

QUEEN OF NIGHT: JASMINE



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INDEX

| | |
|--|----|
| 1. Jasmine: An Introduction | 1 |
| 2. Major Varieties and Cultivars of Jasmines | 2 |
| 3. Major Products of Jasmines | 4 |
| 4. Major Uses of Jasmines | 4 |
| 5. Growing Practices for Jasmines | 5 |
| 6. Weed and Insect Management | 9 |
| 7. Disease Management | 10 |
| 8. Pest Management Practices | 12 |
| 9. Harvesting and Yield of Jasmines | 12 |
| 10. Marketing and Extraction of Jasmines | 13 |

Jasmines: An Introduction

Jasmines are the only flowers which are demanded on a large scale for their rich fragrance and beauty. Considered as one of the most important flower grown in Indian gardens, various species are cultivated with the purpose of purifying the garden atmosphere with their fragrance. In the commercial markets, Jasmines are demanded for their flower extracts in the form of perfumes, oils, concretes and as an essential ingredient in many cosmetics. Hence the value of this crop is very high in home gardens as well as commercially. Having its natural rich fragrance which is mostly high in the evening, the flower in floriculture is also known as “Queen of the night”. It is also one of the most important aromatic crops having high economic value which can be grown by every garden lover and commercial florists.

Taxonomy of Jasmines

Jasmine comes under the genus "Jasminum" and family *Oleaceae*. The family comes under the order Oleals. According to Baker, Cooke and Duthie, the genus contains a total of 90 species and it is thus verified by other scientists. Out of all 90 species, very few species are under cultivation for the purpose of garden and commercial. Among them the number of scented species which are cultivated in gardens as well as commercially, is only three. These are *Jasminum sambac*, *Jasminum auriculatum* and *Jasminum grandiflorum*. The species which are cultivated for ornamental purposes are: *Jasminum humile*; *Jasminum Arborescens* and *Jasminum pubescens*.

Origin of Jasmine

Jasmines are considered to be originated in Tropical and Sub-Tropical regions mainly India, China, Europe and Australia. The crop is found diversely in South and South East Asia therefore is also known to be the Centre of Diversities. However a rich flora is also found in Mediterranean Europe

Major Varieties and Cultivars of Jasmines

Jasminum Sambac: The centre of origin of *Jasminum sambac* is India. It is known as Arabian Jasmine as the species is first sent and planted in Arabia and Persia by man according to Chinese records. Later on, from these regions these species were introduced to other parts of the world. Another common name of the species is Sambac Jasmine. It is an evergreen shrub or vine of dwarf growth habit having wavy leaf margins which are ovate. The flower is mainly cultivated for its scent while also used for making perfumes and tea. The flowers either single or double (semi or perfect) borne in clusters that open at night and close in the morning hours. In India especially West Bengal, *Jasminum sambac* is also cultivated as cut flowers. It is the national flower of Philippines and also one among the three national flowers of Indonesia. The cultivars of this species differ in shape of leaves flower buds and corolla structure

Motia or Moga or Maid of Orleans: The flowers are single layered which oval shaped petals to four or five in number. Single Mogra has three to four whorls and Double Mogra has eight to ten whorls

Duke of Tuskany: One can resemble this cultivar with presence of flowers having doubled petals. The flowers also resemble small white roses therefore Rose jasmine is another name of this cultivar. The flowers possess less fragrance than others

Gundumali: It is a double small and round flower having very sweet fragrance and is called as Gundumali in Southern parts of Indian peninsula and is a high yielding cultivar whereas shrub bearing semi-doubled flowers are known as donthara malle

Ramabanam: Here flowers are recognized as having long buds. The cultivar is also high yielding

Belle of India and Mysore Mulli: Both of the cultivars have single or double layers where Belle of India has elongated petals and Mysore Mulli has shorter petals as compared to the former one

Iruvatchi and Kasthurimalli: The flowers of Iruvatchi have shorter corolla tube along with three to four coils but the flowers of Kasthurimalli possess medium long tube of corolla



Jasminum Grandiflorum: The common names of *Jasminum grandiflorum* is Royal Spanish or Italian Jasmine or Jasmine Odorant or Catalonian Jasmine. In India, the species is known as Chameli. The glossy leaves have dark green color with five to seven leaflets. The centre of the bud is protected by vegetative buds that differentiate into opposite leaves. The species is mostly cultivated for the purpose of extracting perfume. It is also grown in gardens in Tropical and Sub-Tropical regions due to its sweet fragrance. *Jasminum grandiflorum* is a deciduous shrub which reaches up to the height range of two to four metre. There are two clones of this species identified by the scientists. The pin type clone which has more free-flowering habit has style peaks out of the tube of corolla whereas the Thrum type has style hidden by the flowers. The Pin is also high yielding as compared to the Thrum type

Jasminum Auriculatum: *Jasminum auriculatum* is considered to be the native of India, Africa and Malaysia. It is also known as Indian Hasmine and Needle Flower Jasmine. The species is not much popular among the commercial growers and gardeners. It is a small bushy plant which has small and dark green colored leaves and bear flowers white in color. The flowers appear in clusters and are either single or double. The flower possesses strong scent. It is commonly called as Juhi. There are five variants which are differentiated on the basis of flower bud characteristics. These are Long Point, Long round, Medium Point, Short Point and Short Round. Auream is a cultivar of this species which have variegated leaves that generally possess yellow color

Jasminum Humile: Another name of *Jasminum humile* is Italian Jasmine. It is an evergreen shrub native to India, China and Afghanistan. The softly fragrant flowers are yellow in color which appears in clusters of two to four. Due to yellow colored flowers, the species is also known as “Swarna (Gold) Chameli (Jasmine). The flowers appear in winter season

Jasminum Arborescens: It is a shrub of dwarf nature of growth which bears white colored flowers during winter season. The species has its centre of origin in India and Sri Lanka. The flowers are mostly found in hilly regions with an altitude range of 200 to 1000 m

Jasminum Pubscens var Rubiscens: The flowers have white color on upper portion with pinkish bud. China and India are considered as the centre of origin for this species. It is an evergreen shrub

Jasminum Angustifolium: It is also known as Wild Jasmine. The fragrant flowers are white colored having star shape

Major Products of Jasmines

Jasmine Oil: Extraction of Jasmine petals is a labor intensive process hence the oil is comparatively much expensive than other oils. The extraction is generally done by Chemical extraction method as the flower petals are very much delicate which can be destroyed during distillation process. To get sufficient oil, it is advised to harvest the flowers during evening to night as the aroma of the flower is higher

Perfumes and other Cosmetics: The oil of Jasmine is also used as a perfume of high grade. It is also used as an ingredient for soaps, cosmetics, and mouthwashes

Incense Sticks: The highly fragrant flowers are also used to prepare incense sticks

Jasmine Syrup: The jasmine Syrup is used as a flavoring agent for various beverages and recipes

Jasmine Tea: The Green Tea when blended with Jasmine petals adds flavor to the tea and is mostly liked by Chinese

Major Uses of Jasmines

Jasmine as a Flower: The highly fragranced flower is grown in the garden for its aesthetic value. The crop is also grown as a cut flower apart in addition to as a house plant and a garden shrub. In some parts of South and South East Asia, the flowers are also used by women for decorating their hair

Jasmine as a Ingredient: Some species of Jasmines are cultivated to yield essential oil which is used either as such or as an ingredient. The extract obtained after fractional distillation of Jasmine Flower (Petals) is used as an ingredient for the preparation of various products such as Soaps and Perfumes, Oil, Incense Sticks etc

Jasmine as a Flavor in the Tea: Jasmine Tea or Jasmine Flower Tea is generally consumed in China. Blending of Jasmine flowers with Tea adds flavor to it and thus enhances the taste of the tea. The process of Jasmine Tea starts with mixing of flowers with tea till the flavor is completely absorbed by the tea. *Jasminum sambac* is used to prepare Jasmine Tea

Medicinal Value of Jasmines: Since ancient times, jasmine flowers are used for medicinal purposes. The essential oil present in the petals and sepals of flowers has anti-depressant, antiseptic, anti-inflammatory, aphrodisiac and sedative properties. Due to these properties, till today the oil is used to treat illnesses. Jasmine is used to treat cough, nervous exhaustion, depression, laryngitis, labor pains, uterus related disorders, and skin problems such as sensitivity and dryness. It is also used against muscular sprains



Growing Practices for Jasmines

Climatic Requirements: Jasmine is considered as a hardy crop which can be grown in a wide range of climatic conditions. The crop if provided with proper management practices can do very well in any type of soil. It is a water loving crop and is grown successfully during summers to mild winter seasons. Due to its climbing and bushy nature, commercially the crop is not preferred to be grown under greenhouse cultivation

Sunlight: Jasmine is a sun-loving crop. The crop requires sunny days for its full growth

Temperature and Humidity: The crop cannot tolerate very cold temperature hence to save it from harsh temperature the plants are kept inside greenhouses under the temperature of 14 degree Celsius. Sometimes during summers, the some of its species are also kept under cool and shady places. The average temperature for successful growth of Jasmines is 13 degree Celsius. Hot and dry climate are best for higher yields of the crop

Rainfall: Rainfall is an essential parameter for crop growth. The crop is provided with proper irrigation facilities in the areas of less rain

Soil Requirements: Well drained sandy loam soil rich in organic matter is considered as an ideal soil for plant growth. The crop can also be grown in clay soil provided the soil should be porous, fertile and well drained. Jasmines do not prefer water logged soil the growth gets hampered due to water logging. There is a lush green vegetative growth when crop is planted in clay soil while the flowers growth is poor

Site Selection: Jasmine is a hardy crop and with well irrigation facilities, it can flourish in almost every type of climate so as to produce quality crop. The location should also be sunny. However there are few points that should be taken care of while planting any crop

Field Preparation: Jasmine is a perennial crop which gives quality yield for ten to fifteen years once planted. Thus the field should be systematically prepared before planting the crop. Deep and thorough ploughing followed by harrowing is generally practiced for field preparation. Care should be taken to remove all the perennial weeds having deep roots. The size of pits depends upon type of variety to be planted. However the average sized pits of about 30 to 75 cubic centimeters is dug and left it open for a week. The pit should be filled with well decomposed farm yard manure. The water is applied afterwards in order to mix the manure perfectly with the soil.

Yield and Quality of Jasmine: Other main points needed to be taken care of for the high yield and quality of Jasmines for commercial purposes are:

- Proper transportation facilities
- Well connectivity with roads
- Good loading and unloading facilities
- Less pest attack
- Well drainage facility and no water logging
- Minimum or no pest interference
- Well storage and packaging facilities
- Presence of a distillation plant in vicinity

Propagation: Jasmines are usually propagated by mature wood cuttings. Ground Layering is also practiced in many areas. Propagation by seeds is also done to improve the quality of crop. Generally commercial methods of propagating the crop is cutting and layering only

Propagation by Cuttings: Mature soft wood cutting are selected for planting. Cuttings of length 15 to 20 cm with two or three leaves are prepared and raised in nursery beds. The leaves are remained in order to prepare food which helps in proper and strong growth of roots. Cuttings without leaves fail to develop roots even if growth regulators are applied. The ideal, efficient and cheap cutting for *Jasminum sambac* is having single node with one leaf. Care should be taken that the cuttings from middle portion of the shoot are selected. The cuttings become ready for planting in the field after about one year. The best time of raising nursery is rainy season however cuttings rose during the month of March also produces quality roots. The soil media for nursery bed should be proportionate quantity of moss, sand and vermiculite

Layering: In this method, a portion of branch is bent to the ground and covered with soil. Care should be taken to leave the terminal end of the branch exposed. The buried portion is regularly cared and after successful root initiation, the new rooted portion is detached from the mother plant and planted in the pit.

Budding and Grafting: Patch budding is sometimes done in Mogra variety of Jasmine however interspecific grafting of scion of *Jasminum auriculatum* over the rootstock of *Jasminum sambac* is also found successful in some regions

Planting

Time of Planting: The ideal time of planting jasmines is considered to be rainy season when water is sufficient. But the crop can be planted in any season of the year provided availability of adequate amount of water

Planting Method: Jasmines are planted in the pits exposed for a week. The row to row spacing is jasmine should not be less than 75cm and two plants should have minimum space of 1m. However spacing also depends upon species to be grown. In case of *Jasminum sambac*, the ideal spacing between plant is considered under the range of 75 cm to 1.2 m X 1 m to 1.2 m whereas for *Jasminum auriculatum*, the same should not be less than 1.8 m X 1.8 m. An ap-



preciable yield of flowers is obtained when the plants of *Jasminum grandiflorum* is planted with the spacing of 2m X 1.5m. Watering is done immediately after planting to allow the roots to set in soil

Fertilizer Schedule: The rate of application of nutrients too depends on type of species planted. Application of 120 gm Nitrogen and Potassium are applied to varieties of *Jasminum auriculatum* to get abundant foliage and flowers. For *Jasminum grandiflorum*, the ideal quantity of macro-nutrients is 60gm N and 120 gm each of P and K and in case of *Jasminum sambac* this recommended quantity reached to 240 gm each of N and K, with 300 to 350 gm of Phosphorus. Applications of fertilizers in split doses are found beneficial as compared to other methods of application

Irrigation Schedule: Jasmine requires lot of water for its growth and flowering. Appropriate amount of soil moisture helps in better yield. Plants are provided with water by the method of flooding which is to be done once in a week. Jasmine is a deciduous crop which shed their leaves during the months of November and it is advised to stop irrigation during this period. The next irrigation is done when the plant starts showing flower buds and the frequency is increased slowly. During the period of April to June, watering is done once in every fifteen days but in dry climatic areas, it is done once in every week. It is advised to stop watering the plants between two flushes

Pruning: Pruning is considered as one of the most important cultural practice to get high quality flowers where it stimulates the growth of new shoots and also keeps the bushes in their desirable form. The plants are pruned at the time when they start shedding their leaves that is during the months of November and December however light pruning is also done in the month of rainy season. All the shoots of last season are cut and new shoots are allowed to grow. The dead and diseased shoots including shoots overlapping each others are also removed from plants. Pruning helps in getting quality yield of crop. Just after pruning, the cut ends are applied with fungicidal paste in order to prevent diseases and other infection. Before pruning, irrigation is withheld to promote good flowering and it also speeds up the dormancy.. Chemical pruning can also be done in Jasmine. For this foliar spray of defoliant like Paraquat, Pentachlorophenol, Ethereal is applied at recommended doses. Soil is also deeply hoed across the plant at the time of pruning to allow sun exposure and after that application of well decomposed farm yard manure is done and this is again repeated after first flowering. Timely pruning keeps plant healthy and improve the plant form. When crop is grown for commercial purpose, pruning is generally done after two years of planting.

Training: As Jasmine is a perennial crop which remains on the field for almost 10 to 15 years hence proper training is given to each shrub to have desired shape

Water Stress: It is also known as “Bahar Treatment” in Jasmines which is considered as an important cultural practice for flowering. Also discussed in earlier sections, watering is withheld just before the crop goes to dormant stage during winters. After 40 to 50 days of withholding irrigation is started slowly

Some Unknown Facts about Jasmines

- Jasmine as a national symbol in many countries:
 - It is the national flower of Indonesia and also the most important flower in wedding ceremonies.
 - Jasminum officinale or Chambeli is the national flower of Pakistan
 - Jasminum sambac is the national flower of Philippines
- Jasmine is symbol of motherhood in Thailand.
- In India also, the flower is used for worship, marriages, religious ceremony and festivals

Weed Management

Weeds are unwanted plants that affect the crop by the way competing for the space, minerals and other essential components which are crucial for plant growth such as water, light and soil. The result of this attack is reduction in quality and yield of the crop and ultimately wastage of resources utilized. Because of its nature, the crop has to stand in soil for many years and provide high yield with quality flowers. Weed infestation reduces the overall productivity and most of the time roots of some weeds penetrate so deeply and grow vigorously in soil that cannot be discontinued. Hence proper care is to be taken in order to save the crop with the attack of weeds. Some of the common intercultural operations like regular hoeing and weeding should always be followed however it increases the total cost of cultivation of crop. The economical method using chemical methods of controlling the weeds and it also helps in eradicating all parts of weeds including roots. Use of chemicals like Oryzalin at recommended dose also helps in flowering inclusive of eradication of unwanted plants which affect the crop growth and yield. In addition to this covering the spaces with appropriate mulch also helps in controlling weed infestation

Insect Management

There are various insects which cause severe damage to the crop if proper control practices are not adopted. Some of the common insects which attack the crop and damage it severely in case of higher infestation are covered under this section. The cultural practices for insect control is similar for all however chemical control may differ depending upon behavior and type of insects.

Bud Worm: Bud worm is a biting type of insect. It feeds on the floral parts of plant and eats the bud portion thereby causing flower damage. The larval stage of this insect causes damage to the crop. Bud Worm is easily identified with greenish color and black head. Holes in the bud and sometimes webbed appearance on floral portion in case of severe infestation are identifiable symptoms of attack. The cultural management practices for this worm are hand picking the larvae and throw it far off from cropping area. While chemical management includes spraying of recommended quantity of Malathion in the area

Mite: There are few types of mites affecting the crop growth and severe infestation sometimes causes full crop loss. Among them Red Spider Mite and Gall Mite cause damage to the crop. These mites are sucking insects that feed on cell sap of lower surface of leaf thereby causing discoloration. Red Spider Mite is considered as the most harmful out of all the mites that discolor the leaf leading to its falling. These are very minute mite which cannot be seen easily through naked eyes however the webby appearance and yellowing are identifiable symptoms of damage by the mite.

On the other hand the gall mite causes wrinkling of leaves in addition to their discoloration. These are not true spiders. Chemically the mite attack is controlled by spraying Dicofol or Kelthane at the rate of 0.02 to 0.04 milliliter in one liter of water once in fifteen days. Other chemical which also control Mite infestation effectively is Nuvacron that is applied at the rate of 0.04 milliliter per liter of water

Gallery Worm: Gallery worm is also one of the important insect of Jasmine the control of which is very necessary. The worm feed on plant parts especially terminal shoots, branches and flowers thereby causing reduction in crop growth leading to loss. The worm is chemically controlled by spraying Malathion at recommended doses

Tinged Bug: The stage that causes damage to the crop is nymphs and adults. Tinged bug is a sucking insect which feeds on cell sap causing discoloration leaf fall after drying. Chemical method of controlling this insect is same as that of Bud Worm

Disease Management

In addition to damages by weeds and insects, the crop is also affected by diseases infection. There are various fungal, bacterial and viral diseases affecting the crop resulting to whole crop loss. Some of the major diseases with their descriptions are included in this book which needs serious attention in order to get total return of investments

Rust: Rust is common disease of most of the ornamental crops. It is a fungal disease caused by *Uromyces*. The disease mostly infects the plant during monsoon rains in the month of July and August. Rust is mainly identified with the presence of orange color on both the sides of leaves. In advancement of the diseases, blisters also appear which causes yellowing and leaf wrinkling. The rust mostly predominates in lower portion of the leaf. Chemically this disease is controlled by spraying Dithane Z-78 at the rate of 0.002 milliliter in a liter of water. Sulphur dusting is also recommended to control the crop

Leaf Blight: Leaf Blight is also a fungal disease caused by species of *Cercospora* and *Alternaria* fungi. Leaf blight is identified by the appearance of reddish brown circular spots on the upper surface of the leaf. Rain is the medium of rapid spread of this disease in the crop. The leaf portion affected by the fungus results in curling from inward which is then followed by easily breaking and falling down. Not only leaves, severe infection also leads to damage and drying of shoots and branches. Ultimately it causes bark splitting and its bereavement. Severe infection results in about 50% of crop loss. For the blight caused by these two fungi, the chemical method of control is spraying of Dithane Z- 78 at the rate of 0.002 milliliter in a liter of water. Dusting of Bordeaux mixture that is the mixture of Copper Sulphate, Slaked Lime or Calcium Hydroxide and Water (particularly 1 kg each of Copper Sulphate and Slaked Lime in 100 liters of water) ratio of 5:4:50 are also done. Chemical spray should be monthly followed starting from May till the pruning time

Phyllody: The plants affected by this disease produce symptoms like malformed and reduced green flower like structure. There is no fragrance in the crop. The green lobes of corolla also reduce and there is no appearance of flower in the plant as the flowers get transformed to green colored parts. Spraying of Tetracycline hydrochloride at the rate of 250 parts per million effectively reduces the disease appearance

Mosaic: Mosaic is a virus disease which is considered as incurable. There is appearance of irregular yellow patches on the upper side of the leaf. Plants infected by Mosaic have yellowish green and stunted appearance with the presence of comparatively small leaves. The symptoms are clearer in old leaves of Jasmynes. Since it is a viral disease and it has no chemical control. Uprooting and throwing away of all the infected plants is found as an effective measure of control

Root Rot: Root rot in Jasmine is caused in the soil having dampness. It is also one of the major diseases attacking the crop that result in damage of entire plant area. When crop is grown in heavy soils which do not have good drainage capacity, the roots start rotting and leaves also start curling and fall resulting in ultimate death of the entire plant. The control measure to this infection is to dig the entire plant and throw it away from the cropping area or burnt. This will prevent the fungus to spread in other plants

Nematode Attack: Root knot nematode mostly attacks crops that are grown in hot and humid areas. The larval stage of this nematode invades the root resulting in swelling or gall formation. The gall acts as a parasite and consumes all the nutrients from plant resulting in sudden death. In Jasmine it badly affects the flower formation. It can be effectively controlled by application of botanical pesticides which are Neem (*Azadirachta indica*) based.

Deficiency Symptoms in Jasmynes: Jasmine sometime shows Iron deficiency. It starts with yellowing of leaves in the middle of veins. In advance stage the leaves completely turns to creamy white and die. This deficiency can be overcome by foliar application of Iron Sulphate at recommended doses

Pest Management Practices

There are some common management practices which should always be adopted while growing any ornamental plant either in home garden or for commercial purposes. Before planting any crop, check the soil conditions. It includes nutrients availability, water holding capacity, drainage capacity, acidity or alkalinity, presence of perennial weeds, insect larvae or other stages that damage the crop, presence of infection causing microorganisms. If the problem related to any of these is found in the soil, it should be rectified before planting the crop. If possible, try to plant the resistant varieties. Removal of dead and diseased plants from the cropped area to minimize the spread of infection and infestation of pests is advisable. Soil sterilization, Mulching, Exposure to sun, getting rid of vectors that help in transmission of infections, Deep ploughing once in a year are some of the measure to be followed n constant basis in order to avoid pest invitations

Harvesting

The flower should be harvested at right time to utilize the full benefit. Hence it is must to know about the proper time of harvest and harvesting indices. The flowers start blooming during March-April. The first harvesting of flowers take place after six months of crop planting however it also depends upon the purpose for which the operation is to be carried out. If the flowers are required to use it as fresh, the harvesting index is when the flower develops fully but unopened. But is case of extraction, full developed opened fresh flowers are harvested

Ideal Time of Harvesting Jasmines: The ideal time of harvesting fresh Jasmine flowers in early morning before sunrise while the time can be extended but not after noon in case of flowers required for extraction. Harvesting during noon hours considerable reduces the quality of essence of flowers. The flowers should be harvested carefully to prevent damage. Mishandling also affects the quality of harvested produce

Yield of Jasmines

Yield of Flower: There is a direct relation between climatic conditions and yield of the flower however it also depends upon type of species grown. he flower yield is at maximum for nine years and from tenth year onwards, it starts declining. The average yield of *Jasminum sambac* around 1,000 to 1,600 kg per hectare while that of *Jasminum grandiflorum* is up to 3,000 per hectare. The yield also increases if proper crop management practices are adopted

Yield of Essential Oils: The yield depends upon the species, extraction method used, time of harvesting and season. The concrete yield from Jasmine flowers extracted using Solvent extraction methods is higher than water distillation. The concrete is purified further by alcohol to obtain absolute which is then used in perfume industries

Post Harvest Handling

The time of harvesting the flowers greatly influence the post harvest handling of the produce. The harvested flowers if treated with chemicals have longer shelf life as compared to flowers without treatment. Chemicals like Boric Acid, Aluminum Sulphate, and Silver Nitrate are used to enhance shelf life of flowers. Chemical treatment extends the longevity of flowers up to three days. This also helps in retaining fragrance. For packaging of the flowers, grading is generally less practiced and flowers are packed according to their size, freshness and shape. For transportation to distant areas, corrugated fiber boxes are used while in case of local transportation the flowers are packed in bamboo baskets. The main aim of packaging is to minimize cost and maximize output. Before packing, the flowers are also treated with cold water

Marketing of Jasmines

Marketing is easier if all the required resources are available at same time. It includes labor, post harvest practices, packaging materials, transportation facilities and road connectivity. Selling Jasmine flowers for extraction purposes fetch more prices as compared to selling for other purposes. The yield of flowers increases from second year onwards thereby increasing net returns.

Extraction of Jasmines

The oil obtained after extraction of petals and sepals of Jasmine flower is used for various purposes and it has very high commercial value. Some of the major uses are already detailed in this book. The fragrant present in the flower is due to presence of a volatile oil in the epidermal cells of petals and sepals. There are various methods of extracting Jasmine flowers in order to obtain maximum amount of concrete however solvent extraction method is considered as one of the best method because of its easy availability, low operating cost, and mild extracting condition. In Solvent Extraction method, a hydrocarbon mainly ethanol or ethyl alcohol is added to the plant material. The purpose of this is to dissolve essential oils present in the flowers. The solution obtained is then filtered and concentrated by distillation method, the product obtained is known as concrete. A concrete is a mixture of wax and essential oil. To extract pure oil or absolute, alcohol is used and when the alcohol evaporates completely, it leaves the oil.

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