

**Course Code – SIUSBOT22 – Credits 4 – Paper – II – Unit – III – Medicinal Botany and Horticulture (15 Lectures)**

**MEDICINAL BOTANY AND HORTICULTURE**

- **Applications of Aromatherapy: Sandal wood oil, Lavender oil, Geranium oil**
- **Herbal cosmetics in skin and hair care.**
- **Introduction to Horticulture and various Garden locations: Fence, Avenue, Hedge, Edge, Lawn, Arches and Pergolas.**

**Aromatherapy:** It is defined as “the therapeutic application or medicinal uses of aromatic substances (essential oils) for holistic healing. It involves the inhalation and application of volatile essential oils from aromatic plants to restore or enhance health, beauty and well-being. It is the therapeutic use of essential compounds obtained from flowers, plant parts and aromatic shrubs. The primary form of aromatherapy application involves use of essential oils topically to the skin via massage, inhalation, aromatic baths etc.

**Applications of Aromatherapy:**

1. Aromatherapy is a complementary therapy which supports conventional treatments of various diseases or disorders.
2. It soothes the nervous system and heals the patient not only at physical level but also at mental levels.
3. Aromatherapy also treats the patients spiritually and develops the sixth sense of intuition and extrasensory perception.
4. Aromatherapy oils balances and lift up energy levels of body.
5. Inhaling essential oils stimulates the olfactory system, the part of the brain connected to smell, including the nose and the brain. As the oil molecules reach the brain, they help to regulate emotions, anxiety, agitation, stress and depression.
6. It enhances blood circulation in body and regulates the heart rate, blood pressure and breathing.
7. It cures respiratory problems like cough, cold, congestion, bronchitis, etc.
8. It controls hormonal balance and useful in treating menstrual and menopausal problems
9. It is very effective in case of nausea, fatigue and insomnia.
10. It is also used commercially for skin care and hair care.

**Aromatherapy oils and their applications:** Following are the commercially available and widely used aromatherapy oils along with their applications.

**1. Sandal wood oil**

- **Botanical name:** *Santalum album*
- **Common names:** Chandan, Sandal wood, Shrikhand
- **Family:** Santalaceae

- **Part used:** Heartwood
- **Uses**
  - **Mental clarity:** Sandalwood oil promotes mental clarity when used in aromatherapy or as a fragrance. Hence, it is often used for meditation, prayer and in other spiritual rituals. Its fragrance is due to presence of alpha-santalol which generates attentiveness and mood. It increases focus and calmness of mind.
  - **Relaxing and calming agent:** The therapeutic application of sandalwood oil has smoothening and calming effect on central nervous system. Therefore, it helps to relieve anxiety, stress and depression.
  - **Skin treatment:** Sandalwood oil is valued in aromatherapy for its moisturizing effect. It also possesses skin caring and healing properties hence used treat various skin diseases. It acts as astringent and skin toner. It induces minor contractions in soft tissues like gums and skin. Thereby, it helps to soothe, tighten, tone and cleanse the skin. The oil also fights against acne and dark spots. It also has ability to cure acne, eczema, psoriasis, acne and warts.
  - **Anti-aging agent:** Sandalwood oil possesses antioxidant properties which reduces the damage caused by free radicals and slows down the process of aging.
  - **Anti-viral and antiseptic agent:** Sandalwood is an excellent anti-viral agent. It has been found to be beneficial to prevent replication of common viruses like Herpes simplex virus. Being antiseptic the oil helps to heal superficial wounds, pimples, warts or boils.
  - **Anti-inflammatory agent:** Sandalwood is also an anti-inflammatory agent that may provide relief from mild inflammation such as insect bites, contact irritations or other skin infections.
  - **Febrifuge:** The oil is used to treat fever and headache.
  - **Expectorant:** Inhalation of sandalwood oil is an excellent expectorant which is helpful in the treatment of colds and coughs.
  - **Urinary Tract Infections:** The oil is supportive in the treatment of infections of the lower urinary tract.
  - **Anti-cancer effects:** Sandalwood oil contains alpha – santalol which acts as chemopreventive agents and reduces tumour incidence.

## 2. Lavender oil

- **Botanical source:** *Lavandula angustifolia* (*Lavandula officinalis*)
- **Common name:** Lavender
- **Family:** Lamiaceae
- **Part used:** Flowers, Leaves
- **Uses:**
  - **Hair growth:** Scalp massage with Lavender essential oil stimulates hair growth. The hair grow thicker and faster than normal. It prevents premature baldness.

- **Antimicrobial agent:** Lavender oil possesses antimicrobial properties and prevents the growth of pathogenic bacteria and fungi. It is also used to treat the scalp infections like dandruff, head lice and itchy scalp.
- **Anti-inflammatory agent:** Lavender oil is used as a home remedy for skin inflammation, scalp inflammation, skin dryness, ulcers and burns. It reduces the inflammation and speed up the healing process.
- **Relaxant and Calming agent:** Lavender oil possesses divine fragrance. It's wonderful aroma calms down the central nervous system and produces immediate calming down effect on body and mind. Therefore, Lavender oil is diluted with carrier oil and is used as a relaxant in massage therapy. It is also used as bath oil to refresh and charge the body and mind. It is used for relaxation, pleasure and better mood.
- **Insomnia treatment:** Lavender oil is a gentle sedative that can help relieve anxiety and stress. Owing to its calming property it is used as sleep aid in the treatment of insomnia.
- **Bee sting / Insect bite:** Lavender oil is applied on bee sting or insect bite to stop skin itching and also to reduce swelling. It decreases redness and pain.
- **Skin treatment:** Lavender oil is valued in aromatherapy for its skin caring and healing properties. It has ability to cure cuts, acne, sunburns, cold sores, eczema, dermatitis and warts. In case of cuts and wounds, the oil stops bleeding, cleanses the wound and kill bacteria.
- **Nausea or motion sickness:** To alleviate the symptoms of motion sickness or nausea, few Lavender oil drops are applied on end of tongue and behind the ears.
- **Nosebleed and Hay fever:** Lavender oil is also used in the treatment of nosebleed and Hay fever.

### 3. Geranium oil

- **Botanical source:** *Pelargonium graveolens*
- **Common name:** Rose Geranium, Sweet scented Geranium
- **Family:** Geraniaceae
- **Part used:** Leaves and flowers
- **Uses:**
  - **Relaxant and Calming agent:** Geranium oil possesses sweet and soothing fragrance. Therefore, it is diluted with carrier oil and is used as a relaxant in massage therapy. It is used as bath oil to treat anxiety, depression and insomnia. It is used as a massage oil to help relieve aching muscles and stress. It can also aid in uplifting mood, lessening fatigue and promoting emotional wellness.
  - **Skin treatments:** It can help eliminate the appearance of scars and dark spots by helping improve blood circulation just below the skin surface. It also helps to promote an equal distribution of melanin throughout the skin. It causes your gums, muscles, intestines, skin, blood vessels and tissues to contract due to its astringent properties. It assists in preventing skin problems like sagging and wrinkling. It gives facial muscles a toned appearance.

- **Antimicrobial agent:** It contains antibacterial, antifungal, antiseptic and antioxidant properties. Due to this, it used to cure various bacterial and fungal infections of body. Owing to its antiseptic properties, Geranium oil helps in healing of burns, frostbite and insect bites.
- **Anti-inflammatory agent:** Geranium oil also functions as pain-killer and anti-inflammatory agent. It helps to reduce skin inflammations and rashes. Geranium oil also has impressive anti-neuro-inflammatory effects. Due to which it is very effective in the treatments of various neurodegenerative diseases such as Alzheimer's disease and dementia.
- **Wound healing agent:** It can speed up the healing of wounds by triggering blood clotting. This also helps in stopping toxins from reaching blood stream through open wounds.
- **Detoxification:** It assists in detoxification of body by increasing the rate of urination. This process not only not only removes toxins from the body, but also aids in digestive function and helps to inhibit the excess gas in the intestines.
- **Deodorant:** It can serve as a deodorant due to its fragrant scent. It can also help prevent body odor due to its antibacterial action.
- **Weight-loss:** Geranium essential oil acts as a natural diuretic. It stimulates the lymphatic system and aids in elimination of excess water from the body. It is helpful in minimizing cellulite and edema of the ankles.
- **Hormonal balance:** Geranium oil is a tonic for the adrenal cortex which regulates the release of hormones. The oil helps to maintain hormonal balance specifically in cases of puberty, premenstrual phases, menopause, sterility and menstrual irregularities. It is helpful in managing chronic exhaustion and fatigue. Geranium oil application can effectively combat the symptoms of hormonal imbalance such as depression, anxiety, nervousness and fear.

### HERBAL COSMETICS

The word cosmetic was derived from the Greek word "kosmtikos" meaning having the power, arrange and skill of decoration. It is defined as articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness or altering the appearance. The science of Ayurveda had utilized many herbs and floras to make cosmetics for beautification and protection from external affects. This gave birth to the concept of herbal cosmetics.

The term 'Herbal cosmetic' is as the natural cosmetic which is formulated, using different cosmetic ingredients, to form the base in which one or more herbs or their extracts are added to enhance the effect. Herbal cosmetics provide following advantages:

- The herbs provide the human body with useful **nutrients, antioxidants, vitamins** and minerals without causing any side effect.
- Herbal cosmetics are natural and free from all the harmful synthetic chemicals which otherwise may prove to be toxic to the skin.
- Compared to other beauty products, herbal cosmetics are hypo-allergenic and are by tested dermatologists to be safe to use anytime.
- Herbal cosmetics possess desirable physiological activities, such as appearance, skin healing, smoothening, enhancing and conditioning properties with the help of herbal ingredients.
- The herbal cosmetics are suitable for all skin types.
- They offer availability of wide range of products for selection and choice.
- Herbal cosmetics are easily available in affordable price range.

**Classification of herbal cosmetics:** Herbal cosmetics can be classified on the basis of the **dosage form** and the **part of the body to be applied** for.

**A. Dosage form:** These are as follows:

- **Emulsion:** Cold cream, vanishing cream, liquid cream
- **Powders:** Face powder, Talcum powder, Tooth powder
- **Cakes:** Rouge compacts, make-up cake
- **Sticks:** Lipstick, chap stick, kajal stick, deodorant stick
- **Oils :** Hair oils
- **Mucilage :** Hand lotion
- **Jellies :** Hand jelly, wave set jelly, brilliantine jelly
- **Suspension :** Cosmetic stockings
- **Paste :** Tooth paste, deodorant paste
- **Soaps :** Shampoo soap, shaving soap, toilet soap
- **Solutions :** After shave lotions, hair set solutions and lotions

**B. Parts of the body to be applied for:** These are as follows:

- Herbal cosmetics for **Skin-care**
- Herbal cosmetics for **Hair-care**
- Herbal cosmetics for **Nail-care**
- Herbal cosmetics for **hand and foot-care**
- Herbal cosmetics for **eye-care**
- Herbal cosmetics for general **body-care**

### HERBAL COSMETICS FOR SKIN CARE

The herbal cosmetics for skin care include powders, creams, lotions, deodorants, bath and cleansing products, make-up preparations and suntan preparation. The requirements for the basic skin care are as follows:

- **Cleansing agent:** These remove the dust, dead cells and dirt that choke the pores on the skin, e.g. Coconut oil, sesame oil and palm oil.
- **Toners:** The toners help in tightening the skin and protect it from environmental air pollutants, e.g., Geranium, sage, lemon and essential oils.
- **Moisturizing agent:** The moisturizing agent helps the skin to become soft and supple, e.g., Almond, Jojoba, *Aloe vera*.

Common herbal cosmetics used in hair care are described below:

- A. **Face Mask:** Face masks are used to treat and improve the condition of the facial skin. A good face mask should calm, soothe, tighten, tone, hydrate, nourish and rejuvenate the facial skin. It is a non-toxic non-irritant. It helps to remove dirt and impurities from the skin by acting as an exfoliating agent. It improves blood circulation. It improves the facial complexion. The face mask is a combination of many ingredients like clay, black mud, *Aloe vera*, seaweed, algae, essential oils, massage oils, herbs and vitamins. It is applied on the face in the form of paste or solution and is allowed to stay for 10-15 minutes. There are different types of masks viz., clay masks, setting masks, cream/gel masks. **Clay masks** help draw oil and dirt to the skin surface. They contain clay, mud or bentonite for their tightening and sebum-absorbing effects. **Cream** or **gel masks** are formulated to hydrate and nourish the skin. **Setting masks** are cool and refreshing masks which harden into a rubbery state and need to be peeled off at the end.

Following are the most commonly used ingredients in face mask preparations at the home-scale level:

- ✓ **Cucumber:** It acts as a cooling, soothing and healing agent mainly for skin and eyes.
- ✓ **Avocado:** It is rich in oil and vitamins like A, B<sub>1</sub>, B<sub>2</sub>, D and E and hence forms a good choice for dry and sensitive skin.
- ✓ **Papaya:** It contains papain (protein-digesting enzyme) which dissolves the dead outer layer of the skin.

- ✓ **Potatoes:** - It acts as a cleansing and healing agent mainly for oily skin and eyes.
- ✓ **Honey:**It has hydrating, toning and tightening action.
- ✓ **Eggs:** Egg white is also used to tighten and tone the skin.
- ✓ **Yogurt:**It contains natural lactic acid, which helps to exfoliate the skin. It is used as a skin softening agent for all skin types.

Following are the examples of easy face mask preparations at the home-scale level:

#### **i. Face Masks for Normal skin**

- ✓ **Skin Detox mask:** Mix  $\frac{1}{2}$  teaspoon of each ingredient – activated charcoal, turmeric and curd to prepare a paste. Apply it on face and rinse off with warm water after 15 minutes.
- ✓ **Bael fruit face mask:** Mix 2 teaspoons of Bael fruit extract or powder in 1 tablespoon of honey. Apply on face and wash after 20 minutes with cold water. It tones and tightens the skin.
- ✓ **Milk face mask:**Apply fresh cold raw milk on face with the help of cotton swab and wash after 20 minutes with luke-warm water.It cleanses and nourishes the skin.
- ✓ **Apricot face mask:** Mix 2 tea-spoon of apricot pulp, 2 tea-spoon of Honey,  $\frac{1}{2}$  tea-spoon of Lemon juice and  $\frac{1}{2}$  tea-spoon of Almond oil to prepare a paste. Apply on face and wash after 20 minutes with cold water. It acts as a best toner and gives soothing and refreshing effect.

#### **ii. Face Masks for Dry skin**

- ✓ **Mint face mask:** Soak 1 tablespoon of multanimitti in 1 tablespoon of fresh curd by adding 1 teaspoon of mint paste for half an hour. Apply on face and wash after 20 minutes with cold water. It gives cleansing and refreshing effect.
- ✓ **Egg face mask:** Beat the 1 egg yolk with 1 teaspoon milk powder and  $\frac{1}{2}$  teaspoon honey. Apply on face and wash after 20 minutes with luke-warm water. It nourishes the skin and rejuvenates it.

#### **iii. Face Masks for Oily skin**

- ✓ **Potato face mask:**Prepare a paste by mixing 2 teaspoons of finely grated potato with 2 teaspoons of multanimitti. Apply on face and wash after 20 minutes, first with luke-warm water and then with cold water. It rejuvenates the skin and improves the complexion.

- ✓ **Cucumber face mask:** It is prepared by mixing 1 tablespoon of cucumber juice with  $\frac{1}{2}$  teaspoon of mint paste. Apply on face and wash after 20 minutes with cold water. It gives cooling, soothing and refreshing effect.
- ✓ **Papaya face mask:** Apply 2 tablespoon of papaya fruit pulp as face mask wash after 20 minutes with luke-warm water. It gives radiant complexion.

**B. Bath Oil:** It is scented oil added to bath water. It is prepared by mixing essential oils like rose, chandan, citrus, myrrh, mint into carrier oils like almond, jojoba, sesame, castor, coconut, etc. Its' fragrance not only relaxes the body but also refreshes the mind.

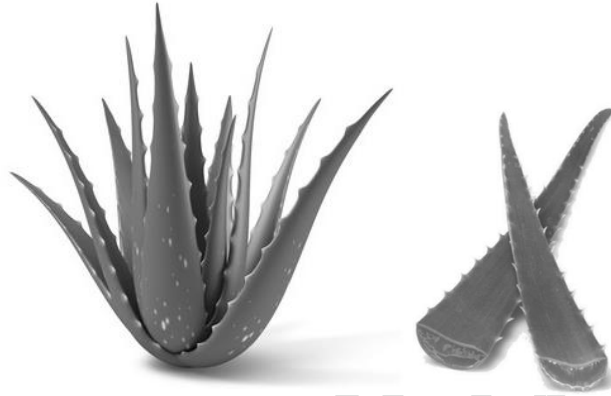
- **Properties:** It acts as a refreshing agent. It cleanses the body. It imparts pleasant odour. It gives relaxing effect.
- **Types:** The bath oils are classified into two types: Emulsifiable type and Oily type. Emulsifiable type of oil is a light oil formulation that provides a unique sensorial moisturizing and cleansing effect. The oily type includes castor oil, alcohol, perfume and colour. A small quantity of these oils is added to bath water. The perfume part gets immediately absorbed in the body while the oil floating on the water; form the film on body which gets slowly absorbed in the body while bathing. Castor oil is mainly used as it is easily miscible with alcohol. The amount of alcohol added is directly related to the viscosity of the final product. These oils do not contain detergent or water softening action or cleansing property.
- **Preparation:**Ingredients include 50% castor oil, 10% alcohol, 7% solubilizer, 30-40% water, 3% perfume & colour. Bath oils made recently in industry are based on the use of synthetic non-foaming detergent. Water is used as diluent. Solubilizer is used to get the clear final product. Addition of perfume and colour enhances the appearance and effect of the final product. The method of manufacturing is simple. In it, the sulphated oil and the detergent are kept in a tank. Then the perfume and solubilizing agent are added into the tank and stirred vigorously to get uniform homogenous product. The colour is added at the end to get final clear colourful product. The bath oil is ready to bottle for sell.

**Plants used in preparation of Skin care herbal cosmetics:** They are as follows:

### 1. Aloe



- **Botanical name:** *Aloe barbadensis* or *Aloe vera*
- **Common names:** Curacao Aloe, Barbados Aloe
- **Family:** Liliaceae
- **Part used:** Leaf
- **Uses**
  - It is used in skin burns and skin diseases.
  - It also promotes wound healing and prevents darkening of skin
  - Leaf juice is an astringent and protects the skin from harmful effects of UV rays.



*Aloe vera*

## 2. Neem

- **Botanical name:** *Azadirachta indica* (Synonium: *Melia azadirachta*)
- **Common names:** Neem, Margosa, Indian lilac.
- **Family:** Meliaceae
- **Part used:** Bark, Leaves, flowers, seeds, oil and gum



*Azadirachta indica*

- **Uses**
  - Bark and leaves are bitter, astringent, antiseptic, and insecticidal.
  - They are also used in reducing burning sensations, leprosy, skin diseases, leucoderma, boils, eczema, malaria and intermittent fevers.
  - It is the best antiseptic and anthelmintic drug and very good for skin and blood disorders.

### 3. Haldi

- **Botanical name:** *Curcuma longa*
- **Common names:** Turmeric, Haldi, Haridra.
- **Family:** Zingiberaceae
- **Part used:** Rhizome
- **Uses**
  - Rhizomes are useful in inflammations, wounds, leprosy, allergic conditions, skin discoloration, ringworm infection and skin diseases.
  - Turmeric is used both internally and externally to impart fair glow to the skin.



*Curcuma longa*

#### HERBAL COSMETICS IN HAIR CARE

The herbal cosmetics for hair care include shampoos, tonics, hair dressing, hair waving preparations, beard softeners, shaving media and depilatories (hair removers).

The qualities of an ideal herbal hair care product are as follows:

- It cleanses hair and scalp without removing the natural oil.
- It replaces back the lost proteins, moisture and nutrients to the hair.
- It increases the strength and elasticity of hair.
- It protects the hair cuticle.
- It prevents drying of hair and the moisture loss.
- It conditions the hair without building up on the scalp.
- It gives brilliant thickness, softness, shine and lustre to the hair.

Common herbal cosmetics used in hair care are described below:

**A. Herbal Shampoo:** Herbal shampoos are the cosmetic preparations that with the use of traditional Ayurvedic herbs are meant for cleansing the hair and scalp. They are used for removal of oils, dandruff, dirt, environmental pollutions, etc. The herbal shampoos

lubricate, condition and medicate the hair and scalp. They stimulate hair growth and help to maintain the hair colour. Commonly used herb in hair care cosmetics are Shikakai, Reetha, Hibiscus, Aloe, Henna, Nagarmotha, Lemon, Amla, etc. Shikakai and Reetha act as cleansing agent. Hibiscus, Aloe and Henna are good conditioners. Hibiscus and Henna also help to maintain the hair colour. Nagarmotha and Lemon act as anti-dandruff agents. Amla being rich antioxidant prevents premature greying of hair.

- a. **Mix herb shampoo:** Two tablespoons of each powder, viz., Reetha, Shikakai and Amala are mixed with two cups of hot water to prepare a paste. The paste is applied on hair and is kept for 10 minutes and then washed off. It cleanses the hair and gives better volume and appearance to the hair without causing any side effect or damage.
- b. **Protein shampoo:** Apply egg-white mixing with equal quantity of aloe gel to provide proteins and other nutrients to the hair and scalp. It is applied to the hair root and is kept for 10 minutes and then washed with herbal shampoo. It gives cleansing and conditioning effect.
- c. **Hair health shampoo:** One tablespoon of each powder, viz., Reetha, Shikakai, Nagarmotha, Mehendi and Amala are mixed with one cups of hot water to prepare a paste. The paste kept overnight as it is. Next day morning, it is applied on hair and is kept for 10 minutes and then washed off. It not only cleanses the hair but also gives better volume, texture and shine to the hair and makes them healthy.
- d. **Anti-hair-fall shampoo:** A freshly ground paste Sesame seeds in cow milk is applied on hair and washed off after keeping for half an hour. The treatment needs to be repeated daily for 1 to 2 weeks to see the desired effect. It completely prevents hair loss and encourages healthy hair growth.
- e. **Hibiscus leaf shampoo:** Hibiscus leaves are crushed and soaked in hot water for half an hour to prepare mucilaginous decoction. It is filtered and the mucilaginous extract is applied as shampoo. It cleanses and conditions the hair. Continuous application gives good volume and lustre to the hair.

**B. Hair Dye:** Hair dye is a temporary colouring preparation which is used to colour the hair. They are used any time to effect a physical change in the shade of the hair colour. Many synthetic preparations are available in the market, but they have various side effects like skin irritation. With the use of herbal hair darkeners, one can produce the

desirable colour without having side effects. The herbal preparations not only darkens the hair but it act as the hair tonic which make hairs healthy and shiny. They are available in the form of powders, crayons, lacquer, etc. There are different types of hair dyes such as bleaching agents, temporary colouring agents, synthetic organic dyes, inorganic dyes and natural organic dyes.

**Natural organic dye:** It is herbal in origin and is obtained from wood, twigs, leaves, flowers, fruits, seeds from plants in the form of powders, infusions, decoctions, packs, etc. The most commonly exploited plant for natural organic dye preparation is *Lawsoniainermis* (Henna). Henna leaves contain an active principle 'Lowson' which acts as a dying agent.

**Preparation:** Commercially available Henna dye consists of Henna extract acidified with mild organic acid like citric acid. The henna extract is made using freshly ground paste of Henna leaves with 2% Sodium Lauryl sulphate or soap-nut or reetha powder. To modify the reddish shade of Henna towards dark brown to blackish side, the dried leaf powder of *Indigofera* is added to it. Hematoxylin obtained from the heart wood of some trees also gives black colour after oxidation to Henna dye. Decoctions of woody barks or nuts also forms good hair dyes. Wood extract of *Acacia catechu* (Kaath) produces brownish to black coloured hair dye due to presence of active principle 'Catechol'. Catechu in combination with tannic acid produces all the shades of hair dye from blond to black. Besides, it also acts as a mordant and helps to fix the hair colour. The leaves of walnut tree (*Juglanscinera*) are used as a source of brown coloured dye. However, it is not long lasting hence; it always needs to be mixed with some other natural organic dye before use. Besides, Nutgalls are also used in production of natural hair dye. Nutgalls are the pathological excretion of leaves and twigs of white oak tree (*Quercusinfectoria*) caused by bacteria, insects or worms. These nutgalls are rich in tannins and gallic acids which act as a source of 'Pyrogallol' which acts as hair dye.

**C. Hair Oil:** Hair oil is a rich nutritive agent which is used to massage the hair and scalp.

**Properties:** It prevents headache, baldness, hair-fall and greying of hair. It improves the tone of the heads. Oil massage to head makes the hair strong, long, silky, shiny and black. It makes the hair roots very firm. It helps to keep body and mind cool and imparts radiance and glow to the face. Oil massage also rejuvenates the brain and other vital organs of the body. Hair-fall is a common problem caused due to aging, pollution, food

adulterations, drug reactions, over-use of chemical shampoos, anxiety, tension, stress. All these factors mainly act on hair follicle and make it weak and thin leading to hair-fall. In such situation, herbal hair oil works on the roots of the hair to strengthen it and thereby stop the hair-fall by imparting new hair growth.

**Plants and their role:** Herbs such as Bhringraj/Maka, Methi, Amala, Brahmi, Hibiscus, Citrus, Nagarmotha, Shikakai, Reetha, etc. are used in herbal hair oil preparations. Coconut, Castor, Sesame, Almond, Jojoba, Olive oil, etc. are used as base oil for herbal hair oil production. The castor oil acts as a cooling agent and promotes hair growth. Sesame oil softens the scalp. Coconut, Almond, Jojoba, Olive oils lubricates and nourishes the hair and rejuvenates the scalp. Maka, Bhringraj, Methi, Jaswand bring about luxuriant hair growth and slowly improves melanin production in hair. Amala gives cooling and cleansing effect. It prevents infections and allergic reactions to hair. Citrus, Maka, Nagarmotha, Shikakai, Reetha act as an anti-dandruff agent and also improve hair texture.

**Preparations:** Following are the methods of herbal hair oil preparations at home scale level:

▪ **Hair tonic oil**

- **Ingredients:** 100g Bhringraj/Maka powder (*Eclipta alba*), 10g Methi powder, 10g Amala (powder / grated), 100ml castor oil, 500ml Coconut/Til oil.
- **Method:** Make a paste of all the herbal ingredients in mixer and grinder. Add the paste to 500ml of Coconut/Til oil. Heat it gently on a low flame till all the water content gets completely evaporated. Cool it down and filter it. To the filtered oil, add 100ml of castor oil and mix well. The herbal tonic oil is ready to use.

▪ **Brahmi, Amalaki Hair oil**

- **Ingredients:** 50g Bhringraj/Maka powder (*Ecliptaalba*), 100g Neer-Brahmi powder (*Baccopamonneri*), 100g Amala (powder / grated), 10ml cow milk, 500ml Coconut oil.
- **Method:** Make a paste of all the herbal ingredients in cow milk by grinding. Add the paste to 500ml of Coconut oil. Heat it gently on a low flame till all the water content gets completely evaporated. Cool it down and filter it. The herbal oil is ready to use.

▪ **Brahmi, Maka, Jaswand Hair oil**

- **Ingredients:** 100g Bhringraj/Maka powder (*Eclipta alba*), 100g Neer-Brahmi powder (*Baccopamonneiri*), 100g Jaswand flowers (*Hibiscusrosa-sinensis*), 100g Amala (powder / grated), 50ml castor oil, 500ml Coconut oil
- **Method:** Make a paste of all the herbal ingredients in mixer and grinder. Add the paste to 500ml of Coconut/Til oil. Heat it gently on a low flame till all the water content gets completely evaporated. Cool it down and filter it. To the filtered oil, add 100ml of castor oil and mix well. The herbal hair oil is ready to use.

**D. Hair Cream:** Herbal hair cream is a nutritive cream which nourishes the hair. It is a form of hair mask which helps to control hair fall and hair damage. Some hair creams act as a tonic and also help to style the hair in different ways. Hair creams are the water based oil emulsions which very often contain Almond oil and Lime water. These are widely accepted famous compositions because of it's creamy texture and ability to provide excellent shine and grooming property. The film that is formed on hair is water resistant and hence can be used in wet climate also.

**Preparations:**

| Type 1 Hair cream<br>Ingredients  | Type 2 Hair cream<br>Ingredients  | Type 3 Hair cream<br>Ingredients   |
|---|---|--|
| <ul style="list-style-type: none"> <li>• <b>Mineral oil:</b> 8.5%</li> <li>• <b>Lanolin:</b> 3.5%</li> <li>• <b>Bee wax:</b> 1.5%</li> <li>• <b>Glycerol:</b> 4.5%</li> <li>• <b>Cholesterol ester:</b> 9%</li> <li>• <b>Perfume</b></li> <li>• <b>Preservatives</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Mineral oil:</b> 36%</li> <li>• <b>Castor oil:</b> 16%</li> <li>• <b>Almond oil:</b> 16%</li> <li>• <b>Water:</b> 50%</li> <li>• <b>Diglycol disteariate:</b> 6%</li> <li>• <b>Perfume</b></li> <li>• <b>Preservatives</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Mineral oil:</b> 32%</li> <li>• <b>Isopropylamine:</b> 0.3%</li> <li>• <b>Diglycoldisteariate:</b> 6%</li> <li>• <b>Stearic acid:</b> 0.6%</li> <li>• <b>Alcohol:</b> 2.6%</li> <li>• <b>Absorptive base:</b> 2.6%</li> <li>• <b>Water:</b> 58%</li> <li>• <b>Perfume&amp;Preservatives</b></li> </ul> |

In the hair cream preparation, the water forms emulsion with the oil to give it a creamy texture. To prevent breaking of this emulsion during application, emulsifiers like Isopropylamine and Diglycoldisteariate are added. The emulsifiers remove the watery feel of the cream during application and act as emollient (moisturizer). The Bee wax adds the shine, gloss, smoothening and stability to the cream. Use of perfume and preservations increase the fragrance and shelf life of the product respectively.

**E. Hair Gel:** Hair gel is the herbal gel used in hair styling. It doesn't give shine or lustre to the hair but holds the hair in particular form or pattern for long time. The gums present in the hair gels give them this hair holding property. Gum Karaya, Tagacanth, Seed mucilage, pectin, gum Arabic, gelatine, *Sterculia urens* mucilage, flax seeds mucilage and water-soluble shellac are commonly used agents in herbal hair gel preparations. Gum tragacanth is most widely used agent but it does not mix easily with water hence it is first mixed with water soluble solvents like alcohol or glycerol and then is added to the water. Karaya gum is more mucilaginous than gum tragacanth. It has an characteristic smell of acetic acid which may be removed by adding borax or mild alkali. Depending upon the gum used, the products have uniform flexible form which helps to hold the hair in desired form. The gels prepared are allowed to dry out for condensation. The drying process may be fasten up by adding 10% alcohol. Polyvinyl Pyrolidone (PVP) is an alcohol best suitable for preparation of hair gel containing lanoline and glycerol derivatives. Lanoline provides excellent plasticity and emollient (moisturizing) effect. Hair gel preparation involves following ingredients and method:

**Ingredients:**

| <b>Type 1 Hair Gel<br/>Ingredients</b>  | <b>Type 2 Hair Gel<br/>Ingredients</b>  |
|---|---|
| <ul style="list-style-type: none"> <li>▪ <b>Karaya gum: 2%</b></li> <li>▪ <b>Ethyl alcohol: 5%</b></li> <li>▪ <b>Water: 93%</b></li> <li>▪ <b>Perfume</b></li> <li>▪ <b>Colour</b></li> <li>▪ <b>Preservatives</b></li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Tragacanth gum: 1%</b></li> <li>▪ <b>Ethyl alcohol: 6%</b></li> <li>▪ <b>Glycerol: 1%</b></li> <li>▪ <b>Castor oil: 2%</b></li> <li>▪ <b>Water: 90%</b></li> <li>▪ <b>Perfume, Colour, Preservatives</b></li> </ul> |

**Method:**

- Melt the gum with alcohol and stir slowly to expel out the air bubbles formed.
- Add glycerol, castor oil perfume, preservative and lastly water to it by constant stirring.
- Addition of castor oil helps in platinizing the gum film and preventing it from dullness.
- Continue stirring till the gum gets uniformly dispersed in the solution and homogenous product is prepared.

- Filter the product and allow it to dry for 2 to 4 hours to attain maximum viscosity.
- The product is ready to use.

**Plants used in preparation of Hair care herbal cosmetics:** They are as follows:

### 1. Henna

- **Botanical name:** *Lawsonia inermis*
- **Common names:** Henna, Hina, Mehendi.
- **Family:** Lythraceae
- **Part used:** Leaf, Flowers, Seeds.
- **Uses**
  - It is used as a natural dye for colouring hair.
  - It also acts as a hair tonic and conditions the hair.
  - Due to its astringent and antimicrobial properties, it cures dandruff problem.
  - It prevents hair fall and promotes new hair growth.



### 2. Maka

- **Botanical name:** *Eclipta alba*
- **Common names:** Bhringaraj, Maka, False daisy.
- **Family:** Asteraceae
- **Part used:** Entire Herbaceous plant, Seed oil.



- **Uses**
  - It is a good hair tonic.
  - It prevents hair fall, premature greying of hair and split ends.
  - It strengthens the hair roots and promotes hair growth.
  - Application of Bhringaraj leaf extract is effective in treating baldness.



### 3. Ritha

- **Botanical name:** *Sapindus mukorossi*
- **Common names:** Indian soapberry, Soap nut, Wash-nut, Ritha.
- **Family:** Sapindaceae
- **Part used:** Fruits
- **Uses**
  - Fruit pulp contains saponins which imparts cleansing properties.
  - Ritha extract is used as shampoo for washing hair.
  - The fruit pulp also has insecticidal properties due to which it is used get rid of lice problem and scalp treatments.



#### **Introduction to Horticulture and various Garden locations: Fence, Avenue, Hedge, Edge, Lawn, Arches and Pergolas**

The Latin words *hortus* (garden plant) and *cultura* (culture) together form horticulture, which is classically defined as the culture or growing of garden plants. When considered from the science and business perspectives, horticulture can be defined as the “Science and art of cultivating, processing and marketing of fruits, vegetables, nuts and ornamental plants”.

Horticulture has two primary goals, viz., to provide food and to impact environment or objectives. For the fulfillment of these goals, horticulture has been divided into four branches which are Pomology, Olericulture, Ornamental horticulture and Landscape Architecture.

- **Pomology:** The branch of horticulture involving production & marketing of fruit trees is called pomology. The area of land on which fruit trees are grown in a significant concentration is called an orchard.
- **Olericulture:** The branch of horticulture involving production & marketing of vegetables is called olericulture.
- **Ornamental horticulture:** The production & use of ornamentals is the branch of horticulture generally called ornamental horticulture. The subdivisions of this branch are floriculture & Arboriculture. Floriculture is the production & use of flowering plants. Arboriculture is the cultivation of tree plants.
- **Landscape Architecture:** Landscaping is the use of ornamental plants in conjunction with other elements to beautify a given area.

Landscape gardening is an aesthetic branch of horticulture which involves the application of garden forms, method and materials to develop natural artistic landscape creations. A landscape involves various locations such as Avenues, Hedges, Edges, Arches, Pergolas, Lawn and Fence. There are specific plants which suitable for a particular location. Their brief account is as follows:

**A. Avenues:** An avenue is generally a long roadway, pathway or drive way to reach the destination. The avenues give shade to the long pathway. Indigenous plants which are selected for avenues are also referred to as road side plants. Some of the plants are:

**i. *Delonix regia* (Gulmohar)**

**Family:** Leguminaceae, **Sub-Family:** Caesalpinae

**Description:** A large spreading, ornamental tree with bipinnate foliage. It is grown on roadside and in gardens along the avenue. Flowering time is April-May. The flowers are borne in large masses covering the whole tree. Flowers are light orange to deep scarlet in colour. It is a beautiful tree when in bloom and is suitable for planting as an avenue as well as in parks.

**ii. *Thespesia populnea* (Indian Tulip Tree, Wild Bhendi)**

**Family:** Malvaceae

**Description:** A medium sized quick growing evergreen tree. The leaves are heart shaped and form a huge canopy for providing shade. Flowers are large, bell-shaped and yellow in colour with reddish blotches at the base. Old flowers turn rosy-violet. This plant flowers throughout the year as well as provides shade and therefore, becomes suitable for avenue plantation.

**B. Hedges:** Hedges are screens used to give privacy to a garden. They are tall and serve as a compound wall.

**i. *Duranta plumieri* (Damayanti)**

**Family:** Verbenaceae

**Description:** Plants are tall thorny woody shrubs. Plants flower (white) throughout the year. It makes a firm hedge and stands severe trimming.

**ii. *Clerodendron inerme* (Wild Jasmine, Vanjai)**

**Family:** Verbenaceae

**Description:** Plants are medium heighted, thorny woody shrubs. Leaves are small, opposite and elliptic, simple. It is a well suited plant for topiary's also.

**C. Edges:** Edges are made to demarcate different areas of a garden. The plants are short and maintained in a continuous border like manner.

**i. *Pedilanthus tithymaloides* (Devil's backbone, Slipper spurge)**

**Family:** Euphorbiaceae

**Description:** It is a slender succulent shrub, deciduous and stem is much zigzag with milky latex. Leaves are alternate ovate, acute dentate, fleshy, thick, midrib prominent below. They are kept low by trimming.

ii. ***Lantana camara* (Ghaneri, Wild sage Plant)**

**Family:** Verbenaceae

**Description:** Plants are of medium height, thorny woody shrubs. Leaves are simple, small, opposite and elliptic. Flowers are beautiful in compact heads. The yellow and white flowering types are dwarf and hence are good for making edges. It forms a good edge which stands trimming very well. It is a well suited plant for topiary's also.

**D. Arches and Pergolas:** Arch is one of the important garden features. It is an arc which is supported by pillars and covered totally by clipping and training the climbing plants to form canopy. They are found near the entrance of the garden. Pergola is a series of rustic arches covered with climbers to form canopy. It forms a shaded walkway or passageway of pillars covered with climbers.

i. ***Ipomoea palmata* (Railway creeper)**

**Family:** Convolvulaceae

**Description:** It is a perennial climber. The plant bears palmately compound leaves and large, showy lavender coloured flowers. The plant is used as an ornamental climber for arches, pergolas and walls.

ii. ***Quisqualis indica* (Rangoon creeper, Madhumalati)**

**Family:** Combretaceae

**Description:** The plant is an ornamental climber with pinkish-red fragrant flowers in clusters. The leaves are opposite, elliptical with an acuminate tip and a rounded base.

**E. Lawns:** Lawn makes the major part of the gardens. As a matter of fact, no garden is complete and beautiful without having a good lawn. The green grass has a charm of its own. It accelerates the beauty of the garden and gives peace to the mind and eye. Some of the important lawn plants are as follows:

i. ***Cynodon dactylon* (Doob-grass)**

**Family:** Gramineae

**Description:** It is also called Haryali, Durva or Bermuda grass. It is the most common grass used for making lawn. It thrives well under hot, sunny weather. It is very hardy and can be grown in any type of soil.

ii. ***Paspalum conjugatum* (Ribbon grass)**

**Family:** Gramineae

**Description:** It is a low growing coarse grass. It spreads by runners and forms tufts which can be easily maintained. The leaves are glossy, slightly broad and ribbon like.

**F. Fence:** Fence also forms one of the important parts of the gardens. No garden is complete without a fence as it demarcates the boundary of the garden. It offers protection to the garden. Fence can be erected by using cement concrete and metal wires but many time plants with sharp thorns, rough texture, strong odour, bitter

taste, etc. are also planted along the fence to add to the protection further. This helps to prevent entry of animals into the garden. Some of the important fence plants are as follows:

i. ***Carissa carandus* (Karvand)**

**Family:** Apocynaceae

**Description:** It is a large, armed shrub with alternate branchlets. The plant shows presence of a pair of stout, sharp horizontal thorns. Leaves are opposite, coriaceous, elliptic. Due to presence of sharp thorns, it gives full protection from grazing animals, when planted as a fencing plant.

ii. ***Ziziphus jujuba* (Ber, Bor)**

**Family:** Rhamnaceae

**Description:** It is a small thorny tree. Leaves are small, ovate, roundish, glabrous above and buff hairy below. Due to presence of sharp thorns and hairy leaves, animals avoid eating this plant. Hence it gives protection against animals and therefore forms one of the best fencing plants.

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