



RAMSADAY COLLEGE

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**Essential oils: General account, extraction methods,
comparison with fatty oils and their uses**

GENERAL ACCOUNT ON ESSENTIAL OILS

- The essential oils are also known as volatile oils which evaporate in contact with the air and possess a pleasant fragrance.
- Chemically the essential oils are very complex. They are found in many different species of plants of various families. All aromatic plants contain essential oils. Generally the oils are secreted in oil glands.
- An **essential oil** is a concentrated hydrophobic liquid containing volatile (easily evaporated at normal temperatures) chemical compounds from plants.
- Essential oils are also known as **volatile oils**, **ethereal oils**, **aetherolea**, or simply as the oil of the plant from which they were extracted, such as oil of clove.
- An essential oil is "essential" in the sense that it contains the "essence of" the plant's fragrance—the characteristic fragrance of the plant from which it is derived. The term "essential" used here does not mean indispensable or usable by the human body, as with the terms essential amino acid or essential fatty acid, which are so called because they are nutritionally required by a given living organism.
- Essential oils are often used for aromatherapy, a form of alternative medicine in which healing effects are ascribed to aromatic compounds. Aromatherapy may be useful to induce relaxation, but there is not sufficient evidence that essential oils can effectively treat any condition.
- Improper use of essential oils may cause harm including allergic reactions and skin irritation, and children may be particularly susceptible to the toxic effects of improper use.
- Essential oils are highly concentrated plant extracts distilled into oil. Popular in complementary and alternative medicine, these oils, derived from flowers, leaves, roots, and other parts of plants, have been used for medicinal purposes in some cultures for centuries. Continuing scientific research has found that certain essential oils do indeed have health benefits; in fact, many modern medications are derived from essential oils.
- However, while some oils are beneficial in small doses, others can be dangerous. And because essential oils are not regulated by the U.S. Food and Drug Administration (FDA), most should be used with caution, ideally with the guidance of a certified holistic practitioner.

EXTRACTION METHODS

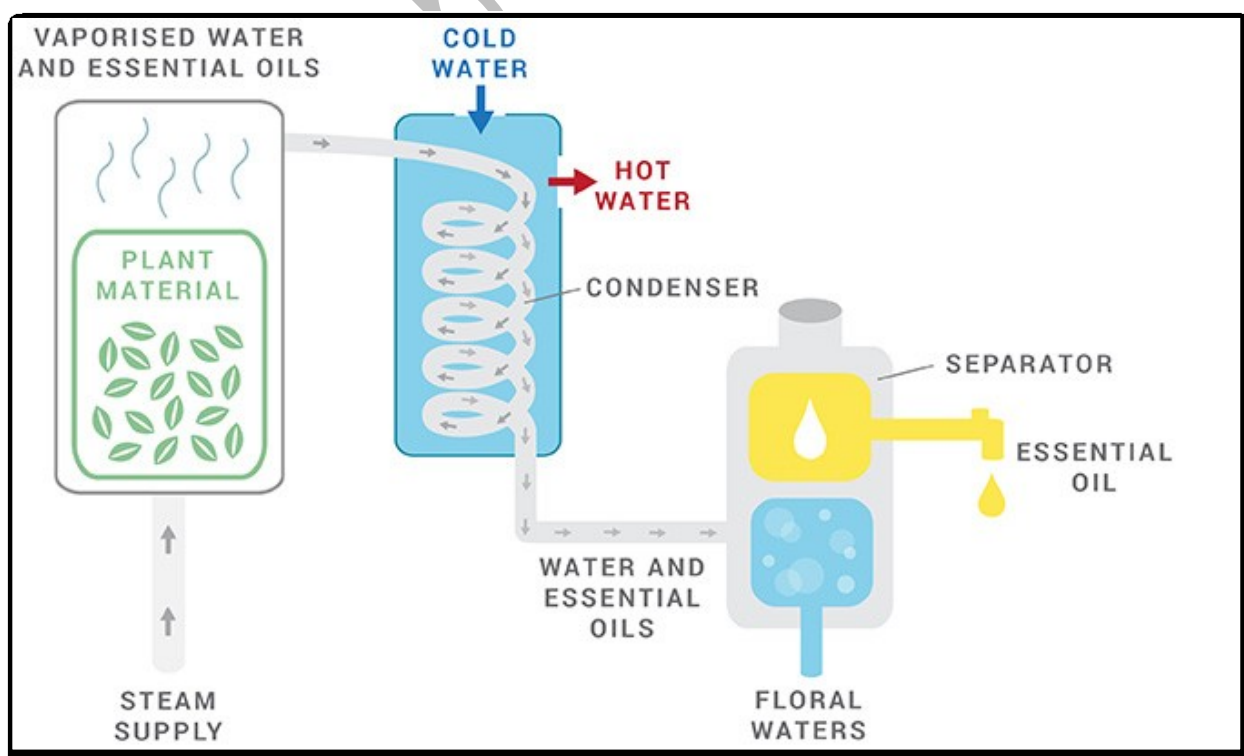
An herbal extract is produced when a botanical material is introduced to a solvent in which some of the plant material components dissolve. Ultimately, the solvent becomes infused with the botanical materials that it has pulled from the source plant, and this is what is referred to as the “extract.” The solution that remains at the end of the process can be liquid, or the liquid can be removed to turn the remnants of the botanical into a solid. The solvents can act as preservatives or as agents that help plant cells to break down and release their contents.

I. STEAM DISTILLATION

Steam Distillation is the most popular method used to extract and isolate essential oils from plants for use in natural products. This happens when the steam vaporizes the plant material’s volatile compounds, which eventually go through a condensation and collection process.

STEAM DISTILLATION PROCESS

1. A large container called a *Still*, which is usually made of stainless steel, containing the plant material has steam added to it.
2. Through an inlet, steam is injected through the plant material containing the desired oils, releasing the plant’s aromatic molecules and turning them into vapor.
3. The vaporized plant compounds travel to the condensation flask or the *Condenser*. Here, two separate pipes make it possible for hot water to exit and for cold water to enter the Condenser. This makes the vapor cool back into liquid form.
4. The aromatic liquid by-product drops from the Condenser and collects inside a receptacle underneath it, which is called a *Separator*. Because water and oil do not mix, the essential oil floats on top of the water. From here, it is siphoned off. (*Some essential oils are heavier than water, such as clove essential oil, so they are found at the bottom of the Separator.*)

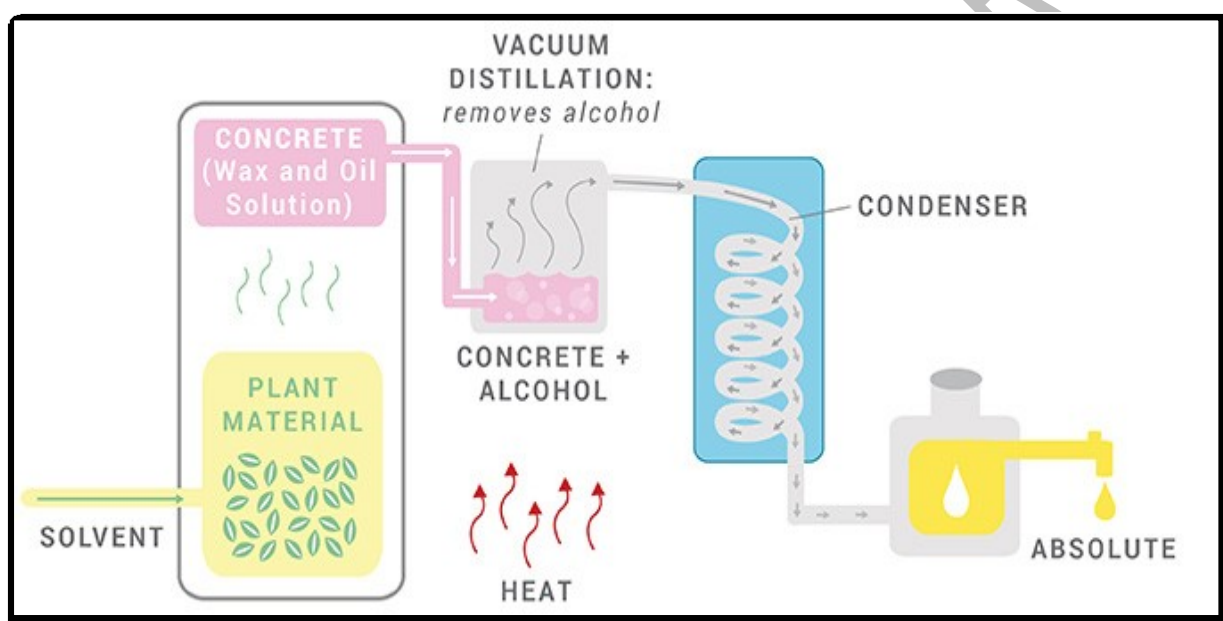


II. SOLVENT EXTRACTION

This method employs food grade solvents like hexane and ethanol to isolate essential oils from plant material. It is best suited for plant materials that yield low amounts of essential oil, that are largely resinous, or that are delicate aromatics unable to withstand the pressure and distress of steam distillation. This method also produces a finer fragrance than any type of distillation method.

Through this process, the non-volatile plant material such as waxes and pigments, are also extracted and sometimes removed through other processes.

Once the plant material has been treated with the solvent, it produces a waxy aromatic compound called a "concrete." When this concrete substance is mixed with alcohol, the oil particles are released. The aforementioned chemicals used in the process then remain in the oil and the oil is used in perfumes by the perfume industry or for aromatherapy purposes.



Solvent Extraction encompasses the following methods: Supercritical CO₂ (Carbon Dioxide), Maceration, Enfleurage.

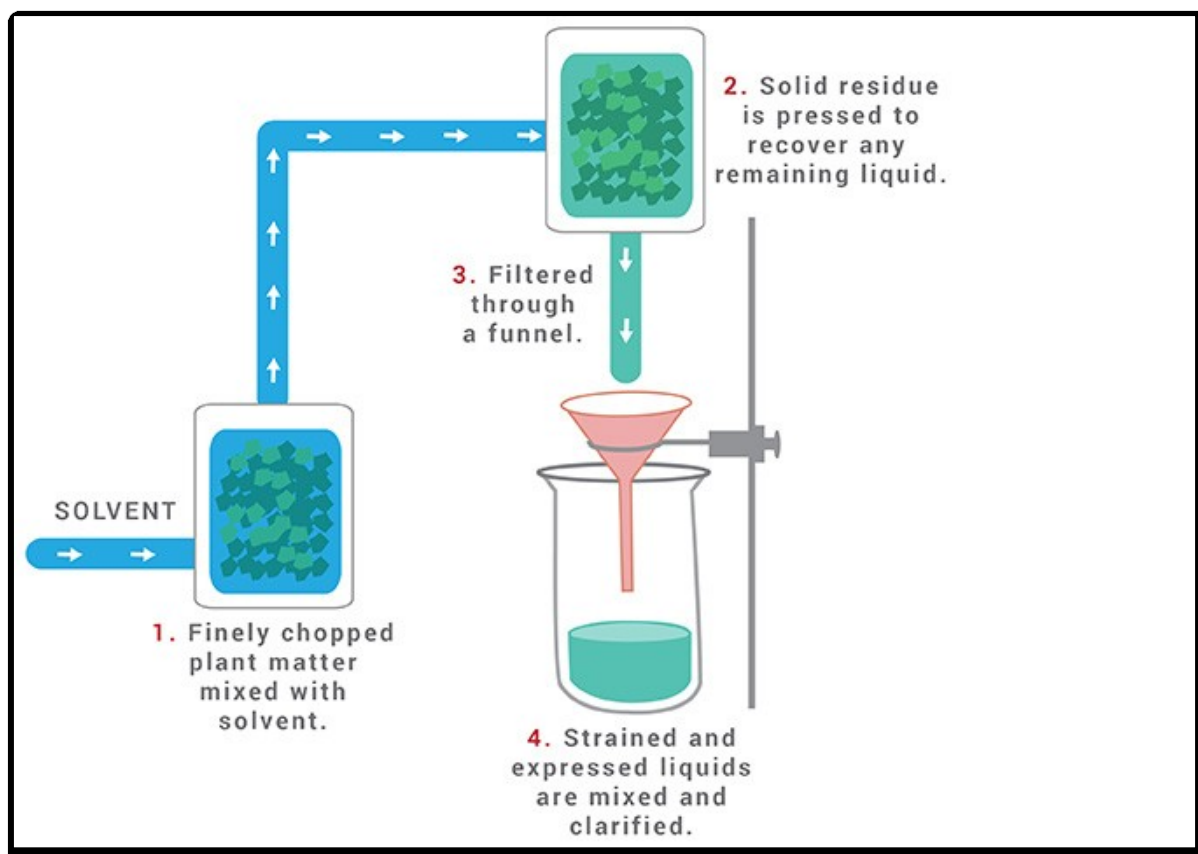
III. MACERATION

Macerated oils are also referred to as infused oils. They are created when carrier oils are used as solvents to extract therapeutic properties from plant material. The benefit of a macerated oil above a distilled oil is that more of a plant's essence is captured in the oil, because it captures heavier, larger plant molecules than the ones captured in the distillation process. This keeps the product closer to retaining more of the plant's valuable offerings.

The ideal plant material to be infused will be harvested so that it is as dry as possible, as any plant moisture will cause the oil to become rancid and will encourage microbial growth. Adding 5% of Vitamin E oil or Wheatgerm oil (which is high in Vitamin E) will prevent rancidity.

MACERATION PROCESS

1. Plant material is finely *cut, crushed, or ground* into moderately coarse powder.
2. Plant material is placed in a closed *vessel*.
3. Solvent (*Menstruum*) is added.
4. The mixture is allowed to stand for 1 week and is *shaken* occasionally.
5. The liquid is *strained*.
6. Solid residue (*Marc*) is pressed to recover any remaining liquid.
7. Strained and expressed liquids are *mixed*.
8. Liquids are *clarified* through filtration or subsidence.

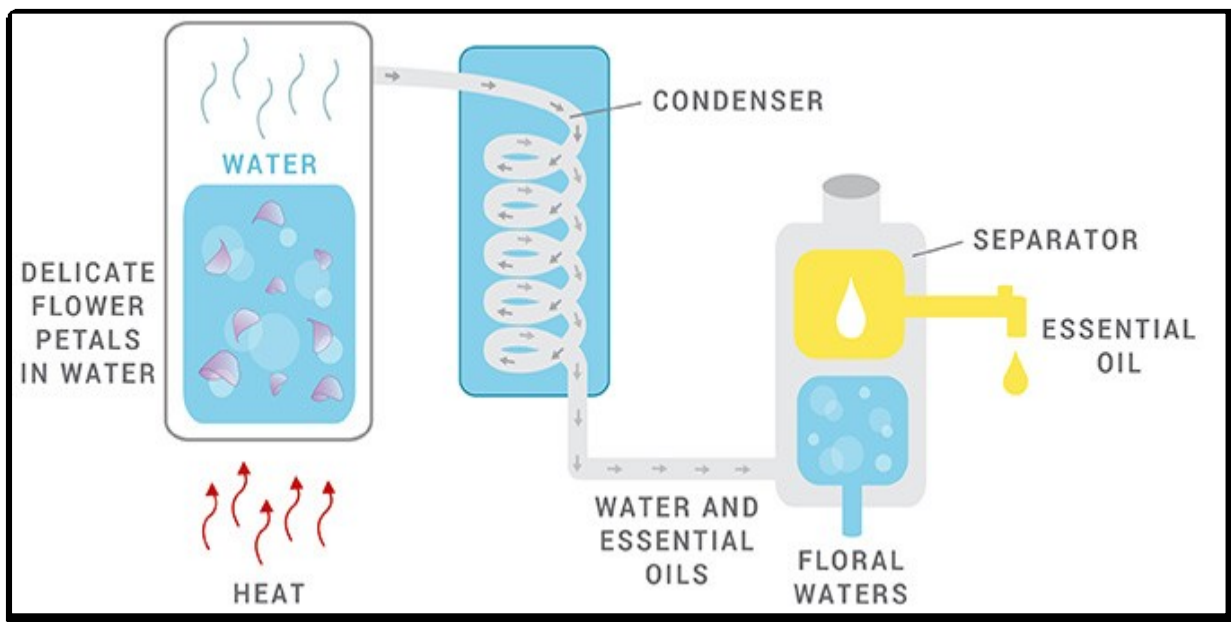


When the maceration process is complete, the base oil will likely have changed color. The final maceration should be filtered of its plant material and poured into an airtight container to be stored in a cool, dry place for up to 12 months. A macerated oil will go cloudy or will smell bad when rancid.

5-10% of a macerated oil can be used as an 'active botanical' in a cosmetic formula. Used in a larger quantity, it can also replace plain base oil.

IV. WATER DISTILLATION

Delicate flowers such as roses and orange blossoms would clump together when introduced to steam in the distillation process, so the most effective method of extraction in this situation is to submerge fragile plant material in pure boiling water instead. The water protects the extracted oil from overheating. The condensed liquids cool down and separate from each other. The remaining water, which can sometimes be fragrant, is referred to by several names including *hydrolate*, *hydrosol*, *herbal water*, *essential water*, *floral water*, or *herbal distillate*.



COMPARISON OF FATTY OILS AGAINST ESSENTIAL OILS

Essential and Fatty Oils Compared

Essential Oils	Fatty Oils
1. Distilled from plant parts.	1. Pressed from seeds
2. Not involved with seed germination and early growth	2. Necessary food for seeds to germinate and sprout
3. Essential to the life processes of the plant	3. Not essential to the life processes of the plant
4. Tiny molecules	4. Large molecules
5. Molecules built from rings and short chains	5. Molecules built from long chains (larger molecular size)
6. Aromatic and volatile	6. Nonaromatic and nonvolatile
7. Circulate throughout plants and in human bodies	7. Do not circulate in plants or in human bodies
8. Can pass thru tissues, cell walls, and cell membranes	8. Do not pass thru tissues, cell walls, and cell membranes
9. Not greasy to the touch	9. Greasy to the touch
10. Do not spoil or turn rancid	10. Can spoil and turn rancid
11. Antibacterial, antiviral, antifungal, antiparasitic, antiseptic	11. Not antibacterial, antiviral, antifungal, antiparasitic, antiseptic

USES OF ESSENTIAL OILS

1. Essential oils are often used to ease stress, boost mood, relieve pain from headaches and migraines, get a better night's sleep, quell nausea, and even repel insects. The beneficial compounds in the oils often are delivered in three ways: inhalation, topical application to the skin, and oral ingestion.
2. Essential oils typically are extracted using steam distillation, a process that involves applying steam to a plant part until only oil remains. Essential oils contain volatile compounds, which make up the strong, characteristic scent of the plant.
3. In aromatherapy, these volatile compounds are inhaled using either a drop of oil on a piece of cloth or jewelry or diffused into the air with an aromatherapy diffuser. Inhalation is the safest method for using essential oils.
4. When inhaled, molecules in essential oils are believed to influence the nervous system, the limbic area of the brain, as well as hormones, brain chemicals, metabolism, and other body functions.
5. Essential oils sometimes are applied directly to the skin to treat pain in a specific body part such as the back or a joint, for example, or to relieve sinus pain. However, many essential oils can be irritating and so should not be applied full-strength to the skin but rather diluted in a carrier oil (such as almond, apricot kernel, or avocado oil) first.¹
6. Essential oils also sometimes are added to soap, lotion, shampoo, bath salts, and other products, and used during massage and spa treatments.
7. Some essential oils can be used in cooking or even swallowed in small doses as medication, but this should be done with great caution: While many essential oils are safe in small doses, others are inherently poisonous and should never be ingested.
8. Essential oils should only be ingested under the care of a qualified essential oil therapist, and dosed and diluted appropriately for safety. Because essential oils are fat-soluble, they always should be ingested along with dietary fat.
9. Essential oils can be used to treat many physical and emotional health issues. At the molecular level, these oils contain beneficial compounds like antioxidants, terpenes, and esters that may help to boost Health Benefits wellness.
10. It evaluated the general health effects of supplements, herbs, and essential oils and found oils are as effective as other supplements in improving health.
11. In particular, study participants reported improved immunity, reduced pain and anxiety, and more energy and mental clarity.

N.B.: Common Essential Oils [Extra data]

There are dozens of essential oils, each with a unique smell and potential healing properties. Here is a closer look at some of the more common essential oils and their purported health benefits.

- **Basil:** Distilled from the popular cooking herb, basil oil is believed to ease coughs and congestion, enhance mood, improve digestion, increase alertness, and soothe muscle aches.
- **Bergamot:** This citrus oil gives Earl Grey tea its distinctive flavor and is used to relieve anxiety. Bergamot also is being studied for its potential to lower cholesterol
- **Calendula:** A relative of the marigold, calendula may ease rashes, wounds, yeast infections, and other skin irritations.
- **Carrot Seed:** Used in cosmetics, this oil has antibacterial and anti-inflammatory properties

- **Cedarwood:** Used to treat hair loss, cedar or cedarwood oil may also ease stress and improve sleep.
- **Cinnamon:** Research suggests the oil in this popular spice may improve circulation, ease stress, relieve pain, fight off infections, and improve digestion
- **Citronella:** A natural insect repellent, citronella also may relieve stress and fatigue.
- **Clove:** Spicy clove oil can be used to treat toothaches and relieve other types of pain
- **Eucalyptus:** The active ingredient in VapoRub, eucalyptus is commonly used to treat colds, congestion, and coughs, and is being studied for antibacterial benefits
- **Frankincense:** This Biblical oil can help treat dry skin and reduce the appearance of wrinkles, age spots, scars, and stretch marks. It is also being investigated as an anti-cancer agent
- **Geranium:** Commonly used in skincare, research shows this floral oil has antimicrobial properties
- **Grapefruit:** This citrus oil is said to relieve hangovers and jet lag and is used to reduce stress, stimulate circulation, increase energy, enhance mood, and improve digestion.
- **Helichrysum:** This oil has a medicinal scent and is said to reduce inflammation, promote healing of wounds and burns, stimulate digestion, boost the immune system, and soothe body and mind.
- **Jasmine:** A sweet-smelling floral oil, jasmine is touted as a stress-reliever with the potential to help treat dry skin and signs of aging, inflammation, and psoriasis
- **Lavender:** One of the most widely used essential oils, lavender is used for relaxation and to relieve insomnia
- **Lemon:** Said to boost mood and energy, this citrus oil relieves anxiety and may help promote weight loss
- **Lemongrass:** Used for stress-relief and boosting immunity, studies suggest this oil can treat dandruff and fungal infections, and ease anxiety, headaches, and upset stomach
- **Myrrh:** A Biblical oil, myrrh is believed to ease coughs and colds, soothe digestive discomfort, and boost immunity
- **Neem:** Neem is used to treat nail fungus and acne. It also is an effective insect repellent
- **Neroli:** This sweet oil is used to relieve anxiety and may lower blood pressure
- **Orange:** The bright citrus scent of orange can boost energy and improve mood. There's also research to suggest it can ease anxiety
- **Patchouli:** This musky scent, popular in incense, has been found to improve sleep in studies
- **Peppermint:** This popular oil is used for headaches, pain, and stomach issues like irritable bowel syndrome

- **Rose:** One of the more expensive essential oils, this highly prized soothing floral scent may ease stress and menstrual cramps
- **Rosemary:** Distilled from the cooking herb, rosemary essential oil is said to boost attention and focus and is being studied in the prevention of dementia
- **Sandalwood:** This fragrant earthy scent is popular in meditation centers and is believed to relieve anxiety and improve sleep.
- **Tea Tree:** This distinctively-scented oil is used to treat fungal skin infections and as a spot treatment for acne.
- **Ylang Ylang:** Used to relieve pain, reduce inflammation, improve mood, and enhance libido, research shows this oil also may lower blood pressure.