter was inoculated into Rosmarinus officinalis [18]. Compared to a control treatment, found a significant increase in plant height and biomass following the application of some phosphate solubilizing bacteria to Lemon Grass.

It has been shown that *Majorana hortensis* L. increases its growth parameters when inoculated with bacteria and when phosphorus is applied organically. According to [19], the inoculation of Hibiscus sabdariffa with the mixture of bio-fertilizers improved the growth characteristics. Other plants such as *Nigella sativa* and *Ammi visnaga* also showed similar results. On the medicinal plant, *Majorana Hortensis*, two studies have reported favorable results regarding the effects of Azospirillum and Azotobacter. Microorganisms have been shown to improve the growth and performance of medicinal plants in many research studies. Furthermore, Azospirillum produces stimulating compounds that improve root growth, leading to an increase in water and nutrient uptake and the performance of plants [20].

### Conclusion

Organic farming produces better quality and yields for medicinal and aromatic plants. Currently, the imbalanced application of chemical fertilizer leads to a decrease in quality of products, not only in terms of inferiority, but also with a residual effect that enters the food chain, and in turn, presents a threat to human and animal health. In addition to improving yields, organic manures also control weeds and provide organic matter and nutrients to the soil, improving its health in the long run. Indian farmers, however, do not have the ability to switch over to organic farming at the moment. However, in order to produce medicinal plants for medical purposes which meet the standards of organic agriculture, there is a need to socialize organic agriculture to the farmers of medicinal plants, followed by their registration and certification.

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