IJPHT Journal
Papers Having Good Impact

International Journal of Pharmacy and Herbal Technology- ISSN NO: 2583-8962 (Online)

A REVIEW: COMMERCIAL, COLLECTION AND CULTIVATION OF AROMATIC PLANT AND MEDICINAL PLANT

Savita D. Sonawane, Sanjay K. Bais, Shubhangi H. Patil
Fabtech College of Pharmacy, Sangola
Corresponding author Mail ID: shubhangihpatil09@gmail.com

ABSTRACT:

Many organizations are advocating the introduction of wild species into agricultural systems as the overexploitation of many wild medicinal and aromatic plant (MAP) species becomes more apparent. Others argue that since most wild species are valuable to local economies and have a higher long-term value to harvesters, sustainable harvesting is the most essential conservation technique. The primary obstacles to sustainable wild-collection, in addition to poverty and the collapse of traditional restrictions, are a lack of information regarding sustainable harvest rates and practices, ambiguous land-use rights, and a lack of political and legal direction. Determining whether or not species conservation should occur in the wild should be based on an understanding of the costs and conservation benefits of the different MAP production options.

Keyword: *Aromatic plant and medicinal plant.*

INTRODUCTION

People have been gathering animal and plant resources for their purposes since the dawn of time. Example Fruits and edible nuts, gums, game, seasonings, herbs, and foods created from plants or animals for use in medicine, cosmetics, or culture. Fibres used to construct homes and other buildings are also examples. Numerous millions of people, primarily in developing countries, still primarily depend on collected animal and plant products for their daily requires and income. In affluent nations, high-value items including medicinal herbs like ginseng, black cohosh, and goldenseal, and mushrooms like morels, mat stake, and truffles are still harvested for cultural and commercial purposes. Herbal remedies are one of the most important of these applications since they are frequently employed in far-off markets as traditional medicines and commerce goods. The term aromatic and medicinal plant refers to the entire range of plants employed in the linked and frequently Overlapping sections of condiments, gastronomy, and makeup, in addition to their usage in constrictor therapeutic applications. Request for a diverse range of natural species is rising in tandem with the expansion of human populations, demands, and trade. Many organisations are advocating for the integration of wild species into agricultural systems as the over-exploitation of some wild species becomes increasingly apparent. But there might be more effects of farming on conservation that need to be investigated.[1] For example, growing medicinal plants can lessen the number of wild populations that are taken, but it can also negatively impact the ecosystem, causing a loss of genetic diversity and necessitating the preservation of wild populations. The link among in situ and ex situ management of species has fascinating implications not just for wild creatures but also for entire industries, residents, and managers and owners of natural species. The kind and quantity of active molecules that provide therapeutic action in crude medications are determined by a number of procedures that they go through before being sold and distributed by the pharmaceutical industry. If a drug is to be as beneficial to mankind as possible, those phases need enhanced attention. This chapter covers the variables that may have an impact on plants. The plant becomes of higher quality after cultivation. The regulated expansion of the surroundings leads to superior plant products and facilitates the selection of species, hybrids, or variations that contain the necessary phytoconstituents. This simplifies the Procedures for gathering and processing

information when in contrast to natural sources from cultivar I on, the plants produce the greatest number of secondary metabolites. [2]

1.It guarantees the efficacy and purity of medicinal plants. The chemical components of basic medications are what give them their usefulness. If consistency is upheld during the cultivation process, high-quality pharmaceuticals can be generated. When growing rhizomes, it's imperative to use the right kind of irrigation and a sufficient amount of fertiliser. Careful cultivation yields a crop with the highest volatile oil content along with other components. To illustrate this idea, use liquorice, ginger, and turmeric as examples. It's simple to prevent raw drugs from getting contaminated by keeping weeds out of the growing plants. system

2.Cultivation ensures a steady supply of crude drugs. Crop planning is, to put it another way, an agricultural. By ensuring a steady supply, crop production planning helps industries that depend on crude pharmaceuticals from experiencing a lack of raw materials.

3.The growing of aromatic and therapeutic plants also contributes significantly to the acceleration of industrialization. Kerala's plantations of cocoa and coffee have given rise to numerous smallscale and cottage businesses. An alkaloid cinchona mill in Darjeeling was established as a result of cinchona cultivation in the state of West Bengal. The Ghaziabad mill, which is controlled by the government, is a devastating illustration of the necessity of well-organized poppy growing.[3]

4. Modern technological components like polyploidy, hybridization, and mutation are made possible through cultivation. A natural, sustainable supply of valuable industrial raw materials for the food, cosmetic, agrichemical, and pharmaceutical industries is provided by the cultivation of aromatic and medicinal crops. It also offers a great deal of potential for growth in the rural economy and gives farmers new ways to increase their income levels. Even though these plants have been used for centuries to treat and prevent disease, advancements in technology and the Consumer demand is rising as traditional knowledge and usage are validated. demand for organic goods and increasing the crops' commercial compare.[4]

GENERAL ASPECT INVOLVED IN CULTIVATION OF MEDICINAL PLANT

Factor Affecting on Cultivation of Crude Drug

Following factor are included

A. Altitude
B. Temperature
C. Irrigation of Rainfall
D. Soil
E. Soil fertility
F. Control of Pests and Pests
G. Day length and Day light

A. Altitude:

When growing medicinal plants, altitude is a critical factor. Cultivating tea, cinchona, and eucalyptus is advantageous at elevations between 1,000 and 2,000 m. Although senna can be grown at sea level, cardamom and cinnamon are grown at elevations between 500 and 1000 metres. The examples of medicinal and aromatic plants below show the elevation at which they can be successful. Altitude is a crucial factor to take into account when growing medicinal plants. The following is a list of examples of aromatic and medicinal plants that can be grown successfully at each elevation.

B. Temperature:

Temperature plays a key part in regulating a plant's growth, metabolism, and ultimately the amount of secondary metabolites it produces. Each species can survive in a wide range of temperatures even though it has evolved to fit its unique natural habitat. In temperate climates, many plants thrive in the summer but are not hardy enough to survive winter frost. In temperate climates, many plants can thrive in the summer, but they are not resistant enough to survive winter frost.

C. Irrigation of rainstorms:

Appropriate amounts of rainfall are necessary for plant development. Aloes and other xerophytic plants don't need rain or irrigation. Rainfall's effects on plants need to be weighed against the year's total annual rainfall and the soil's capacity to retain water. Regarding the production of constituents under various rainfall conditions, inconsistent results have been documented. Because water soluble substances from the plants leach, excessive rainfall may result in a decrease in secondary metabolites. With the exception of xerophytes, most other plants require water, appropriate irrigation, and enough rainfall to grow. Water dissolves the minerals in the soil, which plants then absorb. Water has an impact on the plant physiology and morphology. For instance, constant rain barrel cause water soluble substances to leach out of leaves and roots.

D. Soil:

Every type of plant has unique needs when it comes to nutrients and soil. The physical, chemical, and microbiological qualities of soils are their three main fundamental characteristics. Water, nutrients, and mechanical support are all provided by the soil to help plants grow. Air, water, mineral materials, and organic materials make up soil. Soils differ according to differences in particle size, resulting in clay, sand, and gravel among others. The soil's ability to hold water is influenced by particle size. When growing plants, the kind and quantity of minerals are extremely important. Calcium has advantageous effects. on some plants' growth while possessing no impact on others. Water, nutrients, and mechanical support are all provided by the soil to help plants grow.[5]

E. Fertility of Soils:

It's the ability of the dirt to supply plants with nutrients in an appropriate ratio and in sufficient amounts. Soil fertility is lost when crops are planted without first fortifying the soil with plant nutrients. Additionally, erosion and leaching reduce it. Chemical fertilisers, nitrogen-fixing bacteria, and animal manures can all be used to preserve soil fertility. Of all the above techniques, the latter is the most reliable and saves time. Additionally, erosion and leaching reduce it. Chemical fertilisers, the addition of animal manures, or the use of nitrogen fixing bacteria can all be used to maintain soil fertility.

F. Control of Pests and Pests:

Unwanted plant or animal species that seriously harm plants are known as pests. Pests come in various forms: microorganisms, insects, weeds, and pests other than insects.

a. Small organisms:

These comprise viruses, germs and fungus. The fungus Armillaria mellea (Marasmiaceae) causes a disease known as Armillaria Root Rot (Oak Root Fungus), which renders the infected plant unproductive and usually results in its death in two to four years. As the pathogen infects plants, weaker, shorter shoots emerge. When plant symptoms emerge, dark, root like structures called rhizomorphs emerge from the soil. Cladosporium herbarium, Aspergillus niger, Alternaria tennis, Botrytis cinerea, and others. Berries that are impacted sprout large amounts of black, brown, or green spores on their exterior. Any agent that comes into contact with contaminated material has the potential to spread the pathogen. Galls frequently form in plant injuries sustained during pruning or cultivation. Pierce's disease is caused by the bacteria Xylella fastidious, which causes leaves to turn slightly yellow or red around the margins before the margins eventually dry out or die. Necrosis of leaves, petioles, and stems has also been linked to a number of viruses, including tobacco mosaic virus, cucumber mosaic virus, tobacco ring spot virus, yellow vein mosaic, and others.

b) Insects

Ants come in a variety of varieties. The humble Argentine ant, Linepi-thema Formica perpilosa and aerata are two species of grey ants. The Tetramorium caespitum pavement ant. Fire ant from the South: Solenopsis xyloni, Identity thieves or Molesta solenopsis, degrade the soil by building nests and feeding on plant-secreted honeydew. Melalgus confertus, commonly called the Branch and Twig Borer, burrows into canes through the spur and shoot crotch or the base of the bud. Often, feeding takes place far enough down the hole to hide the adult from view.

C) Non- insect pests

Vertebrates and invertebrates make up their division. Vertebrates such as squirrels, birds, rats, and monkeys can cause disturbance to the plants. Webspinning Spider Mites (Tetranychus pacificus) (Eotetranychus willamettei) (Tetranychus urticae) are non-vertebrates that cause yellow spots and leaf discoloration. Crabs and snails are among the few additional invertebrates that pose issues for plants, aside from parasites (melons incognita), Xiphinema americanutri, and Criconemella xenoplax, which generate large cell development, impair the intake of nutrients and water, and impede plant growth.

G. Day Light and Day Length:

It has been demonstrated that even the duration of the day affects the production of metabolites. Compared to plants produced under short-day settings, plants developed within long-day conditions may contain more or fewer components. For example, peppermint has been shown to create Menthone when grown under lengthy days. Only Menthe furan was successfully created under short-day circumstances; menthol and quantities of menthofuran have also been produced. The quantity and quality of light that plants need to develop varies greatly. Although plants that are grown in the wild would meet the necessary conditions and flourish, during cultivation we must meet the needs of the plants. It has been discovered that day light increases the content of the alkaloid in the plant like stramonium, cinchona, belladonna etc. The radiation is effect on development of plant. An unwanted animal or plant that destroys cultivated plants is called a pest. The following are the various pest species that afflict medicinal plants: 1. Viruses and Fungi 2. Insects 3. Grass Pests that are not insects. Various methods are employed to effectively control pests. The following is a discussion of these methods: The methods that are mechanical, agricultural, biological, and chemical.[6]

POST- HARVESTING TECHNOLOGY OF HEALTH AND AROMATIC PLANTS

This are following technology used in post- harvesting:

A) Harvesting:

Fig.1: Harvesting

It is not advisable to harvest crops when it is raining. Harvesting equipment needs to be kept clean and in good working order. Before being collected, containers need to be clear of any accumulated crop.Crop material that has spoiled or been damaged needs to be sorted and thrown out. Harvested material should not be gathered on the ground, but rather in dry sacks, baskets, trailers, or hoppers. Preventing mechanical damage, excessive compaction, and storage that encourages composting are recommended. It is important to keep domestic animals and pests away from the harvested crop. In terms of cultivation technology, harvesting is crucial since it affects the raw drugs' financial aspects. How crude drugs are harvested depends on the type of drug to be harvested and the pharmacopoeia standards it needs to meet. Professional harvesters can harvest in every way with efficiency. Mechanical tools like diggers or lifters are used to harvest underground drugs such as roots, rhizomes, tubers etc. The roots or tubers are well washed in water to get rid of any earthy material.

Example: A tool called a seed stripper is used to harvest flowers, seeds, and small fruits.[7]

B) Drying:

As soon as the crop arrives at the drying facilities, it should be unpacked. Structures utilised for crop drying ought to have adequate ventilation and should never house animals. The structure should be designed to keep out birds, insects, and domestic and farm animals from damaging the crop. Drying racks need to be routinely maintained and kept clean. To promote free air circulation, crops should be arranged on wire mesh racks that are elevated off the ground. It is not advised to dry in direct sunlight or on the floor. To get rid of broken pieces and other foreign objects, dried crops should be examined and then sieved or winnowed. Sieves need to be routinely maintained and kept clean. Trash cans with clear markings ought to be available, emptied every day, and cleaned. Several procedures or treatments are used in this processing, depending on the chemical makeup and source of the crude drugs. Drying is the process of removing enough moisture from crude medications to enhance their quality and prevent the expansion of microbes. largely enzymatic processes are inhibited by drying. To meet certain standards, specific procedures must be followed when using some medications. To improve drying, the food is sliced and chopped into smaller pieces. The purpose of slicing and chopping into smaller pieces is to enhance drying, just like with glycyrrhizin. To preserve their colour and volatile oil content, the flowers are dried in the shade. There are two types of drying techniques: artificial and natural. There are

several techniques available for natural drying. Tray dryers, vacuum dryers and spray dryers are used for artificial drying, shed drying and direct sun drying.[8]

Fig.2: Drying

C) Garbling:

method is recommended when chemical impurities, sand and foreign organic matter need to be removed from the same facility. The pharmacopoeia limit may occasionally not be met by drug surfers if extraneous matter is permitted in crude drugs.

D) Packing:

Packing materials need to be kept out of the reach of animals and in a dry, clean environment free of pests. Before being reused, reusable packaging substance like plastic bags, jute sacks, etc. should be thoroughly cleaned and dried. The packed crop needs to be kept dry, off the ground, and away from walls. It also needs to be shielded from pests and household and farm animals The supplier and the buyer should, whenever possible, agree on the packaging materials to be used. When packing drugs, one should consider their physical and chemical makeup, intended use, and the impact of various weather conditions on transportation and storage. As an illustration: Goat skin is used to pack aloe. medications that are both extremely expensive and moisture-sensitive.[9]

E) Storage And Transport:

A solid understanding of the physical and chemical properties of crude drugs is necessary for their preservation. Every medication should be kept in tightly sealed containers, preferably filled ones. They ought to be kept in locations that are resistant to fire, water, and rodents. Temperature plays a crucial role in the preservation of medications as well because it speeds up a number of chemical reactions that cause the components to break down. Dried crop that has been packed should be kept in a dry, well-ventilated structure. with good air ventilation and little daily temperature fluctuation. To keep pests and domestic and farm animals out, wire screens should be placed over shutter and door openings. It is advised that dried crops that are packed be stored: in a structure having concrete flooring; apart from the barrier; kept well apart from other crops.

F) Current Good Agricultural Practices:

Good Agriculture practices: (GAP) is a collection of guidelines for crop production that is both sustainable and safe. The objective is to assist farmers in optimising crop yields while reducing production expenses and ecological footprint. The following describes the various processing stages that are part of the good agricultural practices:

1.Material for seed and propagation
2.Growing
3.Fertilisation and soil
4.Watering
5.Crop upkeep/ maintenance
6. Gathering
7.Process primary
8.putting together/packaging
9.Transport and storage
10.Personnel need
11.Record-keeping
12.Quality assurance [10]

CONSERVATION OF AROMATIC PLANT AND MEDICINAL PLANT

Every day there is a greater and greater demand for health plants. However, the number of health plants is declining daily. Therefore, protecting medicinal plants is crucial. Most developing nations' health care systems heavily rely on traditional medicine and medicinal plants. Picking wild plants is the main way that traditional medicine gets its supply of therapeutic herbs. In spite of this, the biodiversity of botanical medicines continues to decrease due to man-made and natural calamities

A. Need for conservation Heath and Species with Aroma:

In order to fulfil the demands of growing populations and expanding regional and global markets for healthcare products In order to fulfil the increasing need for raw materials required for both export and domestic use Medicinal plants are used by more than 1.5 million Indian medical practitioners in the oral and codified streams for preventive, promotive, and curative purposes. Many populations of medicinal plants exist, and many of these plants are taken out of forests in large quantities. Because of this, the natural resources are quickly running out.[11]

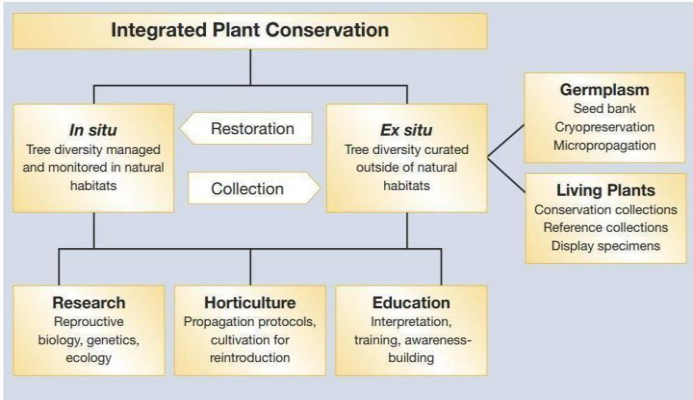

Fig.3: Integrated Plant Conservation

B. Conservation in situ:

Survival of genetic resources in their natural habitats or within the ecosystems to which they have evolved is referred to as conservation in situ, often called site conservation. These resources can be found in farmers' fields as wild or crop cultivars that are a part of the traditional agricultural system, or they can be found there as components of a traditional agricultural system. System is necessary for in situ conservation to be successful. The implementation of policies, guidelines, and the potential for medicinal plants to abide by them in their natural growth environments are essential to the success of in situ conservation.

C. Natural reserve:

Degradation and loss of habitat are major contributors to the depletion of resources associated with medicinal plants. Natural resources Degradation and loss of habitat are major contributors to the depletion of resources associated with medicinal plants. Natural resources One of the main reasons for the depletion of resources related to medicinal plants is habitat degradation and destruction. Natural reserves are major wild resource management zones created to preserve and restore wildlife. global it to rise. Worldwide, there are more than 12,700 Protected. Evaluating the more than 12,700Protected is necessary to conserve medicinal plants by safeguarding important natural habitats. It is necessary to evaluate the contributions and ecosystem functions of each individual habitat in order to protect important natural habitats for medicinal plants. One of the main reasons for the disappearance of sources of medicinal plants is habitat degradation and destruction to protect and replenish biodiversity. There are now more than 12,700 designated protected areas.[12]

D. Wild nurseries:

Considering the price and competing land uses, it is not practical to designate every natural wild plant ecosystem as a protected area.Wild nurseries provide an effective means of in situ conservation for endemic, endangered, and commercially valuable medicinal plants.[13]

E. Conservation of Ex- Situ

All species of medicinal plants should ideally be preserved as dynamic populations found in the wild. Conservation of ex-situ, or the preservation of these species outside of their native environments, is also essential. [14]"Ex-situ conservation" refers to the preservation of wildlife away from its initial site or habitat in nature, where genetic variety is retained. “The requirement for Situ genetic conservation is met by Ex-Situ genetic conservation, which also satisfies any future or current demands related to the environment, society, and economy. Propagation and the evaluation of mental needs are also included in conservation. Propagation and molecular diversity assessment are also included in conservation. [15]

METHOD OF IMPROVING QUALITY OF CROPS AND THEIR APPLICATION

A. Plant Breeding:

The art, science, and technology of improving a plant's genetic composition for human use economically is known as plant breeding. The art and science of altering a plant's characteristics to produce desired traits is known as plant breeding. The science of modifying a plant's traits to produce desired qualities is known as plant breeding. It has been applied to raise the standard of nutrition in both human and animal products. Researchers

have improved crop quality by introducing several advantageous traits—like better yield, tolerance to biotic and abiotic stresses, and increased nutritional value—through plant breeding with wild relatives.

B. Hybridization:

Crop varieties are improved through hybridization in terms of yield, disease resistance, pest resistance, etc. The process of crossing two genetically dissimilar plants from different species is known as hybridization. For instance, a plant can acquire both traits by crossing a plant with a high fruit yield with another plant that can yield sweeter fruits. Hybridization is the process of creating a hybrid through the crossing of two individuals with dissimilar genetic constitutions. Hybridization is the process, whether natural or artificial, that leads to the formation of a hybrid. Although hybridization creates new gene combinations, it does not alter an organism's genetic makeup.[16]

C. Chemodemes:

A chemotype is a collection of plants belonging to the same species that share the same morphological characteristics but differ chemically. Chemo demes' chemical characteristics are inherited. The only way to verify the observation of chemo demes is to cultivate several plants of the same species under the same circumstances, ideally from seeds over several generations.

D. Polyploidy:

Polyploidy is the result of two or more genomes fusing together within one nucleus; this means that each cell has more than two pairs of homologous chromosomes. Most angiosperms exhibit polyploidy, which is crucial for the survival of agricultural crops used by humans. A cell is polyploid if it has more than two paired chromosomes. such as tetraploid and triploid.

E. Mutation:

permanent and comparatively uncommon alteration in the quantity or arrangement of nucleotides is known as a mutation. Put differently, alterations in DNA bases give rise to mutations. Transition: A nucleotide change that occurs when one pyrimidine is replaced with another pyrimidine or one purine with another purine. Tran's version: A pyrimidine is used in place of a purine in the nucleotides. [17]

ROLE OF MEDICINAL PLANTS IN NATIONAL ECONOMY

1. **Ginger:**

Fig.4: Ginger

Synonyms:
Zingiber
Family:
Zingiberaceae
Geographical source:
Although it is cultivated in the Caribbean, Africa, Australia, Mauritius, Jamaica, Taiwan, and India, it is believed to be native to South East Asia. India produces more than 35 percent of the world's total.
Biological source: The dried, scraped, or unscraped rhizomes of Zingiber officinale Roscoe, a member of the Zingiberene family, are what make up ginger. On a dried basis, it contains at least 0.8% of all gingerols. [18]
Uses:
A spicy, carminative, and stimulating plant, ginger is often used to treat fevers, stomachaches, and malaria. Its primary usage is in the treatment of illnesses brought on by the morbidity of Vat and Kaph. Pain in the abdomen, an eating disorder, osteoarthritis, atonic indigestion, swollen, tumors, your upper body pollution, chicken pox, diarrhea, persistent bronchitis, cold fingertips, colicky babies, colitis, which is common cold, wheeze, severe cystic fibrosis, diarrhea, breathlessness, high temperatures, flatulent, constipation, gallbladder cancer illnesses, early morning sickness, feeling dizzy, arthritic conditions discomfort in the throat.

2. Senna:

Fig.5: Senna

Synonyms:
Alexandrian senna, senna leave
Family:
Leguminosae [19]
Geographical source:
Its cultivation is primarily focused in the Tamil Nadu districts of Tinnevelly, Maudrai, and Ramnathapuram.
Biological source: Senna leaves are dried leaflets belonging to the Leguminosae family (Cassia acutifolia, Cassia angustifolia [20]
Uses:

Senna's fruit, or pods, and leaves have long been used as a cathartic in both India and other countries.Sennosides, the primary components of senna, are effective purgatives that can be used occasionally or as a habitual remedy for constipation.

3.Aloe:

Synonym:

Aloe, kumari, Hindi-musabbar, Marathi-korphad

Biological source:

The dried latex of leaves from several species of aloes, including: Curacao Aloe, also known as Miller's Aloe barbadensis; Cape Aloe, or Aloe ferox Miller, sometimes called Aloe perryl Baker, is a socotrine aloe.Aloe spicata Baker, also known as Cape Aloe, and Aloe africana Miller.

Family:

Liliaceae

Geographical source:

Aloe is native to eastern and southern Africa, where it is grown on the islands of Socotra, Zanzibar, and the Cape Colony. It is also grown in many regions of India, including the North West.**Use:**Benzoin tincture and cathartic are two compounds for which aloe is a pharmaceutical aid.To induce abortion, a decoction of dried leaves is taken orally.Wounds are treated with it.taken orally for diabetes in Mexico. Aloe vera is an antibacterial and antioxidant-rich medicinal plant. Benefits of aloe vera include managing blood sugar, preventing wrinkles, speeding wound healing, and lowering dental plaque. Aloe vera, also known as Aloe barbadensis, is a plant with short stalks that retains water in its leaves. This medicinal plant has historically been used to treat skin conditions such as burns, wounds, and inflammation. Aloe vera has additionally demonstrated antihyperlipidemic, antidiabetic, antioxidant, and anticancer effects. [21]

PATENTING AND REGULATORY REQUIREMENTS OF HERBAL DRUG

Patent:

An inventor is granted an exclusive right, which is known as a patent. "Patentee" refers to the individual who has been granted a patent. A patent is a legal document that grants the holder the sole authority to commercially implement the invention that is described. "PATERE" (which means to lay open or open letter) is the Latin root of the word "patent." A patent, which is a type of intellectual property, grants the holder the temporary, usually 20year right to prevent others from creating, utilising, importing, or selling their invention. A patent implies that no one else can profit commercially from producing, utilising, selling, or distributing the invention. An invention that has anything to do with a process or product can be granted a patent. The Patents Act of 1970, as amended from time to time, defines the term "invention." "A new product or purpose having industrial application and involving an inventive step is referred to as an invention." A patent may only be issued for an invention provided that the following requirements are met: It's a novel invention. requires a creative action. possesses the ability to be used or applied industrially. This system aims to protect and foster inventions in order to support the development of industries that benefit society by improving its standard of living. [22]

Procedure for patent:

1.Filling and application.
2.Examination of application
3.Claim for patent
4.Granting and patent seal

1. Filling and application:

On the designated application form, a patent application may be submitted. The following details must be provided by the applicant in order to obtain this from the Patent Office. Name, address, nationality, and title of the inventor. Specification: Providing the invention's specifics. Claims: Defining and extending the invention. It should ideally be no more than 150 words and should cover all of the invention's key features.

2.Examination of application:

The technique by which the Patent Office reviews the application to see if the innovation qualifies for patent protection is known as examination. The aim of the patent office's review process is to ascertain the usefulness, claim form, and prior filing history of each application.

3.Claim for the patent:

Any application has three months to be submitted before the patent is granted and sealed.

4.Granting and patent sealing:

If there is no opposition, or if there is and the decision is in favour of granting a patent, the applicant will receive the patent upon payment of the prescribed fee, subject to any conditions the government deems appropriate. In the event of a joint application, the patent will be granted to the When there isn't any opposition or when the applicant has satisfactorily addressed all of the objections, the patent is awarded by the patent office and published in the official gazette. By paying an annual fee by the deadline, a patent can be maintained and its age increased. It can be extended once it expires. [23]

FARMERS RIGHT

Farmers now have the opportunity to contribute to the development, conservation, and availability of plant genetic resources (PGR), which removes the need for them to regularly visit breeders. The Protection of Plant Variety and Farmers Right Act 2001 (PPV FR act) was approved by the Indian Parliament in order to establish a framework for the effective protection of plant variations. Farmers and plant breeders have the right to promote the creation and cultivation of novel plant types. To protect the creative property rights owned by farmers, scientists, and plant breeders that generate new extinct plant species, the PPV & FR Act of 2001 was developed. Farmers' rights are essential to the maintenance of crop genetic variety, which is the foundation of agricultural and food production worldwide. A farmer's right enables them to safeguard and improve agricultural genetic resources and to get recognition and compensation for their vital contribution to the global genetic resource base. This privilege is given to farmers so they can improve, protect, and use genetic material from plants without having to go to breeders all the time.

BREEDERS RIGHT

Another name for it is plant breeder's right (PBR), and it's a type of intellectual property created specifically to shield novel plant varieties. It is a unique privilege over the commercial production and distribution of the protected variety's vegetative or reproductive propagation material. The breeder of a new variety of plant is granted complete control over the material used for propagation, including seed, cuttings, divisions, tissue culture, and harvested materials such cut flowers, fruit leaves, etc. This right grant exclusive rights to anyone

who develops a new variety of plant. With the help of these rights, the breeder can become the variety's exclusive marketer or grant licences to other parties. For a variety to be eligible for these exclusive rights, it needs to be novel, unique, stable, and consistent. Plant breeders that create new plant varieties are awarded Plant Breeder's Rights (PBR) or Plant Variety Rights (PVR). o These rights provide the breeder exclusive control over the materials used to harvest and propagate a new variety for a predetermined amount of time. With the use of these rights, the breeder can market an exclusive variety or get licenses for more types. A variety cannot be granted these exclusive rights unless it is novel, unique, stable, and uniform. The International Union for the Preservation of New Varieties of Plants (UPOV) grants the PBR.[24]

BIOPROSPECTING

It is defined as the methodical development and exploration of new sources for chemicals, micro- and macroorganisms, genes, and other valuable natural products. It encourages searching the natural world for genetic and biochemical resources that have commercial value. It seeks to find strategies for maximising the advantages of natural resources. It facilitates the long-term utilization and maintenance of biological resources while upholding the fundamental liberties of regional and indigenous populations. Most medicinal plants were discovered by means of bioprospecting. Biodiversity prospecting is the process of locating, obtaining, and vetting biological diversity and traditional knowledge for genetic and biochemical resources that have commercial value. The methodical search for biochemical and genetic information in nature, also known as biodiversity prospecting or bioprospecting, aims to create commercially valuable products for use in cosmetic, agricultural, pharmaceutical, and other applications. The process of finding and bringing to market novel products derived from biological resources is known as bioprospecting. the search for plant and animal species that can yield pharmaceuticals and other compounds with high commercial value. the study of living things to determine how they might benefit humans economically. The U.S. National Cancer Institute examined 35,000 plants and animals for anti-cancer substances between 1956 and 1976. However, this programme was discontinued in 1981 because it was unable to find a larger number of novel anti-cancer agents.

BIOPIRACY

Pat Mooney' first used the term "biopiracy" to refer to a practise in which native knowledge of the natural world that comes from native people is exploited by others for financial gain without the native people's consent or payment. For example, when local knowledge of a therapeutic plant is subsequently protected by a patent held by pharmaceutical enterprises. without admitting that the knowledge is not novel or original to Patentee, and denying the indigenous people the ability to profit from the technologies they created for themselves. The unethical commercial use of biological elements, such as extracts from local medicinal plants, for profit without giving credit to the government or people of the country or region in issue is known as biopiracy. It happens when research organisations obtain biological resources without official authorization from underdeveloped nations or unimportant individuals. In order to gain patents for ideas generated from such genetic resources, developed nations are abusing the traditional wisdom of indigenous populations and the genetic wealth of developing nations. Unauthorised duplication of another person's creations is known as piracy. When someone is accused of piracy, it means they are using someone else's creations without their consent or in an illegal manner. The taking of someone else's knowledge about how to use biological resources is known as biopiracy. The exploitation of patent natural assets or the understanding of agriculturalists, cultural groups, and native peoples by various organizations and international businesses is the main issue of biopiracy at hand. Since the advancements and discoveries made in the fields of agriculture and medicine are based on centuries' worth of traditional knowledge, they cannot be considered new inventions.[25]

CASE STUDY'S OF PRODUCTION OF SOME IMPORTANT MEDICINAL AND AROMATIC PLANT:

1. Case Study of Neem:

The neem tree, Azadirachta indica, is a tropical hardwood tree native to India and other south-east Asian nations. Research has demonstrated the presence of chemicals with antiseptic, antiviral, antipyretic, antiinflammatory, anti-ulcer, and antifungal activities in the seeds, bark, and leaves. In 1971, a US lumber importer named "Robert Harson" noticed the usefulness of neem trees in India and started bringing in neem seedlings for his offices. He evaluated the safety and functionality of the neem plant. After three years, he sold his discovery to the US Department of Agriculture and the international chemical company WR Grace and Co. WR 1992's Grace and Co. procured the recipe for a powerful fungicide derived from the grain and secretions of neem trees. An extract from the tree's seed was used to generate a new fungicide, according to the company's patent application. However, Indian farmers argue that the fungicide has been around for decades and that the patent does not seem sufficiently unique. The patent was challenged by Indians and Green Party supporters in the European Union, who claimed that it would violate the rights of underprivileged farmers in underdeveloped nations. The patent was challenged by Indians and Environmental Party leaders in the European Union, who claimed that it would violate the rights of underprivileged farmers in underdeveloped nations. The Neem patent was the first to spark worries about biopiracy against US and European patents. Indian experts contended that the therapeutic benefits of neem have long been known to the Indian populace. The US Patent Office's decision to award the patent to WR Grace and others was reversed by the European Patent Office (EPO), which considered the reasons presented by the Indian scientist. For four years, the Science, Technology, and Environment Research Foundation put up great effort to attain this accomplishment.

2. Case Study of Curcuma:

Turmeric is a tropical plant native to East India. Turmeric powder has a rich, unique color and a bitter flavor. It may be used as a food colouring, flavouring, litmus test chemical, and medication. A US patent was granted to the University of Mississippi's Medical Center in May 1995, particularly for the use of turmeric as a wound healing agent. The Indian Council of Scientific and Industrial Research (CSIR) lodged a complaint after a period of two years. The Indian Council throughout Scientific Investigation (CSIR) said that since turmeric has been used for many years to cure rashes and wounds, the patent on its therapeutic uses was not new Documentary proof of traditional knowledge, such as an old Sanskrit manuscript and a 1953 study that appeared in the Indian Medical Association periodicals, backed the CSIR's assertion. The patent's validity was investigated by the USPTO, the United States Patent and Trade Mark Office. The USPTO affirmed the CSIR objection and invalidated the patent in 1997, alleging lack of innovation, notwithstanding an appeal by the patent holders. [26]

3.Case Study of Basmati Rice:

When RiceTec Inc. received a patent from the US Patent Office, India objected., an American company, in late 1997 to refer to aromatic rice grown outside of India as "Basmati". India exports a lot of basmati to many other countries; therefore, the US Intellectual Office's judgment was likely to affect its business. Given the custom of growing Basmati rice in Pakistan and India, it was argued that RiceTec's patent was granted in violation of the Geographical Indications Act in accordance with TRIPS. A geographical indication, sometimes shortened to GI, is a name or symbol applied to some products that designates a particular geographic origin or location (such as a town, region, or nation). The use of a Geographical Indication (GI) can serve as certification that a product has particular attributes or has a particular reputation because of its place of origin. The use of the name Basmati

by RiceTec for rice that was not grown in India, but was derived from Indian rice, would have violated the concept of Geographical Indication and been misleading to consumers. RiceTec Inc. retracted 15 of the 20 claims. Additionally, they reclaimed their claim to the name "Basmati".[27]

CONCLUSION

Adopting scientific measures for the sustainable use, long-term preservation, and cultivation of aromatic and medicinal plants is imperative. Additionally, quality analysis of the produce is needed to oversee the development programme on medicinal and aromatic plants in order to guarantee materials of consistent quality regarding alkaloids, essential oils, and other chemical compositions that make these plants valuable in the market.

REFERENCE

1.A V Pore SK Bais Anjali Bhausaheb Sathe Review on Commercial Cultivation and Collection Aspects of Medicinal and Aromatic Plants International Journal of Advanced Research in Science Communication and Technology Volume3 Issue1 January 2023 ISSN (online)2581-9429 P No550
2. https://www.wbhealth.gov.in/WBSMPB/aims_objectives.php
3.https://www.researchgate.net/publication/277059910_A_Comparison_of_Cultivation_and_Wild_Collection_of_Medicinal_and_Aromatic_Plants_Under_Sustainability_Aspects.
4)S. D. Sonawane S K Bais MH Pawar Recent Herbal Technology International Journal Of Advanced Research in science Communication and Technology Volume 3 Issues 1 January 2023 ISSN (online) 2581-9429 P No 510
5.Textbook of Pharmacognosy and photochemistry by Biren Shah and A. K. Seth. Page no.7273
6.https://www.slideshare.net/DRxPoojaBhandare/factorsaffectingcultivationpharmacognosyphytochemistryibp405tunitiipart2?from_m_app=android
7. Pandey AK, Mandal AK. Sustainable Harvesting of Terminalia arjuna (Roxb.) Wight & Arnot (Arjuna) and Litsea glutinosa (Lour.) Robinson (Maida) bark in central India. J. Sus. For. 2012; 31(3):294-309.
8.Pandey AK, Yadav S. Variation in gymnemic acid content and non-destructive harvesting of Gymnema sylvestre (Gudmar). Phcog. Res. 2010; 2(5):309-342.
9.https://www.slideshare.net/subhamdwivedi1/postharvest-managementofmedicinalandaromaticplants?from_m_app=android
10.A Textbook of Pharmacognosy and photochemistry- II by AtulKabra, Dr. Parveen Kumar Ashok, Sanjay Setia. (PV Publications) .Page no 144-148
11.https://www.slideshare.net/SonamkzBhutia/conservationofmedicinalplants229331013?frommapp=android
12..https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4967523/#:~:text=of%20medicinal%20plants,In%20situ%20conservation,conditions%20%5B22%2C%2029%5D
13.Schoen DJ, Brown AHD. The conservation of wild plant species in seed banks. Bioscience. 2001; 51:960-6
14."Ex-SituConservation."Botanical Survay of India,Government Indiabsi.gov.in/content256_1_Exsitu conservation.aspx
15.Li DZ, Pritchard HW. The science and economics of ex situ plant conservation. Trends Plant Sci. 2009; 14:614–21.
16.https://byjus.com/question-answer/discuss-the-role-of-hybridisation-incropimprovement/
17.A Textbook of Pharmacognosy and photochemistry by Dr.KuntalDas(NiraliPrakashan) Page no. 2.32 – 2.33

18.A Textbook of Pharmacognosy and Phytochemistry 2 by Dr.K.Prabhu, Dr. G. Arunachalam (Thakur Publications) Page no. 149-151.
19.https://www.yourarticlelibrary.com/biology/resins/gingersourcescultivationanduses/49779
20.https://www.slideshare.net/GopalSitafale/role-of-plantsineconomy?from_m_app=android
21..https://www.slideshare.net/ArvindYadav296/medicinal-andaromaticalplantscultivationofmedicinal-andaromatic-crops-production-technlogy-ofmedicinalandaromaticplanst?from_m_app=android
22)https://www.glocaluniversity.edu.in/files/eContent/eBpharm/Herbal%20Drug%20Technology.pdf
23.A Textbook of Herbal Drug Technology by Dr.ZeeshanAfsar (PV Publications) Page no. 7981 11.
24..https://www.slideshare.net/Shaguftafarooqui1/patenting-and regulatoryrequirementsofnaturalproducts248298859?from_m_app=android
25.A Textbook of Herbal Drug Technology by Dr. G. Arunachalam, Dr.V.E.IdaChristill, Dr. Prashant Kumar (Thakur Publications) Page no. 224 – 229
26.A Textbook of Herbal Drug Technology by Dr. V. M. Shinde, Mrs. K.S. BODAS-YADAV Page no 10.20 – 10.21.
27.https://www.slideshare.net/Abhishekvb/case-study-onbasamatiricepatentbattle?from_m_app=android