

## Medicinal plants and aromatic plants

Medicinal plants and aromatic plants have been used for centuries to improve human health and well-being. They offer a wide range of benefits, including:

### Medicinal Plants

**Natural remedies:** Medicinal plants can provide natural remedies for a variety of ailments, from the common cold to chronic conditions. Many common medications were derived from plants such as aspirin from willow bark and digoxin from foxglove.

**Fewer side effects:** Medicinal plants are often seen as having fewer side effects than conventional medications. However, it is important to consult with a healthcare professional before using any herbal remedy, as some can interact with medications or have other side effects.

**Improved well-being:** Some medicinal plants can help to improve overall well-being by boosting the immune system, reducing stress, and improving sleep.

### Aromatic Plants

**Improved mood and relaxation:** Aromatic plants can improve mood and promote relaxation. The essential oils extracted from these plants are often used in aromatherapy, a form of complementary medicine that uses plant fragrances to improve health and well-being.

1. **Aromatherapy:** A complementary and alternative medicine that uses plant oils that give off strong pleasant aromas (smells) to promote
2. **Pain relief:** Some aromatic plants, such as lavender, have pain-relieving properties.
3. **Insect repellent:** Certain aromatic plants, such as citronella, can help to repel insects.

### Both Medicinal and Aromatic Plants

- ❖ **Culinary uses:** Many medicinal and aromatic plants are also used in cooking. These plants can add flavor and aroma to food, as well as provide health benefits. Examples include rosemary, thyme, and oregano.
- ❖ **Cosmetics:** Medicinal and aromatic plants are also used in cosmetics. The essential oils from these plants can be used to make perfumes, soaps, and lotions.

### Important Considerations

- ❖ **Safe Use:** It is important to remember that medicinal plants can be powerful and can have side effects. It is important to consult with a healthcare professional before using any medicinal plant, especially if you are pregnant, breastfeeding, or taking medications.
- ❖ **Sustainability:** When using medicinal and aromatic plants, it is important to harvest them sustainably. This means harvesting only what you need and not over-harvesting wild populations.

Overall, medicinal plants and aromatic plants offer a wide range of benefits for human health and well-being. When used safely and sustainably, they can be a valuable addition to a healthy lifestyle.

## Importance of Medicinal Plants

### Medicinal Plants and Global Health

- Traditional and natural medicine is increasingly being used by the global population, with 80% relying on it for primary healthcare.
- Western drug development is increasingly using plant remedies to discover new treatments and income sources.
- The range and quality of medicine have significantly improved over the past fifty years, with the main active ingredient being digoxin from the purple foxglove leaves.
- The benefits of herbal medicine to human health and ecosystems are immeasurable, as they are a major focus for the global population.
- However, overexploitation and habitat depletion of medicinal plant life threatens critically endangered species and habitats, affecting biodiversity for years.
- The medicinal plant industry in poorer countries has led to desertification and soil erosion, putting a large range of plant life at risk.
- The Himalayas' collection of plant life is a prime example of this, with a growing industry with little intervention and regulations, allowing for the destruction of the landscape.

**Medicinal and aromatic plants have been used for thousands of years for their various health and therapeutic benefits. Here are some key benefits:**

- 1) **Medicinal Properties:** Many plants contain compounds that have medicinal properties, such as anti-inflammatory, antibacterial, antifungal, and antiviral effects. These properties can help in treating various illnesses and conditions.
- 2) **Traditional Medicine:** These plants are often used in traditional medicine systems like Ayurveda, Traditional Chinese Medicine, and Indigenous healing practices. They are believed to be effective in treating a wide range of ailments.
- 3) **Aromatherapy:** Aromatic plants contain essential oils that are used in aromatherapy for their therapeutic effects on the mind and body. They can help reduce stress, improve mood, and promote relaxation.
- 4) **Nutritional Benefits:** Some medicinal plants are also rich in vitamins, minerals, and antioxidants, which are important for overall health and well-being.
- 5) **Natural and Sustainable:** Using medicinal and aromatic plants for health purposes is often seen as a more natural and sustainable alternative to synthetic drugs.
- 6) **Cultural Significance:** Many medicinal and aromatic plants have cultural significance and are used in rituals, ceremonies, and traditional practices.
- 7) **Economic Value:** These plants can also have economic value, as they are often used in the production of herbal medicines, cosmetics, perfumes, and food flavorings.

Overall, medicinal and aromatic plants offer a range of health benefits and play an important role in traditional medicine and cultural practices.

**Aromatic plants play a significant role in various aspects of human life and the environment. Here are some key reasons for their importance:**

- 1) **Aromatherapy:** Aromatic plants are widely used in aromatherapy for their therapeutic effects on the mind and body. The essential oils extracted from these plants are used in massage oils, diffusers, and inhalers to promote relaxation, reduce stress, improve mood, and alleviate various physical and emotional ailments.
- 2) **Culinary Uses:** Many aromatic plants, such as basil, rosemary, thyme, and mint, are used as culinary herbs to add flavor and aroma to food. These plants not only enhance the taste of dishes but also have digestive and health benefits.
- 3) **Medicinal Properties:** Aromatic plants contain compounds that have medicinal properties. For example, peppermint is used to relieve digestive issues, lavender is known for its calming effects, and eucalyptus is used to relieve respiratory congestion.
- 4) **Pest Repellent:** The strong fragrances of some aromatic plants act as natural insect repellents. Plants like citronella, lemongrass, and lavender are often used to keep pests away from homes and gardens.
- 5) **Environmental Benefits:** Aromatic plants contribute to the ecosystem by attracting pollinators like bees, butterflies, and birds. They also help in soil conservation and erosion control.
- 6) **Cultural and Spiritual Significance:** Aromatic plants have been used for centuries in various cultures for their cultural and spiritual significance. They are often used in religious ceremonies, rituals, and traditional practices.
- 7) **Economic Value:** Aromatic plants have economic value as they are used in the production of essential oils, perfumes, cosmetics, and herbal products. They also contribute to the livelihoods of many communities involved in their cultivation and trade.

### **What is a medicinal plant?**

A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. This description makes it possible to distinguish between medicinal plants whose therapeutic properties and constituents have been established scientifically, and plants that are regarded as medicinal but which have not yet been subjected to a thorough scientific study.

A number of plants have been used in traditional medicine for many years. Some do seem to work although there may not be sufficient scientific data (double-blind trials, for example) to confirm their efficacy. Such plants should qualify as medicinal plants. The term 'crude drugs of natural or biological origin' is used by pharmacists and pharmacologists to describe whole plants or parts of plants which have medicinal properties.

A definition of medicinal plants for the purpose of this presentation should include the following:

- plants or plant parts used medicinally in galenical preparations (e.g. decoctions, infusions, etc.) e.g. Cascara bark;
- plants used for extraction of pure substances either for direct medicinal use or for the hemi-synthesis of medicinal compounds (e.g. hemi-synthesis of sex hormones from diosgenin obtained from *Dioscorea yams*);
- food, spice, and perfumery plants used medicinally, e.g. ginger;

- microscopic plants, e.g. fungi, actinomycetes, used for isolation of drugs, especially antibiotics. Examples are ergot (*Claviceps purpurea* growing on rye) or *Streptomyces griseus*; and
- fibre plants, e.g. cotton, flax, jute, used for the preparation of surgical dressings.

Plants have been one of the important sources of medicines even since the dawn of human civilization. In spite of tremendous developments in the field of allopathy during the 20th century, plants still remain one of the major sources of drugs in modern as well as traditional system of medicine throughout the world. Approximately one-third of all pharmaceuticals are of plant origin, wherein fungi and bacteria are also included. Over 60% of all pharmaceuticals are plant-based.

Plants may have bioactive constituents like alkaloids, glycosides, steroids, phenols, tannin, antioxidants and other groups of compounds which may have marked pharmaceutical actions as anti-cancerous, anti-malarial, anti-helminthic or anti-dysentric, etc. Many of the essential oils, dyes, latex and even vegetable oils are also widely used as medicines. Many substances that go into making up medicines are frequently products of living cells, although seemingly ‘waste’ or intermediate, metabolic compounds and not an integral part of the protoplasm and may have no obvious utility to the plants.

Out of nearly 450,000 species of higher plants available, only a small proportion have been investigated for medicinal properties and still a smaller number of plants yield well defined drugs. The same is the case with lower plants and with plants of the sea origin. Thus, the knowledge of plant constituents gained so far is still meager, considering the huge number of species available in the world. Approximately, only 10% of the organic constituents of plants are reported to be known and the remaining 90% are yet to be explored.

A very small proportion of Iraqn medicinal plants are lower plants like lichens, ferns, algae, etc. The majority of medicinal plants are higher plants. The major families in which medicinal plants occur are Fabaceae, Euphorbiaceae, Asteraceae, Poaceae, Rubiaceae, Cucurbitaceae, Apiaceae, Convolvulaceae, Malvaceae and Solanaceae.

Drugs are derived from trees, shrubs, herbs and even from primitive kinds of plants which do not fall into the above categories. They are made from fruits (Senna, *Solanum viarum*, *Datura*, etc.), flowers (*Butea monosperma*, *Bauhinia variegata*), leaves (Senna, *Datura*, Periwinkle, *Tylophora*, etc.), stems (Liquorice, Ginger, *Dioscorea*, *Costus*, Garlic), roots (*Rauvolfia*, Periwinkle, Ginseng, etc.), seeds (Isabgol, *Abrus*, *Nux vomica*) and even bark (*Cinchona*).

### **Why People Use Herbal Medicine:**

The earliest evidence of human’s use of plants for healing dates back to the Neanderthal period. Herbal medicine is now being used by an increasing number of patients who typically do not report to their clinician concomitant use. There are multiple reasons for patients turning to herbal therapies. Often cited as a “sense of

control, a mental comfort from taking action,” which helps explain why many people taking herbs have diseases that are chronic or incurable viz. diabetes, cancer, arthritis, or AIDS. In such situations, they often believe that conventional medicine has failed them. When patients use home remedies for acute, often self-limiting conditions, such as cold, sore throat, or bee sting, it is often because professional care is not immediately available, too inconvenient, costly or time-consuming. In rural areas, there are additional cultural factors that encourage the use of botanicals, such as the environment and culture, a “man earth relationship.” People believe that where an area gives rise to a particular disease, it will also support plants that can be used to cure it. In Iraq vast sections of the rural population have no access to modern medicine. Hundred of primary health centers which are intended to serve rural areas, lack staffs, diagnostic facilities, and adequate supplies of drugs. The rural population is heavily dependent on traditional medical systems.

- Natural plant products are perceived to be healthier than manufactured medicine. Additionally, reports of adverse effects of conventional medications are found in the lay press at a much higher rate than reports of herbal toxicities, in part because mechanisms to track adverse effects exist for conventional medicines whereas such data for self-treatment is harder to ascertain. Even physicians often dismiss herbs as harmless placebos.

Plants with medicinal or aromatic properties that are used in pharmacy and/or perfumery are usually defined as medicinal and aromatic plants; however, medicinal, aromatic and cosmetic plants would be a better term as many medicinal and aromatic plants are also used in cosmetics. Aromatic plants are those that contain aromatic compounds – basically essential oils that are volatile at room temperature. These essential oils are odorous, volatile, hydrophobic and highly concentrated compounds. They can be obtained from flowers, buds, seeds, leaves, twigs, bark, wood, fruits and roots. Essential oils are complex mixtures of secondary metabolites comprised of low-boiling point phenylpropenes and terpenes. These oils usually consist of about tens-to-hundreds of low molecular weight terpenoids. Even unidentified trace constituents may be held responsible for altering the odour, flavour and the bioactivity of the oil to a considerable degree. Essential oils have characteristic flavor and fragrance properties, possess biological activities and are widely applied in aromatherapy and healthcare in addition to several industries such as cosmetics, flavoring and fragrance, spices, pesticides and repellents, as well as herbal beverages.

Antioxidant and antimicrobial activities of aromatic plants have been widely explored and found to have health applications in prevention and reducing risk of diseases such as inflammation, atherosclerosis, cardiovascular and cancer. Various plant families, particularly Lamiaceae, Apiaceae and Zingiberaceae have been investigated in depth for their medicinal value due to their significant antioxidant properties. The antioxidant activities of aromatic plants is influenced by various factors such as growing conditions, methods of processing/extraction and importantly constituents of the antioxidants; the methods involved in determination of antioxidant capacity as well as extraction therefore play a crucial role.

## History of Herbal Medicine

Plants had been used for medicinal purposes long before recorded history. Ancient Chinese and Egyptian papyrus writings describe medicinal uses for plants as early as 3,000 BC. Indigenous cultures (such as African and Native American) used herbs in their healing rituals, while others developed traditional medical systems (such as Siddha, Ayurveda, Unani and TCM) in which herbal therapies were used. The consumption of plant-based medicines and other botanicals in the West has increased manifold in recent years. About two centuries ago, our medicinal practices were largely dominated by plant-based medicines. However, the medicinal use of herbs went into a rapid decline in the West when more predictable synthetic drugs were made commonly available. In contrast, many developing nations continued to benefit from the rich knowledge of medical herbalism. For example, Siddha & Ayurveda medicines in India, Kampo Medicine in Japan, traditional Chinese medicine (TCM), and Unani medicine in the Middle East and South Asia are still used by a large majority of people.

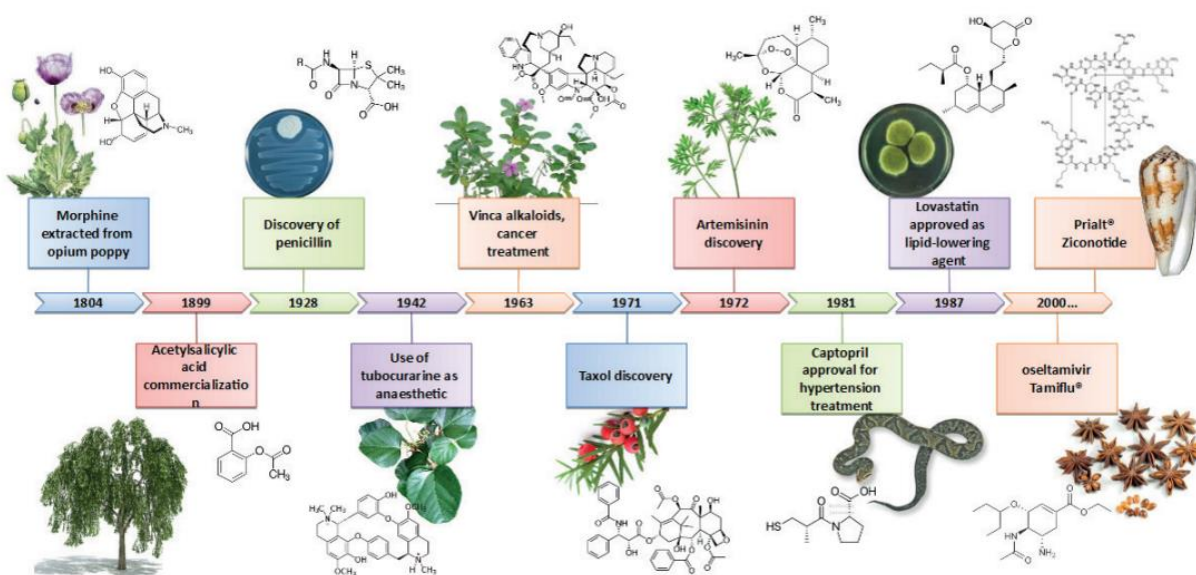


Figure 1 - A few natural products used as medicines identified in the last century.

## The importance of plants

Plants have been used by the mankind since prehistoric times for getting relief from sufferings and ailments. Primitive people, when injured in battle or when they had a fall or cut, instinctively resorted to materials available at the reach of hand for stopping the flow of blood or for relieving from pain and, by trial and error, they learnt that certain plants were more effective than others. Man has also gained such knowledge from his observation of birds and animals which use plants for curing their ailments. Even today, we find that the domestic dog and cat, when they suffer from indigestion or other ailments, run to the field, chew some

grasses or herbs and vomit to get cured. The folk medicines of almost all the countries of the world abound in medicinal plants wealth, rely chiefly on herbal medicine, even today.

Today, chemical and pharmaceutical investigations have added a great deal of status to the use of medicinal plants by revealing the presence of the active principles and their actions on human and animal systems. Investigations in the field of pharmacognosy and pharmacology have provided valuable information on medicinal plants with regard to their availability, botanical properties, method of cultivation, collection, storage, commerce and therapeutic uses. All these have contributed towards their acceptance in modern medicine and their inclusion in the pharmacopeias of civilized nations.

The practices of indigenous systems of medicine in Iraq are based mainly on the use of plants. Charaka Samhita (1000 BC-100 AD) records the use of 2000 plants for remedies. Ancient medicine was not solely based on empiricism and this is evident from the fact that some medicinal plants which were used in ancient times still have their place in modern therapy. Thus for example, 'Ephedra' a plant used in China 4000 years ago is still mentioned in modern pharmacopoeias as the source of an important drug, ephedrine. The plant Sarpagandha (*Rauvolfia serpentina*) which was well known in India as a remedy for insanity is in existence today for curing mental ailments. Quinine, another important anti-malarial drug of modern medicine, was obtained from the cinchona tree.

The knowledge about the use of medicinal plants has been accrued through centuries and such plants are still valued even today, although synthetics, antibiotics, etc. have attained greater prominence in modern medicine. It is, however, a fact that these synthetics and antibiotics although they often show miraculous and often instantaneous results, prove harmful in the long run and that is why many synthetics and antibiotics have now gone out of use or have been specified to be prescribed strictly under medical supervision. In the case of most medicinal plants, however, no such cumulative derogatory effect has been recorded and that is why many of the medicines obtained from plants are still widely used today.

It is also true that lately, in spite of the rapid progress and spread of modern medicine, the popularity of herbal medicines is gaining momentum.

Besides the above, the following are some of the reasons that make the large scale cultivation of medicinal plants inevitable.

1. In nature, there remains a wide variation among the plants with regard to their active principles. As only the best among them are used for cultivation, it enables us to obtain raw material of homogenous quality with high potency.
2. It is easy to grow and fulfill the commitment of large scale demand through cultivated sources rather than from natural sources, which mainly depend on nature for their regeneration and availability.
3. The increasing pressure of population and the development of roads into remote areas have resulted in deforestation and the eventual loss of natural plant resources.

4. In many cases, the important plant parts used are roots or the entire plant, results in destructive collection/ extractive methods, which results in the extinction of many species and ecotypes.

5. Despite the fact that our forests are the major resource base for medicinal plants as many of them appear in wild, the importance of conservation has not been clearly spelt out. Any long-term strategy includes the conservation of biodiversity and support to the communities which are solely dependent on forests for their livelihood.

6. The unauthorized collection of minor forest produce by persons who are led by the burgeoning demand for raw medicinal plant parts has led to the deprivation of the rights and opportunities of the forest-dwelling communities.

7. Since government of Iraq provides policy support for promoting Iraqn system of medicine, the pharma industries look for organized supply of quality raw materials in larger quantities.

A comparative analysis of the prospects and constraints of the medicinal plant-based drug industry in our country reveals the following.



**Table 1. The experts most needed for a programme of conservation and sustainable utilization of medicinal plants**

Agronomists:	To improve techniques for cultivating medicinal plants
Conservation Campaigners:	To persuade the public of the need to conserve medicinal plants
Ecologists:	To understand the ecosystems in which medicinal plants grow
Ethnobotanists:	To identify the use of plants as medicines in traditional societies
Health Policy-makers:	To include conservation and utilization of medicinal plants in their policy and planning
Horticulturists:	To cultivate medicinal plants
Legal Experts:	To develop effective legal mechanisms that ensure that collection of medicinal plants is at levels that are sustainable
Park Managers:	To conserve medicinal plants within their parks and reserves
Park Planners:	To ensure the park and reserve system contains the maximum diversity of medicinal plants
Pharmacognosists:	To study the application of medicinal plants
Plant Breeders:	To breed improved strains of medicinal plants for cultivation
Plant Genetic Resource Specialists:	To assess and map the genetic variation in medicinal plants and maintain seed banks of medicinal plants
Plant Pathologists:	To protect the cultivated medicinal plants from pests and diseases without using dangerous chemicals
Religious Leaders:	To promote a respect for nature
Resource Economists:	To evaluate the patterns of use and the economic values of medicinal plants
Seed Biologists:	To understand the germination and storage requirements of the seed of different medicinal plants
Taxonomists:	To identify the medicinal plants accurately
Traditional Health Practitioners:	To provide information on the uses and availability of medicinal plants