

**ESSENTIAL OILS: MODERN TECHNIQUES APPLIED FOR EXTRACTION OF OILS****Sakshi Minocha†**

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JVWU, Jaipur, Rajasthan.**E-mail:** [saksmin7@gmail.com](mailto:saksmin7@gmail.com)**ABSTRACT**

Essential oils are extracted from plant organs like flowers, leaves, stems, roots, seeds, bark, and resin or fruit rinds containing concentrated liquid of complex mixtures of volatile compounds. The amount of essential oils found in these parts of plant ranges from 0.01 percent to 10 percent of the total. Essential oils are widely used to treat human diseases and contains bioactive compound which possess antibacterial, antiviral, antioxidants and anti-diabetic properties. The main goal of this article is to collect an overview of the various uses and modern techniques applied to extract the essential oils.

**Keywords:** Sources, types, applications & extraction methods.© [www.albertscience.com](http://www.albertscience.com), All Right Reserved.**INTRODUCTION**

Essential oils [1-5] are generally referred as the "life force" of plants. These are aromatic oily liquids extracted from different plants part like, leaves, peels, barks, flowers, buds, seeds, etc. These are used since ancient times for their preservative and medicinal properties.

These oils are used for their flavor and their therapeutic or odoriferous properties in products such as foods, medicines, and cosmetics.

Several techniques are used to extract essential oils from different parts like water or steam distillation, solvent extraction, expression under pressure, supercritical fluid and subcritical water extractions.

The effective way to use most essential oils is by external application or inhalation, though some can be taken internally. The use of essential oils include body oils, cosmetic lotions, baths, hair rinses, inhalation by steam, perfumes and room sprays. Essential oils are potent as sometimes cause skin irritation or other harmful effects.

**CLASSIFICATION OF ESSENTIAL OILS [2, 4-8]:**

1. **Top note classification-** These are volatile and delicate substances, derived from the flowers and leaves of the plant. If exposed to sunlight for long time they evaporate quickly. They are used to treat stress or fatigue, depression, and lethargy. Examples- sweet orange oil, pepper-mint oil, clary sage oil, basil oil, cinnamon oil, eucalyptus oil etc.
2. **Middle note classification-** These oils are extracted from the herbs and spices of the plant. They are used to treat stiff joints, muscle pull and balance the

mental turmoil. Example- rosemary oil, chamomile oil, lavender oil, pine oil, cardamom oil, etc.

3. **Base note classification-** They are extracted from gums and resins of the trees and are most expensive essential oils. They treat anxiety, anger, nervousness, mental pressures and balances body energy level. Examples- vanilla oil, sandalwood oil, frankincense oil, ginger oil, clove oil, rose oil, etc.

**SOURCES AND CHEMICAL COMPOSITION [3, 5-9]:**

Essential oils are extracted from plant organs like flowers, leaves, stems, roots, seeds, bark, and resin or fruit rinds. These are usually the complex mixture of both polar and nonpolar natural compounds.

**These are classified into two groups:**

1. **Volatile Oils-** It constitutes about 90–95% of the oil in weight, containing the monoterpene and sesquiterpene hydrocarbons, as well as their oxygenated derivatives with aliphatic aldehydes, alcohols, and esters.
  2. **Non-Volatile Oils-** It constitutes 1–10% of the oil, containing hydrocarbons, fatty acids, sterols, carotenoids, waxes, and flavonoids.
- ✚ **Terpene Hydrocarbons:** These are hydrocarbons constituting H and C atoms arranged in chains. These hydrocarbons may be acyclic, alicyclic, monocyclic, bicyclic, or tricyclic or aromatic made from isoprene units.

It consists mainly of monoterpene (C<sub>10</sub>) and sesquiterpene (C<sub>15</sub>), which are hydrocarbons with the general formula (C<sub>5</sub>H<sub>8</sub>)<sub>n</sub>.

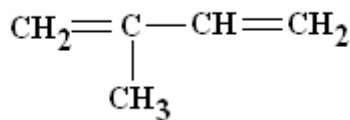


Figure 1: Isoprene

**Oxygenated Compounds:** These contain C, H and O. These are derived from the terpenes, and termed as "Terpenoids".

Some oxygenated compounds are:

- **Alcohols-** It contains Hydroxyl compounds, exists either as a free compound, or combined with a terpenes or ester and have anti-septic, anti-viral, bactericidal and germicidal properties.
- **Aldehydes-** Which have anti-fungal, anti-inflammatory, anti-septic, anti-viral, bactericidal, disinfectant, sedative properties.
- **Acids-** They exist in Free State and found in small quantities. Act as buffer systems to control acidity and have anti-inflammatory property.
- **Esters-** It is used for their soothing, balancing effects and is effective antimicrobial agents.
- **Ketones-** It finds in plants used for upper respiratory complaints. They assist the flow of mucus and increase congestion. These are used for promoting wound healing.

#### PHARMACOLOGICAL PROPERTIES:-

##### ❖ SKIN-

1. **ANTISEPTIC:** Active against wide range of bacteria, fungi for cuts, insect bites, spots, etc. Example: Cinnamon, Thyme; Clover; Eucalyptus, Lavender, Citral, linalool, thymol.
2. **ANTI-INFLAMMATORY:** Active against wounds, bruises, eczema. Example: chamomile, lavender and yarrow.
3. **FUNGICIDAL OILS:** Effective against athlete's foot, ringworm infection. Example: lavender, tea tree, myrrh, patchouli and sweet marjoram.

##### ❖ CIRCULATION, MUSCLES & JOINTS-

1. **HYPOTENSIVE:** for high blood pressure, stress. Example: sweet marjoram, lavender, lemon.
2. **HYPERTENSIVE:** for poor circulation. Example: rosemary, spike lavender, eucalyptus, peppermint, thyme.
3. **ANTITOXIC AGENTS:** for arthritis, gout, congestion, skin eruptions. Example: juniper, lemon, and fennel.
4. **LYMPHATIC STIMULANTS:** for obesity, water retention. Example: grapefruit, lime, fennel, lemon, mandarin, white birch.
5. **ASTRINGENTS:** for swellings, inflammations. Example: cypress, yarrow, lemon.

##### ❖ RESPIRATORY SYSTEM-

1. **EXPECTORANTS:** for sinusitis, coughs, bronchitis. Example: eucalyptus, pine, thyme, myrrh, sandalwood, and fennel.
2. **ANTISPASMODICS:** for colic, asthma, dry cough, whooping cough. Example: hyssop, cypress, Atlas cedar-wood, bergamot, chamomile.
3. **ANTISEPTIC:** for flu, colds, sore throat, tonsillitis, gingivitis. Example: thyme, sage, eucalyptus, hyssop, pine, tea tree.

##### ❖ DIGESTIVE SYSTEM-

1. **ANTISPASMODIC:** for spasm, pain, indigestion. Example: chamomile, caraway, fennel, orange, peppermint, lemon balm, aniseed, cinnamon.
2. **CARMINATIVES:** for flatulent dyspepsia, nausea. Example: angelica, basil, fennel, chamomile, peppermint, mandarin.
3. **CHOLAGOGUES:** increases flow of bile & stimulates gall bladder. **Example:** caraway, lavender, peppermint and borneol.
4. **HEPATICS:** for liver congestion, jaundice. **Example:** lemon, lime, rosemary, peppermint.

##### ❖ ENDOCRINE SYSTEM-

1. **ANTISPASMODIC:** for menstrual cramp, labour pains. **Example:** sweet-marjoram, chamomile, clary sage, jasmine, lavender.
2. **UTERINE TONICS & REGULATORS:** for pregnancy, excess menstruation, PMT. **Example:** clary sage, jasmine, rose, myrrh, frankincense, lemon balm.
3. **ANTISEPTICS:** for leucorrhoea, vaginal pruritis and thrush. **Example:** bergamot, chamomile, myrrh, rose, tea tree.
4. **ADRENAL STIMULANTS:** for anxiety, stress-related conditions. **Example:** basil, geranium, rosemary, borneol, sage, pine.

##### ❖ NERVOUS SYSTEM-

1. **SEDATIVES:** for nervous tension, stress, insomnia. **Example:** chamomile, bergamot, sandalwood, lavender, sweet marjoram, lemon balm, hops, valerian, lemon.
2. **STIMULANTS:** for lack of strength, nervous fatigue. **Example:** basil, jasmine, peppermint, neroli, angelica, rosemary.

#### EXTRACTION OF ESSENTIAL OIL [ 4-6, 8-13]-

Essential Oils are extracted from plant parts by depending upon the quantity of oil it contains, its economic value, and stability. The quantity of oils extracted ranges from 0.005% to 10%.

**There are various methods for extraction of oils:**

**MACERATION:** In this method plant material is powdered and soaked in organic solvent for some time and is continuously stirred. The extract is then decanted and filtered. Process is repeated for complete extraction.



**COLD PRESSING:** It is used to extract oils from citrus plants like orange, lemon, grape fruit. In this rind is pressed at about 120°F. The rinds are separated from plants are chopped and then pressed. The oil extracted from this has short half-life and used within 6 months.

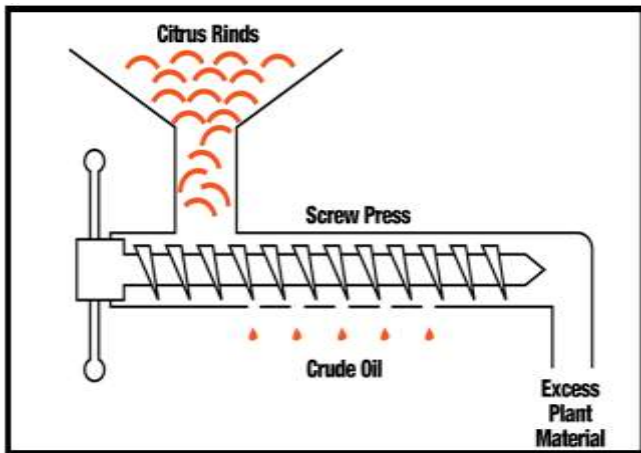


Figure 2: Cold-Pressing Method

- + **SOLVENT EXTRACTION:** In this essential oil is dissolved by adding hydrocarbon solvent to plant. Solution is then filtered and distillation is done, combination of resin and oil remains. Pure Alcohol is added to extract oil. Alcohol leaving behind the Essential oil.
- + **ENFLEURAGE:** In this oil is extracted from Flowers. Layer of Fat is poured over the flower. When fat absorbs the oil, alcohol is added and evaporated to extract the oil.



Figure 3: Effleurage Method

- + **CO<sub>2</sub> & SUPER CRITICAL CO<sub>2</sub> EXTRACTION:** CO<sub>2</sub> is used as chilling CO<sub>2</sub> between 35 and 55°F, and pumping it through plant material at about 1000 psi. CO<sub>2</sub> then condenses to liquid form. In super-critical CO<sub>2</sub>, carbon dioxide is heated at 850°F and pumped through plant material at 8,000 psi, CO<sub>2</sub> resembles like vapor form. When pressure is released in either process CO<sub>2</sub> escapes in gaseous form leaving oil. This process is mainly done at low pressure and low temperature as high temperature and solvents alters the molecular structure and destroys therapeutic values.
- + **HYDRODISTILLATION:** In this plant is packed in still and water is added and boiled. Steam is added to it, due to hot water and steam essential oil leaves oil gland of plant. By indirect cooling vapor mixture of water and oil is

condensed. From condenser distillate flows into separator and oil gets separated.

It is of three types: water distillation, water and steam distillation and direct steam distillation.

1. **WATER DISTILLATION:** In this the material is fully immersed in water and boiled by heating by direct fire, steam jacket, closed steam jacket, closed steam coil or open steam coil. The boiled water and plant material is in direct contact with each other. When heated by direct fire, precautions are taken to prevent the charge from overheating. When a steam jacket or closed steam coil is used, there is less danger of overheating; with open steam coils this danger is avoided. But with open steam, care must be taken to prevent accumulation of condensed water within the still. Therefore, the still should be well insulated. In this process complete extraction is not possible and it requires large quantity of steam.
2. **WATER & STEAM DISTILLATION:** In this steam is generated either in satellite boiler or within still and separated from plant material, a perforated grid or plate is placed so that the plant material is raised above the water to reduce the capacity of the still and gives a better quality of oil. A cohobation tube is attached to maintain amount of water so that condense water is added back to still.
3. **DIRECT STEAM DISTILLATION:** In this plant material is distilled by steam generated outside the still in boiler, the amount of steam is maintained in it. Heated not more than 100°C to prevent thermal degradation.

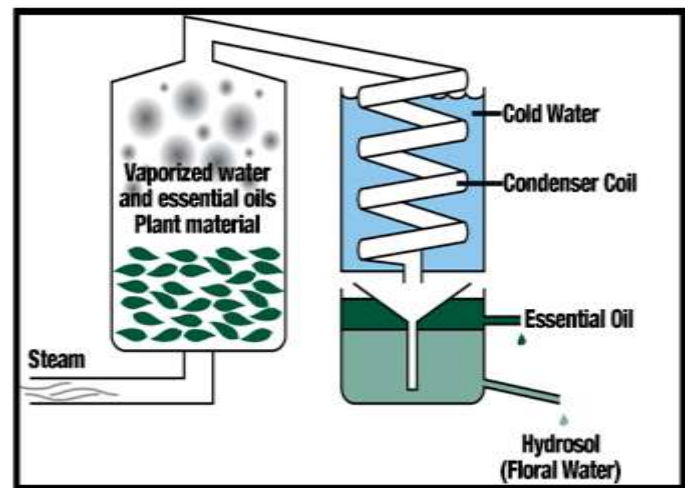


Figure 4: Steam Distillation

**MODERN TECHNIQUES OF EXTRACTION OF OILS-**

- Headspace trapping techniques
  - Static headspace technique
  - Vacuum headspace technique
  - Dynamic headspace technique
- Solid phase micro-extraction (SPME)
- Supercritical fluid extraction (SFE)
- Phytosol (phytol) extraction
- Protoplast technique
- Simultaneous distillation extraction (SDE)

- Microwave distillation
- Controlled instantaneous decomposition (CID)
- Thermo-micro-distillation
- Micro-distillation
- Molecular spinning band distillation
- Membrane extraction

#### HOW TO USE/ APPLICATION OF ESSENTIAL OILS [4-8, 12-18]:

A. **TOPICAL APPLICATION-** It is the most effective method to apply oil, because of their low molecular weight and lipid solubility they easily penetrate the skin and passes to blood stream. But essential oil should be diluted before applying to skin and it should be diluted in carrier substance (vegetable or nut oil or water) not more than 3-5% concentration. Carrier oil also increases absorption of oil in skin and moisturizes the skin.

**Effective Areas:** Neck, Forehead, Chest, Abdomen, Arms, Legs, Bottom of feet.

**Sensitive Areas:** Skin around eyes, eyes, Injured skin.

B. **INHALATION-**

**The following methods are:**

- ✓ **DIFFUSER-** Diffuse the oils using a Young Living diffuser which disperses the oil in vapor form into the air. This will not heat the oils, thus ensures full benefits as extreme heat can damage important constituents in the oil.
- ✓ **DRY EVAPORATION-** Drops of essential oil is placed over the cotton balls and evaporate it into air and inhale or sniff it.
- ✓ **STEAM-** Add essential oil drops to steaming water bowl, it vaporize the oil. Place towel over the head & bowl and breathe deeply. This is useful in respiratory problems.

#### USES OF ESSENTIAL OILS:

1. **HEAD ACHE-** Essential oils are effective for relieving headache. Dilute or concentrate the oil and by massaging apply it on forehead and back of neck.

**Examples:** Lavender, Pepper-Mint, Ginger oil.

2. **INSOMNIA-** applying oil makes calm and falls asleep faster.

**Examples:** Lavender- promotes relaxation, Roman Chamomile- natural sedative, Clary Sage.

3. **STRESS-** Essential oils enhance relaxation and calmness by reducing stress.

**Example:** Lavender- relaxes body by both physical & emotional level, Frankincense, Rose- reduces depression, and Vanilla- induces tranquillity and stimulates mental clarity.

#### ESSENTIAL OILS TO TREAT ACNE:

1. **TEA TREE OIL-** It has antibacterial, antimicrobial, antiseptic, antiviral and disinfectant properties. Put 2-3 drops of oil on cotton ball and apply over the acne or add drops of oil on face-wash.
2. **LAVENDER OIL-** Because of analgesic, antibacterial and antiseptic properties it is used to cure acne.
3. **BASIL OIL-** It is potent against acne due to antibacterial property. Fresh basil leaves can be used to make anti-acne face masks.
4. **GERANIUM OIL-** It has antioxidant and antibacterial property against acne.

5. **CLARY SAGE OIL-** Its antiseptic, bactericidal and astringent properties used for fighting acne.
6. **OREGANO OIL-** Has disinfectant property and in large amount causes skin irritation. Mixed with moisturizer and then applied.
7. **NEROLI OIL-** Has anti-infectious, bactericidal and antiseptic properties. Mixed with vitamin E oil and then applied on scars and acne.
8. **ROSE OIL-** Has antioxidant, antiseptic and astringent properties and effective against acne.
9. **LEMON GRASS OIL-** It constitutes Vitamin A, which repairs cell and has anti-acne properties, and also Vitamin E, which lighten acne and pimple scars.

#### ESSENTIAL OILS TO TREAT ITCHING/PRURITIS:

1. **MYRRH-** Has healing property. It soothes itchy, and cracked skin and has anti-fungal property.
2. **LAVENDER-** Has anti-inflammatory and antiseptic property. It hydrates skin and reduces dryness of skin.
3. **EUCALYPTUS-** Protects against infection and has antiseptic property.
4. **PEPPER-MINT OIL**
5. **FRANKINCENSE-** It is a skin tonic. Improves skin tone, smooth and softens skin and maintains skin elasticity.
6. **SANDALWOOD OIL-** It has anti-ager property. Moisturize skin and reduces inflammation and skin dryness.
7. **PATCHOULI'S OIL-** Has antibacterial, anti-inflammatory and antiseptic properties. Heals cracked skin and prevent infection and inflammation.

#### ESSENTIAL OILS TO TREAT SKIN RASHES/SKIN PROBLEMS:

1. **CEDAR-WOOD OIL-** Used for skin cleaning, scalp problems, oily skin, psoriasis, and inflamed-skin.
2. **CHAMOMILE OIL-** Used for soothing skin, psoriasis, baby skin rashes, shingles, inflamed skin, dry skin, sunburns, eczema (dry & wet)
3. **CYPRESS OIL-** irritated skin, oily skin, varicose veins, and warts.
4. **FENNEL OIL-** Reduces wrinkles and smoothens skin.
5. **HYSSOP OIL-** Used in eczema.
6. **JASMINE OIL-** Reduces dry skin and warts.
7. **LAVENDER OIL-** Used to treat psoriasis, skin rashes, ringworms, scars from burns, shingles, cold sores, oily & dry skin, stretch marks, sunburns, warts, wrinkles, eczema (wet).
8. **NEEM OIL-** Used to cure psoriasis, eczema, fungus, wrinkles, dry skin, and also used as mosquito repellent.
9. **Other Oils are-** Sandalwood oil, Thyme oil, Myrrh oil, Tea-Tree oil, Rose oil, Pepper-mint oil.

#### USES FOR CLEANING & HOUSE:

1. **ALL-PURPOSE CLEANER-** Add few drops of lemon oil and tea tree oil in warm water and spray. It acts as natural disinfectant.
2. **NATURAL MOSQUITO REPELLENT-** Add few drops of lemongrass oil, citronella oil and eucalyptus oil in

one tablespoon of coconut oil and then apply it on skin.

3. **SPORTS GEAR-** Add 1-2 drops of tea tree oil and lemon oil in baking soda and clean the jerseys and sports gear with it.
4. **CLEAN AIR-** Spray cinnamon oil in air as it has anti-microbial property.
5. **WASH PRODUCE-** Add 2-3 drops of lemon oil in a bowl of water and wash fruits and vegetables.
6. **HOME-MADE SUNSCREEN-** Mix coconut oil, zinc oxide, lavender oil, helichrysum oil and shea butter and keep it in a bottle.
7. **ELIMINATE SMOKE-** Add 2-3 drops of rosemary, tea tree oil and eucalyptus oil in spray bottle and spray to remove smoke.
8. **ELIMINATE MOLD-** Add tea tree oil to diffuser and spray in rooms.
9. **KILL PESTS-** Mix orange oil and clove oil and spray in home.

#### USES FOR SKIN, BEAUTY AND RELAXATION:

1. **IMPROVES SLEEP-** Sprinkle few drops of lavender oil on pillow to reduce insomnia.
2. **LIP BALM-** Mix coconut oil, beeswax and lavender oil to treat chapped lips.
3. **DETOX BATH-** Mix lavender oil, Epsom oil and sea salt in warm water to cleanse body.
4. **REDUCE DEPRESSION-** Inhale rose oil.
5. **FOOT BATH-** Add eucalyptus oil to warm water and soothes feet.
6. **TOOTHPASTES-** Mix sea salt, baking soda, coconut oil and xylitol with peppermint oil to make home-made toothpaste.
7. **THICKEN HAIR-** Add few drops of rosemary oil to shampoo for thicken hair.
8. **TEETH WHITENER-** Mix lemon essential oil, coconut oil and fresh strawberries, then rub on your teeth. Rinse after two minutes.
9. **REDUCE STRETCH MARKS-** Mix 3-5 drops of frankincense, myrrh and grapefruit essential oils with coconut oil and apply to stretch marks.

#### ANTI-BACTERIAL ESSENTIAL OILS:

1. **EUCALYPTUS-** It is disinfectant essential oil and has germicidal activity. It cures wounds, burns, cuts, ulcers, sores and also use in dental products to treat cavities, plaque, and gingivitis.
2. **PEPPERMINT-** Has antibacterial activity and antiviral properties and have cooling effect. Used in dental products helping teeth and gums fight off harmful bacteria. Also have anti-fungal property.
3. **LAVENDER-** It has antibacterial property and boosts up immunity. Treats various skin conditions as acne, psoriasis etc. Inhibits growth of bacteria and also heals wounds, cuts, burns, and sunburns.
4. **BERGAMOT-** Has antibacterial property and eliminates intestinal worms. Used in infections such as urinary tract infections, meningitis, endocarditis etc. also heals mouth ulcers.
5. **LEMON GRASS-** It inhibits the growth of bacteria both internal and external of the body. Protects against infections such as urinary tract infections, malaria, typhoid, food poisoning, body odor, and various skin conditions.

6. **OREGANO-** Improves immune system. Protects against bacteria like E. coli, staphylococcus, and salmonella. Stimulates production of WBCs.
7. **THYME and CLOVE-** Given in combination and treats bacterial vaginosis and used in dental products.
8. **CINNAMON-** It is the strongest anti-bacterial oil. Protects against bacterial infection caused by Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Proteus vulgaris, Bacillus subtilis and Staphylococcus aureus.

#### ANTI-VIRAL ESSENTIAL OILS:

These essential oils not only fight off infection caused by viruses, but also protect immune system, skin, muscles, bones, cells, and healing.

1. **TEA-TREE OIL-** Stimulate immune system. Cures stuffy nose, head and chest congestion.
2. **LEMON OIL-** It is rich source of vitamins stimulates immune system and enhances production of WBCs.
3. **PINE-** Clears nasal blockage and cures sore throat.
4. **PEPPER-MINT-** Clears nasal passage and treats cough. Has antiseptic property.
5. **CINNAMON-** Fights against infections and eliminates germs from gall bladder.

#### BENEFITS OF APPLYING ESSENTIAL OIL ON NAVEL:

1. **MOISTURIZES SKIN-** Applies coconut and olive oils, because of their emollient effects they will smooth the skin.
2. **REMOVES DIRT-** Uses jojoba, safflower, and grape seed, they will remove dead skin and dirt.
3. **RELIEVES STOMACH ACHE-** Uses peppermint or ginger essential oils by mixing with carrier oil.
4. **IMPROVES FERTILITY-** Mix carrier oil with damiana, guava leaf, or clary sage essential oils, this will increase relaxation, sperm protection, menstrual problems.
5. **REDUCE PIMPLES & WHITE SPOTS-** Applies neem oil on navel and it will soften skin and reduces pimples and spots from face.
6. **REDUCE DARK CIRCLE & TANNING-** Use almond oil as it contains vitamin E which glows up the skin.
7. **REDUCE MENSTRUAL PAIN-** Applies peppermint, clary sage, and ginger oil to reduce cramps and pain.
8. **HEAL CHAPPED LIPS-** Uses mustard oil to heal cracked lips.

#### ESSENTIAL OILS DURING PREGNANCY:

**Essential oils safe during pregnancy:** Bergamot, Roman chamomile, Eucalyptus, Geranium, Ginger, Grapefruit, Lavender, Lemon, Lemongrass, Lime, Neroli, Patchouli, Rose, Sandalwood, Sweet orange, Tea tree oil.

#### ESSENTIAL OILS FOR LABOUR & BIRTH:

1. **CLARY SAGE:** It stimulates the oxytocin in pregnant women and helps in contraction.
2. **ROSE OIL:** It relaxes uterine and makes easier for pelvic to expand.
3. **NEROLI:** It increases oxygen to blood and enhances breathing during labour.
4. **LAVENDER OIL:** It increases circulation.

## TOXICITY DUE TO ESSENTIAL OILS:

### The toxic reactions are based on three factors:

- The amount of the oils being used
- The method of administration
- Physiological condition of the person undergoing treatment
- **ACUTE TOXICITY**- It occurs when administered with the strong fatal dose of oil. It is mainly by oral or dermal administration. It leads to poisoning and death. Disrupts nerve cell functioning and causes cardiac arrest.
- **CHRONIC TOXICITY**- It depends upon the repeated dose of essential oil over a long period of time and its internal use. Symptoms are nausea, headaches, lethargy and minor skin irritations.
- **PHOTO-TOXICITY**- In these toxicity UV-radiations combine with phototoxic oils and causes skin discoloration, sun-burns.

### DISADVANTAGES/HARMFUL EFFECTS OF ESSENTIAL OILS:

1. **Skin discoloration, burning and sores**- Don't apply photosensitizing oil on skin when going to direct sunlight as they will decolorize skin and cause sun burns. **Example**- Bergamot oil, Lemon essential oil, Lime essential oil, Cumin essential oil.
2. **Skin irritation and itching**- Don't apply some oils directly to skin always mix them with carrier oils. **Example**- Lemongrass oil, Cinnamon leaf oil, Citronella oil, Bay oil.
3. **Some toxic oils can cause miscarriage when swallowed**- Example- pennyroyal and wintergreen.
4. Essential oils not to use during pregnancy: Basil, Bitter almond, Camphor (brown or yellow), Cassia, Cedar wood, Cinnamon, Clove, Coriander, Fennel, Hyssop, Mustard, Nutmeg Origanum, Pine oil.

### CONCLUSION:

Essential oils are extracted from various plants organs with different therapeutic activities and properties (like anti-viral, anti-microbial, anti-fungal, treats skin problems, etc.) and different chemical constituents. They are classified according to part they are derived and their effect.

Essential oils are extracted by various old and modern techniques like maceration, hydro-distillation, steam distillation, etc.

Essential oils also have toxicity leading to fatal death and skin irritation.

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