

## **Aromatherapy with essential oils reduces the risk of anxiety, insomnia and depression and efficacious in many numerous ailments: A Review**

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**Abstract:** The application of alternative and complementary therapies with mainstream medicine has reached the milestone in past few years. Aromatherapy is one of the holistic healing therapy which use plant extract and natural essential oils (obtained from plants) as major remedies to treat various disorders. The essential or volatile oils are extracted from the flowers, barks, stem, leaves, roots, fruits and other parts of the plant by using different methods. It began to exist after the researchers construed the antiseptic and skin permeability properties of essential oils. Inhalation, local application and baths are those methods used in aromatherapy that let these oils to penetrate inside the skin surface with efficacy. Once the oil enters inside a system, they demodulate themselves and work in an efficient manner at the site or affected area. These therapy utilizes various permutation and combinations to obtain relief from numerous ailments like depression, indigestion, headache, insomnia, muscular pain, respiratory problems, skin ailments, swollen joints, urine associated complications etc. The essential oils are conferring benefits. This review pours the information available in the literature regarding therapeutic, medical, cosmetic, psychological, olfactory, massage aromatherapy, safety issues and different plants used in aromatherapy. All the available information was assembled from electronic databases such as Academic Journals, Ethnobotany, Google Scholar, PubMed, Science Direct, Web of Science, and library search.

**Keywords:** Complementary therapy, Aromatherapy, Essential oils, Inhalation

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### **INTRODUCTION TO AROMATHERAPY**

Aromatherapy derived its name from the word aroma, which means fragrance or smell and therapy which means treatment. This therapy is a natural way of healing a person's mind, body and soul [1]. Many ancient civilizations like Egypt, China and India have used this as a popular complementary and alternative therapy from at least 6000 years [2],[3].

Aromatherapy has established itself for the treatment of various arrays of complications and conditions. Literature survey reveals that this therapy has gained a lot of attention in the late 20th century and is very popular in the 21st century too, and due to its importance, popularity and widespread use, it is recognized as aroma science therapy [4]. The essential oils have gained their importance in therapeutic, cosmetic, aromatic, fragrant and spiritual uses [5]. Aromatherapy is a complementary therapy that uses essential oils extracted from plants to promote physical and psychological well-being. While aromatherapy is popular and widely used, it's important to note that scientific research on its effectiveness is limited, and the evidence is not always conclusive. However, I can provide you with a general overview of some of the potential benefits of aromatherapy in relation to anxiety, insomnia, depression, and other ailments based on the available research up until my knowledge cutoff in September 2021 [6]. Aromatherapy uses essential oils, as the main therapeutic agents, which are said to be highly concentrated substances extracted from flowers, leaves, stalks, fruits and roots, and also distilled from resins [7]. Essential oils are a mixture of saturated and unsaturated hydrocarbons, alcohol, aldehydes, esters, ethers, ketones, oxides phenols and terpenes, which may produce characteristic odors [8], [9]. They are colorless pleasant smelling liquids with high refractive index. These oils are so potent and concentrated that they work on pressure points and rejuvenate. The essential oils in plants are present in different areas like, pockets and reservoirs, glandular hairs, specialized cells, or even in the intercellular spaces. Essences evaporation from the plants, shields them from bacterial attack and a warming aura due to essences protects the plant from temperature fluctuations [2]. There are various methods by which they are administered in small quantity like inhalation, massage or simple applications on the skin surface and rarely, they are taken internally [6], [10]. Inhalation and the external application of these oils for the treatment of mental and physical balance are the very basics of aromatherapy. The therapy of these oils is known to relieve the stress, rejuvenate and regenerate the individual for a next day's work. Olfactory nerves from nose to the brain are the site of action for these essential oils. These oils have well proven antibacterial, antibiotic, and antiviral properties and many published reports elsewhere as well as folkloric practitioners have suggested them to be useful in many other diseases like Alzheimer, cardiovascular, and labor pain in pregnancy etc [11], [12], [13], [14], [15]. There is an increased trend nowadays to use this therapy in the treatment of sleep disorder [16], [17], [18]. Their organic character and to act in a supportive manner with the body, provide a feeling of well-being [19]. It was found that the locomotor activity of mice increased significantly by inhalation of rosemary essential oils, which are used in phytotherapy as activating and refreshing remedy for exhaustion [20].

The use of aromatherapy in holistic medicine has taken a long leap within a couple of years [21]. On reviewing the literature on this therapy, it is found that numerous studies have been carried out to study the effects of this therapy on human brain and its emotions. Its role in mood, alertness, and mental stress in healthy subjects was a topic of hot discussion among scientific community recently. Some researchers tried to investigate the effects on work ability, reaction time, and some spontaneous actions on the brain through electroencephalograph patterns and functional imaging studies [22]. This therapy was found

to be superior when compared to synthetic odors. Synthetic fragrances generally contain irritants, like solvents and propellants causing irritation in some people [23], [24], [25]. According to aroma therapists, synthetic odor does not match the importance of essential oils as they are deficient in natural or vital energy; however, this has been remained a matter of debate between odor psychologists and biochemists [26].

## **1. How aromatherapy can work**

For centuries, the essential oils have found their importance as a fragrance with a curative potential on the body, mind and spirit. These aroma molecules are very potent organic plant chemicals that make the surroundings free from disease, bacteria, virus and fungus [27], [28]. Their versatile character of antibacterial, antiviral, anti-inflammatory nature along with immune booster body with hormonal, glandular, emotional, circulatory, calming effect, memory and alertness enhancer, is well documented by many scientists [6], [10]. Many pilot projects and studies have been conducted on humans to decipher their nature and role with disease and disorder [29]. These oils are known for their energy specific character, as their potency is not lost with time and age. The stimulation properties of these oils lay in their structure which are closely in resemblance with actual hormones [30]. The penetration potential of these oils to reach the subcutaneous tissues is one of the important characters of this therapy. Their effects are also complex and subtle due to their complex structure and chemical properties. The mechanism of their action involves integration of essential oils into a biological signal of the receptor cells in the nose when inhaled. The signal is transmitted to limbic and hypothalamus parts of the brain via olfactory bulb. These signals cause brain to release neuro messengers like serotonin, endorphin etc., to link our nervous and other body systems assuring a desired change and to provide a feeling of relief. Serotonin, endorphin and noradrenalin are released from calming oil, euphoric, and stimulating oil respectively to give expected effect on mind and body [2], [31].

### 1.2. Classification of aromatherapy

#### 1.2.1. Cosmetic aromatherapy

This therapy utilizes certain essential oils for skin, body, face and hair cosmetic products. These products are used for their various effects as cleansing, moisturizing, drying and toning. A healthy skin can be obtained by use of essential oils in facial products. On a personal level, cosmetic aromatherapy of full-body or foot bath will be a simple and an effective way to have an experience. Similarly, few drops of appropriate oil give a rejuvenating and revitalizing experience [32].

#### 1.2.2. Massage aromatherapy

The use of grape seed, almond, or jojoba oil in pure vegetable oil during massage has been shown to have wonderful effects. This is also known as healing touch of massage therapy [33], [34].

#### 1.2.3. Medical aromatherapy

The founder of modern aromatherapy Rene-Maurice Gattefosse has used essential oils to massage patients during surgery, thus utilizing the medical aromatherapy knowledge of the effect of essential oils on promoting and treating clinically diagnosed medical ailments [35].

#### 1.2.4. Olfactory aromatherapy

Inhalation of essential oils has given rise to olfactory aromatherapy, where simple inhalation has resulted in enhanced emotional wellness, calmness, relaxation or rejuvenation of the human body. The release of stress is welded with pleasurable scents which unlock odor memories. Essential oils are complemented to medical treatment and can never be taken as a replacement for it [36], [37], [38].

#### 1.2.5. Psycho-aromatherapy

In psycho-aromatherapy, certain states of moods and emotions can be obtained by these oils giving the pleasure of relaxation, invigoration or a pleasant memory. The inhalation of the oils in this therapy is direct though the infusion in the room of a patient. Psycho-aromatherapy and aromacology, both deal with the study and effects of aroma be it natural or synthetic. Psycho-aromatherapy has limited itself with study of natural essential oils [11].

## 2. Some plants used in aromatherapy

Many plants have been reported to use in the aromatherapy due to presence of essential or volatile oils in different plants' materials like flowers, barks, stem, leaves, roots, fruits etc. Some of the plants used in aromatherapy are summarized in Table 1.

**Table 1. Plants producing essential oils [10].**

<b>Essential oils of the plant</b>	<b>Parts</b>
Bergamot, lemon, lime, sweet orange, tangerine, mandarin peel	Fruit
Cinnamon	Bark
Citronella, lemongrass, petitgrain, palmarosa, patchouli Leaves	
Geranium, lavender, rosemary, spike lavender	
Entire plant	
Ginger, vetiver	
Roots	
Jasmine, neroli (orange blossom), rose, ylang ylang	
Flowers	

### **Lavender**

Lavender (*Lavandula officinalis* Chaix.) belonging to the family of Lamiaceae, is a beautiful herb of the garden (Figure 4). It contains camphor, terpinen-4-ol, linalool, linalyl acetate, beta-ocimene and 1,8-cineole [38]. Its constituent varies in concentration and therapeutic

effects with the different species. Linalool and linalyl acetate have maximum and great absorbing properties from skin during massage with a depression of central nervous system. Linalool shows sedative effects and linalyl acetate shows marked narcotic actions. These two actions may be responsible for its use in lavender pillow anxiety patients with sleep disturbance pattern, improving the feeling of well being, supporting mental alertness and suppressing aggression and anxiety [51]. Lavender oil shows its antibacterial and antifungal properties against many species of bacteria, especially when antibiotics fail to work, but the exact mechanisms are yet to be established. When talking about its use in aromatherapy, it is well documented for the treatment of abrasions, burns, stress, headaches, in promotion of new cell growth, skin problems, painful muscles and boosting an immune system [47], [48], [52]. This oil is used in the treatment of primary dysmenorrheal and has shown some promising results in one of the randomized, double-blind clinical trials [15], [16].

## **Lemon**

Lemon [*Citrus limon* Linn. (*C. limon*)] belongs to the family of Rutaceae (Figure 5). *C. limon* long trees grow up to the 15 feet height and bear rich scented lemon fruits all year round. Its oil constituents are abundant in the terpenes, d-limonene and l-limonene, together forming about 90 percent of the bulk of the oil. Traces of phellandrene, pinene and sesquiterpene are also present [38]. The valuable portion of the oil is the remaining 10 percent which consists of oxygenated bodies, chiefly the aldehyde citral, to which the odor of the oil is largely due and of which there is 3.5%–5% odor present in the oil. When compared to other essential oils, its constituents have antiseptic, astringent and detoxifying properties, for blemishes associated with oily skin [5]. Its oil brightens and rejuvenates dull skin. Lemon essential oil is mainly used to boost the immune system and to accelerate the white corpuscles production along with counteracting acidity and ulcers through citric acid, which helps digestion, by forming carbonates and bicarbonates of potassium and calcium [47], [48]. A recently conducted double-blinded, randomized, controlled clinical trial study on aromatherapy has suggested that citrus oil is good in relieving the first stage labor pain. It is effective in controlling the nausea and vomiting along with its mood elevating properties [1], [9], [6].

## **Peppermint**

Peppermint [*Mentha piperita* Linn. (*M. piperita*)] belongs to the family of Lamiaceae (Figure 6). Till date, all the 600 kinds of mints are raised from 25 well-defined species. The two most important are peppermint (*M. piperita*) and spearmint (*Mentha spicata*). Spearmint bears the strong aroma of sweet character with a sharp menthol undertone. Its oil constituents include carvacrol, menthol, carvone, methyl acetate, limonene and menthone. The pharmacological action is due to menthol, a primary constituent of peppermint oil. At least 44% free menthol is present in peppermint oil. Components are sensitive to climate, latitude and maturity of the plant. Inhalation and application of menthol on skin causes a skin reaction. It is used in many liniments dosage form to relieve pain spasms and arthritic problems. Peppermint oil is studied and documented for its anti-inflammatory, analgesic, anti-infectious, antimicrobial, antiseptic, antispasmodic, astringent, digestive, carminative, fungicidal effects, nervine stimulant, vasoconstrictor, decongestant and stomachic properties.

## **Rosemary**

Rosemary (*Rosmarinus officinalis* Linn.) belonging to the family of Lamiaceae bears small pale blue flowers in late spring/early summer and grows up to the height of 90 cm (Figure 8). It has three varieties (silver, gold and green stripe); it's the green variety that is used for its medicinal properties. This plant is rich in bitter principle, resin, tannic acid and volatile oil. The active constituents are bornyl acetate, borneol along with other esters and, special camphor similar to that possessed by the myrtle, cineol, pinene and camphene [40]. Its oil has a marked action on the digestive system, with relieving the symptoms of indigestion, constipation and colitis. It works as liver and gall-bladder tonic. The oil also possesses some good action on the cardiovascular system. It regularizes the blood pressure and retards the hardening of arteries. In winter, it used to relieve the rheumatic pain which aggravates due to cold. Its stimulating properties on the nervous system have found to be beneficial in hysteria and paralysis. In latest human trials, aromatherapy is an efficacious non-pharmacological therapy for dementia and may have some potential for improving cognitive function, especially in Alzheimer's disease patients, due to its free radical scavenging activity [12], [5]. Excellent skin tonic properties, a soothing, positive effect on menstrual cramps, for hair growth are some of the other important properties of this oil. The other benefits of rosemary include a stimulant for the scalp encouraging hair growth and providing treatment for dandruff and greasy hair [26].

## **Ylang**

Ylang-ylang (*Cananga odorata* Hook. F. & Thoms) belonging to the family of Annonaceae, native to Madagascar, Indonesia and Philippines is a small tree (Figure 10). Its chemical constituent includes geranyl acetate, linalol, geraniol, farnesol, benzyl acetate, geranial, methyl chavicol, beta-caryophyllene, eugenol, pinene and farnesene. The best property of this tree is to retard the heart beat and rapid breathing with perfect use in shock and trauma situations. It is antidepressive in nature with euphoric properties [5], thus giving the feeling of well being. Low self-esteem and women suffering from the post-menopausal syndrome have better results on them. A pilot study involving 34 professionals from a nursing group was carried out in Portugal to verify the use of ylang essential oil in relieving the anxiety and increasing the self-esteem along with alteration of blood pressure and temperature. The results showed clear evidence that use of this plant led to a significant alteration in self-esteem [74]. Further, its aphrodisiac properties are due to its exotic fragrance advantageous for both dry and oily skins. It is also indicated in depression, anxiety, hypertension, frigidity, stress and palpitations [17].

## **3. Essential oil safety issue**

The essential oils are generally safe with minimum adverse effects. Several of these have been approved as food additives and fall in the category of generally recognized as safe by the U.S. Food and Drug Administration [46]. The most common adverse events are eye, mucous membrane and skin irritation and sensitization particularly to oils containing aldehydes and phenols. Photo toxicity of essential oil that contains furocoumarins, for

example Citrus bergamia, is also reported. Contact sensitization is more likely to occur due to oxidation of monoterpenes, often due to inappropriate storage conditions [48]. Cross-sensitization to other essential oils and foods is also possible. Allergy from inhaled essential oils can occur; however, data about exposure levels are limited and many of the reports concern perfumes rather than aromatherapy essential oils [27]. An exceptional case of airborne contact dermatitis was reported only once in context to aromatherapy without massage [28]. The aromatherapy utilizes non defined mixtures of these essential oils without disclosing their plant sources. Allergic reactions have been reported in few instances, especially with topical administration. These oils are not free from oxidization reaction with age and are reported for the change in their chemical composition on storage for long time. Reversible prepubertal gynecomastia was reported in one study on repeated exposure to lavender and tea tree oils by topical administration [39]. There is always a big controversy which arises when the safety of these essential is discussed. No well-defined studies have proved that these essential oils are harmful. In case of some isolated studies, we have observed that these are not safe, but the majority of studies have not proved these oils if used in aromatherapy are harmful [50].

#### 4. Pharmacological actions of essential oils

Many essential oils were screened for variety of pharmacological potentials. Important pharmacological actions of essential oils are summarized in table. Some of the pharmacological actions of essential oils are discussed below:

**Table 2. Essential oils for common problems [52].**

Condition	Essential oils
Anxiety, agitation, stress, challenging behaviors	<i>Angelica archangelica</i> rad. (angelica)
	<i>Cistus ladaniferus</i> (labdanum)
	<i>Citrus aurantium</i> var. <i>amara</i> fol. (petitgrain bigarade), <i>Citrus aurantium</i> var. <i>amara</i> per. (orange bigarade), <i>Citrus bergamia</i> (bergamot)
	<i>Citrus sinensis</i> (sweet orange)
	<i>Cymbopogon martinii</i> (palmarosa)
	<i>Eucalyptus staigeriana</i> (lemon-scented ironbark), <i>Lavandula angustifolia</i> (lavender)
	<i>Litsea cubeba</i> (may chang)
	<i>Ocimum basilicum</i> (basil)
	<i>Origanum majorana</i> (sweet marjoram)
	<i>Pelargonium graveolens</i> (geranium)

Condition	Essential oils
End-of-life agitation	<i>Pogostemon patchouli</i> (patchouli)
	<i>Valeriana officinalis</i> (valerian)
	<i>Lavandula angustifolia</i> (lavender)
	<i>Santalum album</i> (sandalwood)
Fatigue	<i>Boswellia carteri</i> (frankincense)
	<i>Angelica archangelica</i> rad. (angelica) (nervous)
	<i>Cistus ladaniferus</i> (labdanum) (chronic)
	<i>Citrus aurantium</i> var. <i>amara</i> (neroli bigarade)
	<i>Citrus paradisi</i> (grapefruit) (exhaustion)
	<i>Coriandrum sativum</i> (coriander) (including mental)
	<i>Cymbopogon nardus</i> (citronella)
	<i>Eucalyptus radiata</i> (black peppermint) (chronic)
	<i>Eucalyptus smithii</i> (gully gum)
	<i>Juniperus communis</i> ram. (juniper twig)
	<i>Mentha spicata</i> (spearmint) (mental)
	<i>Pelargonium graveolens</i> (geranium) (nervous)
	<i>Pinus sylvestris</i> (Scots pine)
	<i>Rosmarinus officinalis</i> ct. <i>cineole</i> , ct. <i>camphor</i> , ct. <i>verbenone</i> (rosemary)
<i>Salvia sclarea</i> (clary) (nervous)	
<i>Zingiber officinale</i> (ginger)	
Insomnia	<i>Angelica archangelica</i> rad. (angelica)
	<i>Cananga odorata</i> (ylang ylang)
	<i>Chamaemelum nobile</i> (Roman chamomile)
	<i>Citrus aurantium</i> var. <i>amara</i> (neroli bigarade)
	<i>Cistus ladaniferus</i> (labdanum)
	<i>Citrus bergamia</i> (bergamot)
	<i>C. limon</i> (lemon)



Condition	Essential oils
	<p><i>Citrus reticulata</i> (mandarin)</p> <p><i>Citrus sinensis</i> (sweet orange)</p> <p><i>Cuminum cyminum</i> (cumin)</p> <p><i>Juniperus communis</i> fruct. (juniper berry)</p> <p><i>Lavandula angustifolia</i> (lavender)</p> <p><i>Litsea cubeba</i> (may chang)</p> <p><i>Melissa officinalis</i> (lemon balm)</p> <p><i>Myrtus communis</i> (myrtle)</p> <p><i>Ocimum basilicum</i> (basil) (nervous)</p> <p><i>Origanum majorana</i> (sweet marjoram)</p> <p><i>Ravensara aromatica</i> (ravensara)</p> <p><i>Thymus vulgaris</i> ct. <i>geraniol</i>, ct. <i>linalool</i> (sweet thyme)</p> <p><i>Valeriana officinalis</i> (valerian)</p>
Mental exhaustion, burnout	<p><i>M. piperita</i> (peppermint)</p>
	<p><i>Ocimum basilicum</i> (basil)</p> <p><i>Helichrysum angustifolium</i> (everlasting)</p>
Memory loss	<p><i>Litsea cubeba</i> (may chang)</p> <p><i>M. piperita</i> (peppermint)</p> <p><i>Rosmarinus officinalis</i> ct. <i>cineole</i> (rosemary)</p>
Pain management	<p><i>Eucalyptus smithii</i> (gully gum)</p> <p><i>Lavandula angustifolia</i> (lavender)</p> <p><i>Matricaria recutita</i> (German chamomile)</p> <p><i>Leptospermum scoparium</i> (manuka)</p> <p><i>Origanum majorana</i> (sweet marjoram)</p> <p><i>Pinus mugo</i> var. <i>pumilio</i> (dwarf pine)</p> <p><i>Rosmarinus officinalis</i> ct. <i>camphor</i> (rosemary)</p> <p><i>Zingiber officinale</i> (ginger)</p>

## 5. Conclusion

From above reports and study, we can conclude that aromatherapy is natural and noninvasive gift of nature for humans. It's not only the disease symptoms which are eradicated but the whole body is rejuvenated by the use of aroma. Aromatherapy regulates the physiological, spiritual and psychological upliftment for the new phase of life. This therapy is not only preventive but also can be used in the acute and chronic stages of disease. Pharmaceutical industries are trying for environmental friendly, alternative and natural medicine for disease associated with pathogens and metabolism. There may be a possibility of enhancing the rate of reaction and bioavailability of drugs from the use of these essential oils.

If properly studied, these volatile oils may have the synergistic effect with the drugs used in the treatment of central nervous system disorder. Moreover, the time at which the plant contains the maximum amount of volatile oil with various chemical constituents also is a matter of discussion. Essential oils can be a useful non-medicinal option or can also be combined with conventional care for some health conditions, provided safety and quality issues are considered. The tilt of the scientific community towards complementary and alternative medicine has given the new hope to reduce the unwanted effects of modern medicine by these essential oils and if properly explored to their full potential, this therapy can be a boon not only to the patients but also to a common man.

### Conflict of interest statement

We declare that we have no conflict of interest.

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