

Clinical aromatherapy

Keywords

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Abstract

Essential oils, made out of natural aromatic molecules, are endowed with so many physiological and pharmacological properties that they find applications in almost every field of medicine, not only curatively but also from a preventative medicine point of view. Although the perception of, and reaction to, essential oils seems to be slightly different between women and men, all people of all ages benefit from aromatherapy. Provided that the practitioner has the relevant information and has undergone the appropriate training, and that the aromatic extracts used conform to medical quality criteria, aromatherapy and aromatology can bring real complementary help to many patients, far beyond the anti-stress massage approach.

Aromatherapy can provide a useful complementary medical service both in healthcare settings and in private practice, e.g. in cancer care, dementia, and depression. There are also many indications for the useful and successful application of essential oils, especially for men, such as stress, sleep disorders, back pain, urinary tract infections, rectal abscess, and sexual health. © 2008 WPMH GmbH. Published by Elsevier Ireland Ltd.

Introduction

Aromatherapy is one of the fastest growing branches of complementary and alternative medicine. One definition is: ‘the therapeutic use of fragrances or at least of mere volatiles to cure or to mitigate or to prevent disease, infections, and indispositions only by means of inhalation’ [1] But this does not mention massage or the absorption of essential oils through the skin and their effect on target organs, which is the mainstay of aromatherapy in the UK, USA and many other countries. There is a general difficulty with the concept of massaging with a volatile solution because, by definition, it volatilizes into the air, so perhaps a definition from the *Concise Oxford Dictionary* (1995) that is more relevant to aromatherapists is: ‘use of aromatic plant extracts and essential oils in massage and other treatment’

Aromatic plants have been used for thousands of years in every part of the world by numerous civilizations which, driven by their intuition and their sense of observation, were able to find answers to their health problems in the plant environment. The lack of understanding of the biochemical mechanism of action of a substance has never been an obstacle to its effective use!

Fortunately, progress in analytical chemistry has enabled us to begin to understand the extraordinary laboratory that exists inside the aromatic plant cell; we can only be spellbound by the realisation of the fantastic complexity of the biochemical compounds manufactured therein, and the harmonious and powerful result that is represented by the aromatic substance inside the plant called ‘the essence’.

Wide-ranging application

Essential oils can be put to a multitude of uses both in general practice and in hospitals, as this quotation illustrates [2]:

‘The doctor who is familiar with essential oils can use them to treat a whole range of infections – pulmonary, hepatic, intestinal, urinary, uterine, rhinopharyngeal and cutaneous (infected wounds and suppurating dermatoses). The use of these oils usually produces satisfactory results, provided they have been prescribed wisely and that, in the case of certain long-standing complaints, the treatment is followed for a long enough period. Aromatic therapy can

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neutralise enteritis, colitis and putrid fermentations, and can relieve chronic bronchitis and pulmonary tuberculosis. The colon bacillus cannot resist essential oils.' *Valnet (1990)*

Orthodox medicine currently uses plant material to help cure diseases that previously had a high death rate. Twenty years ago, four out of every five children with leukaemia lost their lives; now, four out of five are returned to health with the aid of vincristine and vinblastine, derivatives of the rosy periwinkle – a plant used for hundreds of years by tribal healers as a medicine. The snakeroot plant from India is now used in the western world to treat hypertension; digitalis, for heart conditions, is produced from the humble foxglove and the well-known rhododendron is used in the treatment of fatigue. 'Plants are an intrinsic part of natural medicine, and not even the most orthodox doctor can get by without them; indeed they represent the link between the natural and the orthodox, the traditional and the ultra-new' [3].

Phytotherapy is the name increasingly given to the use of the whole, or part, of a plant for medicinal purposes. Aromatherapy and aromatology (which is similar to aromatherapy but without massage) are branches of phytotherapy, utilizing only the essential oils produced by distillation and the citrus oils produced by expression. These are simple to use and administer, yet can compete with the steroids and antibiotics used in allopathic medicine today without the body's defence mechanism becoming exhausted or tolerance developing to them.

'The basic reason which accounts for the diversity of conception and application of aromatherapy lies in the very nature of the aromatic substance. Lending itself to easy cutaneous penetration, being endowed with the capacity to influence the mind through its powerful impact upon the olfactive sense, and owing multiple and strong pharmacological properties to its highly active molecular components, it was natural for the aromatic substance to find developments in so many areas' *Pénoël (1993) [4]*

The genesis of genuine essential oils

Plants produce a tremendous variety of chemicals, including a major group of compounds,

the terpenes. According to Harborne [5] there are more than 1000 monoterpenes and possibly 3000 sesquiterpenes presently identified. The phenylpropanoids constitute another much smaller, but significant, group. In essential oils most of the components belong either to the terpene group, which is based on the mevalonic acid pathway, or to the phenylpropane group, which is based on shikimic acid.

In medicine, the quality and wholeness of any essential oil used is of paramount importance irrespective of the cost, whereas when used in flavours and fragrances the taste and the aroma, respectively, are the most important considerations. For the food and perfume industries essential oils may be adjusted or changed to suit the particular need of the purchaser or the vendor.

It is important also to preserve the wholeness of an essential oil in order to guard its natural synergy (from the Greek: *syn* = together, *ergon* = work). The components making up an essential oil co-operate to produce their healing effect and if these are altered in any way the natural synergy is upset. When a single active component is removed, not only is the synergy of the remaining constituents diminished, but the isolated component generally needs much greater care when used alone. It may produce side-effects with continued use. However, when present in the whole oil, the other constituents seem to act as 'quencher' of these unwanted effects, enabling the oil to be used without harm.

It is extremely difficult to judge the probable effects of an essential oil solely by knowing its principal chemical constituent(s), important though this knowledge is. The whole oil has to be considered in all its complexity, the mixture of possibly hundreds of different types of molecules, their molecular energy and the overall synergy. There is no simple direct relationship between any one of the chemical constituents and the therapeutic effect – or even the hazard – of the whole essential oil [6].

The complexity of essential oils should be borne in mind when referring to the therapeutic qualities of a given oil, and helps to explain why one oil can be simultaneously listed as being 'analgesic, anticonvulsive, antidepressant, antimicrobial, antirheumatic, antiseptic, antispasmodic, antitoxic, carminative, cholagogic, choloretic, cicatrizant, cordial, cytophy-

lactic, deodorant, diuretic, emmenagogic, hypotensive, insecticidal, nervine, parasiticidal, rubefacient, sedative, stimulant, sudorific, tonic, vermifuge, vulnerary.’ This staggering array of properties perhaps overstates the case, but demonstrates the ‘shotgun’ holistic approach in contrast to the ‘single bullet’ symptomatic approach [7].

Therapeutic properties of essential oils

There are many reasons why essential oils need to be included in the armoury of weapons for the fight against disease. They have many positive properties and effects that are desirable and few drawbacks (Table 1). They are capable of being anti-inflammatory, antiseptic, appetite-stimulating, carminative, choleric, circulation-stimulating, deodorizing, expectorant, granulation-stimulating, hyperaemic, insecticidal, insect-repelling and sedative. They are natural antimicrobial agents able to act on bacteria, viruses and fungi, and many trials have been performed in this field. Tropical countries have traditionally used lots of spices in their cuisines, not only for the flavour, but also to kill the microbes which flourish in hot climates. It is thought that the antiseptic powers of essential oils are due to their lipid solubility [8] and their surface activity [9].

Essential oils are applied to the skin by various methods, ingested or inhaled, and all of these are harmless unless used incorrectly. A significant point in their favour is their pleasant aroma. They are much used in products for the home (examples are lemon and lavender) and are well accepted – they are much pleasanter and safer to use than bleach

Table 1 Main therapeutic properties of essential oils

• Antiseptic, antibacterial, antiviral, antifungal
• Wound-healing, granulation-promoting
• Analgesic, anti-inflammatory, antitoxic, hyperaemic
• Relaxing, sedative, antidepressive
• Spasmolytic, digestive, diuretic
• Immunostimulant, hormonal
• Insecticidal, repellent
• Mucolytic, expectorant
• Deodorant

or carbolic acid. The aroma itself also has effects on the person using them.

The healer should have precise control over, and full knowledge of, the substances being employed in the treatment. If this is the case and if the healer determines the therapeutic materials to be used, not some faraway laboratory, the medicine may be tailored precisely to the individual patient. Generally speaking there is an absence of unwanted side-effects arising from the use of essential oils in a healing situation, and plant extracts are ecologically sound, causing no pollution, unlike the antibiotics that are flushed down the drain to pollute the land [10].

Aromatherapists are well aware of the remarkable balancing powers of the essential oils. At times this can cause puzzlement because of the apparently contradictory effects of the oils, but essential oils are complex mixtures of many natural constituents, some of which are stimulating and others sedative, so a single oil may demonstrate an arousing effect on one occasion and a sedative effect on another. This is known as the adaptogenic effect.

Essential oil selection

One of the challenges of the use of essential oils in clinical care is that while research studies may be done both *in vivo* and *in vitro*, few use human subjects. Evidence-based rationale for the use of specific oils or techniques is not always supported or discussed in the literature. Some is inferred due to the chemical constituents and the known or purported actions. Thus, essential oil choices are based on the following factors:

- Diagnosis
- Holistic medical, emotional and social history with any contraindications
- Need for allopathic medications along with essential oils
- Suspected or identified organism if infection is present
- Presence of body and mind symptoms such as pain, stress, depression, or fatigue
- Degree of inflammation
- Rate of wound healing
- Essential oil properties
- Patient preference when possible
- Personal experience and intuition

Aromatherapy and the immune system

If aromatherapy elicits a 'feel-good' factor, then it may well enhance the immune system. However, some essential oils may impact the immune function at a cellular level. Although there is nothing clear-cut here, Péroël [4] has suggested that the effects of phenols could be compared to those of human immunoglobulin M (IgM). IgM is secreted for a short period of time when the immune system encounters a pathogenic organism.

Immunoglobulin G (IgG) is secreted for long-term defence. Péroël [4] thought that the action of IgG is mirrored by the behaviour of monoterpenic alcohols. Berkarda et al reported on the ability of coumarins to increase lymphocyte transformation values in cancer patients [11]. Coumarins are found (although only in small quantities) in citrus-peel oils and lavender. Perhaps this is why Rovesti & Columbo thought that lavender stimulated lymphocytosis [12]. J.-C. Lapraz, an eminent aromatherapy practitioner, has been quoted as saying that the presence 'of essential oils in the bloodstream produces leukocytosis' [13]. Valnet cites work by Novi & P. Rovesti in Italy who demonstrated the stimulant effect of 'essences of thyme, lavender, lemon, chamomile and bergamot on the white corpuscles by which curative leukocytosis is activated, enabling the body to combat toxins and to resist infectious disease' [2]. Roulier has suggested that clove, true verbena, niaouli and patchouli essential oils could help to balance the immune system [14]. However, no studies have measured the effect of aromatherapy on immunoglobulins in human blood or saliva, yet. Table 2 lists the essential oils that may assist immune function.

Other essential oils that are thought to elevate levels of lymphocytes and inhibit prostaglandins include *Matricaria recutita* (German chamomile), which increases the number of B lymphocytes [15], and *Citrus bergamia* (bergamot), which is thought to be an immune-system stimulant [14]. Philippe Mailhebiau wrote that *Thymus vulgaris* ct. *thymol* has strong immunostimulant properties and is less hepatotoxic than *Satureja montana* ct. *thymol* [16].

Perhaps two of the most common immunology problems encountered by health professionals are rheumatoid arthritis and HIV/AIDS. Although there is no suggestion that aromatherapy can 'cure' rheumatoid arthritis or HIV/AIDS, it may have a positive impact on immune function through the feel-good factor, as well as through direct and indirect effects on immune competent cells and immunoglobulins (Tables 3 and 4). After all, Murette Flies, an 11-year-old with lupus erythematosus, was able to produce the same physiological response from smelling a rose as from receiving chemotherapy when she thought she was receiving both [17].

The aromatogram

Just like synthetic antibiotics, many essential oils are effective against particular pathogens. The skill lies in knowing which essential oil to use for which infection. Conventional medicine regularly takes wound or throat swabs, or urine or blood samples to cultivate and identify a pathogen.

The French scientist R.-M. Gattefossé used exactly the same principle as used in that process, which is called an antibiogram, and renamed it an aromatogram. The only differ-

Table 2 Essential oils that may help immune function

Common name	Botanical name	Reference
Clove	<i>Syzygium aromaticum</i>	Roulier (1990) [14]
Lemon verbena	<i>Lippia citriodora</i>	Roulier (1990) [14]
Niaouli	<i>Melaleuca viridiflora</i>	Roulier (1990) [14]
Thyme	<i>Thymus vulgaris</i> ct. <i>thymol</i>	Valnet (1990) [2]
Lavender	<i>Lavandula angustifolia</i>	Valnet (1990) [2]
Lemon	<i>Citrus limon</i>	Valnet (1990) [2]
German chamomile	<i>Matricaria recutita</i>	Wagner (1986) [15]
Bergamot	<i>Citrus bergamia</i>	Valnet (1990) [2]
Patchouli	<i>Pogostemon patchouli</i>	Roulier (1990) [14]

Table 3 Anti-inflammatory components of some common essential oils

Common name	Botanical name	Anti-inflammatory component(s)	Reference(s)
German chamomile	<i>Matricaria recutita</i>	Bisabolol, chamazulene	Carle & Gormaa (1992) [18], Safayhi et al (1994) [19]
Helichrysum	<i>Helichrysum italicum</i> subsp. <i>serotinum</i>	Italidiones	Franchomme & Péroël (1991) [20]
Rosemary	<i>Rosmarinus officinalis</i> ct. <i>cineole</i>	1,8-cineole	Juergens et al (1998) [21]
Black pepper	<i>Piper nigrum</i>	Beta-caryophyllene	Tambe et al (1996) [22]

Table 4 Analgesic components of some common essential oils

Common name	Botanical name	Analgesic component(s)	Reference
Lavender	<i>Lavandula angustifolia</i>	Linalyl acetate, linalool	Re et al (2000) [23]
West Indian lemongrass	<i>Cymbopogon citratus</i>	Myrcene	Lorenzetti et al (1991) [24]
Peppermint	<i>Mentha piperita</i>	Menthol	Tyler et al (1988) [25]
Turkish oregano	<i>Origanum onites</i>	Carvacrol	Aydin & Ozturk (1996) [26]
Brazilian mint	<i>Mentha X villosa</i>	Rotundifolene	Almeida et al (1996) [27]

ence in the procedure is that with an aromagram an essential oil is added to the Petri dish instead of an antibiotic.

In England, Deans & Ritchie used the aromagram technique in a comprehensive and impressive study that examined 25 genera of bacteria and 50 essential oils [28]. This kind of sensitivity testing for essential oils in the treatment of bacterial infections is being carried out by several London hospitals, and there is an active campaign to increase the understanding of how aromagrams work [29]. It is hoped that this scientific method of selecting essential oils in sensitivity testing will become more widespread as it becomes better understood. However, a new microdilution method using the redox dye Resazurin has also been developed for determining the minimum inhibitory concentration (MIC) of an essential oil [30]. This method overcomes the problem of adequate contact between an essential oil and the test bacteria and obviates the need for a chemical emulsifier.

Benefits of aromatherapy for cancer patients

Aromatherapy is often used to enhance the quality of life of cancer patients. In a study at the Marie Curie Centre in Liverpool, Eng-

land, patients received a massage with or without Roman chamomile. The group that received the aromatherapy massage was found to have a statistically significantly improved quality of life and reduced anxiety [31]. In another study, conducted to assess the acceptability of using aromatherapy in palliative care, doctors, nurses, paramedics and volunteers were reported to be extremely enthusiastic about the concept [32].

Corner et al. used a premade mixture of lavender, rosewood, lemon, rose and valerian in their randomised controlled study of 52 patients with a variety of cancers [33]. Just over half of the patients received chemotherapy, radiation, or surgery during the 8-week study. Patients were randomly assigned to a group to receive a weekly massage with or without essential oils. A matching control group was selected from patients who were unable to attend the 8-week course of massage. The results showed a statistical difference in anxiety between the two groups receiving massage, but pain and mobility showed almost equal improvement.

Evans conducted an audit into aromatherapy massage in cancer patients in a palliative-care setting [34]. The study lasted 6 months and involved 69 patients. Participants were offered an aromatherapy session with an aromatherapy massage and therapist advice on symptom

Table 5 Isolates thought to have anticarcinogenic properties

Isolate	Source	Botanical name	Reference
Sclareol	Clary sage	<i>Salvia sclarea</i>	Dimas et al (1999) [35]
Bergamottin	Bergamot	<i>Citrus bergamia</i>	Miyake et al (1999) [36]
Perillyl alcohol	Peppermint	<i>Mentha piperita</i>	Bellanger (1998) [37]
	Spearmint	<i>Mentha spicata</i>	
	Lavandin	<i>Lavandula intermedia</i>	
D-limonene, geraniol	Lemongrass	<i>Cymbopogon citratus</i>	Zheng et al (1993) [38]
Carvone, anethufuran, limonene	Dill	<i>Anethum graveolens</i>	Zheng et al (1991) [39]
Carvone, anethufuran, limonene	Caraway	<i>Carum carvi</i>	Zheng et al (1991) [40]

control using aromatherapy. Eighty percent of the patients felt they benefited, although it is difficult to assess whether this was due to the essential oils, massage, or the one-on-one care. Table 5 provides a list of the isolates that are thought to have anticarcinogenic properties.

Stress

Stress is a well-known trigger for depression and it can also affect physical health. Some common signs of too much stress include increased irritability, heightened sensitivity to criticism, signs of tension (such as nail-biting), difficulty getting to sleep and early morning waking (irregular sleep patterns), constant fatigue, drinking and smoking more, indigestion and loss of concentration and short-term memory.

Many situations can lead to stress at work. These include poor relationships with colleagues, an unsupportive boss, lack of consultation and communication, too much interference with private, social or family life, too much pressure with unrealistic deadlines, lack of control over the way the work is done, poor working conditions, being in the wrong job, feeling under-valued and insecurity and the threat of unemployment.

Important brain chemicals affected by stress are serotonin (involved in the regulation of sleep, appetite and mood), dopamine (part of the brain's reward system), noradrenaline (involved in regulating energy and drive), γ -aminobutyric acid (GABA: general sedative effect), glutamate (tending to activate nerve cells) and corticotropin-releasing factor (CRF: increases steroid levels).

Familiar smells associated with happy memories can help re-establish feelings of happiness. To be happy is to be unstressed. Most

essential oils from plants and flowers have the potential to reduce stress. Certain essential oils, such as lavender, rose, neroli and petit-grain, are well known for this ability.

Dunn et al. found 122 patients felt anxiety reduction following aromatherapy massage with lavender in an intensive-care unit [40]. Burns & Blamey studied 585 women in labour to determine whether aromatherapy with any of 10 essential oils could reduce anxiety, increase contractions, and reduce pain [41]. The oils used were lavender, clary sage, peppermint, eucalyptus, mandarin, chamomile, jasmine, rose, frankincense and lemon. Their results showed much satisfaction expressed by mothers and the delivery team concerning the reduction of stress with all of the essential oils used. A further analysis of 8058 mothers who had received aromatherapy between 1990 and 1989 indicated that more than 50% of mothers found it helpful for relaxation [42].

Sleep disorders

In the USA, a 2005 National Sleep Foundation poll found that 75% of adults frequently have symptoms of a sleep problem, including waking during the night. A new generation of sleep scientists are overturning the conventional wisdom about parasomnia. They say that 'with a few simple changes in the patient's routine, a little visualization, a couple of surprisingly counter-intuitive moves, specific breathing techniques, "stretch and release tension", an attitude adjustment, and some relaxing smells, a peaceful night of slumber can be yours'.

Weihbrecht investigated the effect of inhaled true lavender on 10 adults (3 men and 7 women) who had a history of chronic insomnia [43]. For days 15–29 of the study,

2 drops of true lavender were placed on the patients' pillows or on a tissue kept nearby at bedtime. Subjects mailed back a sleep questionnaire, and a telephone interview was completed with each of them following completion of the study. One participant pulled out of the study because she did not like the smell of lavender. Eight participants had improved sleep in 1 of the 4 areas measured, and eight reported less difficulty in getting to sleep. One person reported that his difficulty was neither improved nor worsened by the use of lavender, but he had the flu during the experimental stage. Out of all the participants, eight reported feeling more rested in the morning. The sleep aids normally used by the participants did not change. But many other studies have shown a significant reduction in sleeping medication, such as benzodiazepines, when aromatherapy is also used.

Henry et al. carried out a study on human subjects at Newholme Hospital in Bakewell, UK [44]. The effects of the night-time diffusion of lavender in a ward of dementia patients was monitored. The trial ran for 7 weeks and showed that lavender had a statistically significant sedative effect when inhaled. Hudson also found that lavender was effective for elderly patients in a long-term unit [45]. Eight out of nine patients in the study had improved sleep at night and alertness during the day.

Dementia

Ballard et al. conducted a double-blind study involving 72 dementia patients with clinically significant agitation treated with *Melissa* oil; the patients came from eight National Health Service nursing homes in the UK caring for people with severe dementia [46]. Agitation included anxiety and irritability, motor restlessness and abnormal vocalisation – symptoms which often lead to disturbed behaviours such as pacing, wandering, aggression, shouting and night-time disturbance, all characterised by appropriate inventories. *Melissa* oil, 10% (by weight) (active) or sunflower oil (placebo), combined with a base lotion (*Prunus dulcis* oil, glycerine, stearic acid, cetearyl alcohol and tocopheryl acetate), was dispensed in metred doses and applied to the face and both arms twice daily for 4 weeks by a care assistant, the process taking 1–2 min. The patients also received neu-

roleptic treatment and other conventional treatments where necessary: this was therefore a study of complementary aromatherapy treatment – not an alternative treatment.

The '*Melissa* group' showed a higher significant improvement in reducing aggression than the control group by week 4; the total Cohen–Mansfield Agitation Inventory (CMAI) scores had decreased significantly in both groups, from a mean of 68 to 45 (35%; $P < 0.0001$) in the treatment group and from 61 to 53 (11%; $P = 0.005$) in the placebo group. Clinically significant reduction in agitation, defined as a 30% decrease in CMAI score, occurred in 60% of the *Melissa* group compared with 14% of placebo responders ($P < 0.0001$). Neuropsychiatric Inventory (NPI) scores also declined with *Melissa* treatment, and quality of life was improved, with less social isolation and more involvement in activities. The latter was in contrast to the usual neuroleptic treatment effects.

Further clinical studies have also shown beneficial effects of essential oils in the treatment of agitated behaviour and other behavioural problems [47–49] and on resistance to nursing care procedures and other dementia-related behaviours [49].

Depression and anxiety

Depression affects about one in five men at some time in their lives. It is caused by changed brain and body chemistry. Depression often comes on so slowly that many men have difficulty noticing the change. Depressed people find it difficult to get to sleep, or to feel rested when they wake. Waking through the night, or waking far too early in the morning, is quite a strong sign of depression.

Depressed people have little energy, and they often find it difficult to motivate themselves to do anything. Appetite and interest in food diminishes, and many people lose weight. Aches and pains and a general physical malaise are also very common.

Studies have shown that the depression levels of elderly people living in assisted-care facilities were reduced by the aromas of fruit and flowers [50]. Citrus was found to relieve depression and improve immune function [51]. After the treatment of depressed patients with a continuous application of a citrus fragrance

for 4–11 weeks there was a significant reduction in the Hamilton rating scale for depression (as with antidepressant therapy) and the use of antidepressants was greatly reduced [51].

A number of essential oils, including lavender, jasmine, rosemary, rose and chamomile, are used for treating depression. They are primarily given as inhalants, but Valnet also suggests taking thyme and lavender orally using between 2–5 drops 2 or 3 times a day [2]. In a different study, Itai et al. proved the psychological effects of aromatherapy on chronic haemodialysis patients [52].

Essential oils are chosen according to the particular symptoms presented by the patient. If the patient's symptoms are due to deep anxiety, the following oils can be very useful: *Cananga odorata*, *Chamaemelum nobile*, *Citrus aurantium* var. *amara* fol./per., *Citrus bergamia*, *Citrus limon*, *Citrus reticulata*, *Coriandrum sativum*, *Cupressus sempervirens*, *Lavandula angustifolia*, *Melissa officinalis*, *Ocimum basilicum* var. *album*, *Origanum majorana* and *Pelargonium graveolens*. Recently published clinical trials were able to show a significant reduction in anxiety in patient groups with different diseases such as dementia, tumours, etc [53–57].

Back pain and periarticular pain

Every morning, back pain erupts across the land. It is the second most-common reason for missing work, behind the common cold. One in six adults in Western societies lives with back pain every day. Aromatherapy works on the sensory system and appears to enhance the parasympathetic response, which is closely linked with endorphins, through the effects of touch and smell, encouraging relaxation at a deep level.

The analgesic effects of aromatherapy can be traced to several factors:

- A complex mixture of volatile chemicals reaching specific sites within the brain
- Certain analgesic components within the essential oil affecting the neurotransmitters dopamine, serotonin, and noradrenaline at receptor sites in the brain
- The interaction of touch with sensory fibres in the skin, which affects the transmission of referred pain
- Rubefacient effect (counter-irritant effect)

Essential oils that are suitable for pain management are, e.g., black pepper (*Piper nigrum*), clove bud (*Syzygium aromaticum*), frankincense (*Boswellia carterii*), ginger (*Zingiber officinale*), Juniper (*Juniperus communis*), spike lavender (*Lavandula latifolia*), true lavender (*Lavandula angustifolia*), Lemongrass (*Cymbopogon citratus*), marjoram (*Origanum majorana*), myrrh (*Commiphora molmol*), peppermint (*Mentha piperita*), rose (*Rosa damascene*), rosemary (*Rosmarinus officinalis*), verbena (*Aloysia triphylla*) and ylang ylang (*Cananga odorata*).

Extracts of myrrh were found to have a strong local anaesthetic effect in a study by Dolara et al. [58]. The anaesthetic action blocked the sodium current of excitable mammalian membranes. Krall & Krause conducted an open, randomised study of 100 patients to evaluate the effects of topically applied gel containing peppermint oil (30%) on periarticular pain [59]. In 78% of cases both the physician and the patient considered the results with mint therapy to be highly effective. At the end of the study, 19% of the mint-oil patients were still suffering from pain, compared with 36% of the hydroxyethyl salicylate gel group.

Urinary tract infections

Millions of men acquire urinary tract infections each year. Although most urinary tract infections are not serious, they are painful. The choice of medication and the length of treatment depend on patient history, type of bacteria, cause of the urine infection and the patient's response to treatment.

Many essential oils have specific antibiotic, antiviral and antifungal properties and have been classified accordingly [60]. The primary effect of essential oils on bacteria and viruses appears to be on the cell membrane, where they seem to alter the osmotic regulatory function. The essential oils that are mainly used for bacterial urinary tract infections, applied in a sitz/hip bath, as washes or as a soft lower abdominal aroma-massage, are German and Roman chamomile, sandalwood, juniper berry, lavender, bergamot, lemongrass, manuka, myrtle, savory, thyme, blue gum and cedarwood.

Like many other research teams, Friedman et al. were able to show a significant antibacterial activity for a broad selection of essential oils [61].

Anorectal, perianal and anal abscesses

A rectal abscess is caused by a bacterial infection. As the body attempts to combat the infecting bacteria, white corpuscles and body fluids collect. This forms pus. Rectal abscesses can form near the opening or be much higher up in the rectum. Signs and symptoms include painful hard swelling in the anus, red swelling, pus discharging from the swelling, fever and pain with bowel movements. Treatments for rectal abscesses include surgical drainage, antibiotics, medication for pain relief and warm baths with analgesic, anti-inflammatory and antimicrobial essential oils.

Sexual health

A testosterone shortage can be life-threatening. As if losing muscle mass, bone density and sexual drive to low testosterone levels was not

bad enough, new research shows that the decline can also increase the risk of prostate cancer, heart disease and even death.

Five ways to increase manpower and reduce health risks are:

- Reduce the waist size
- Build up the biceps by lifting weights
- Fill up on fat: eat foods high in mono-unsaturated fats
- Push away from the bar
- Stop stress, can also be done with aromatherapy

Low sexual desire is rapidly becoming the most common issue treated in psychosexual therapy. Common causes include poor self-esteem, relationship issues, partner problems, bad experiences, fears, depression, childbirth, alcohol and drug abuse, illness or damage to testes, which can affect hormone production, illnesses such as pituitary conditions, hypothyroidism, cirrhosis, or stress, as well as certain prescription drugs.

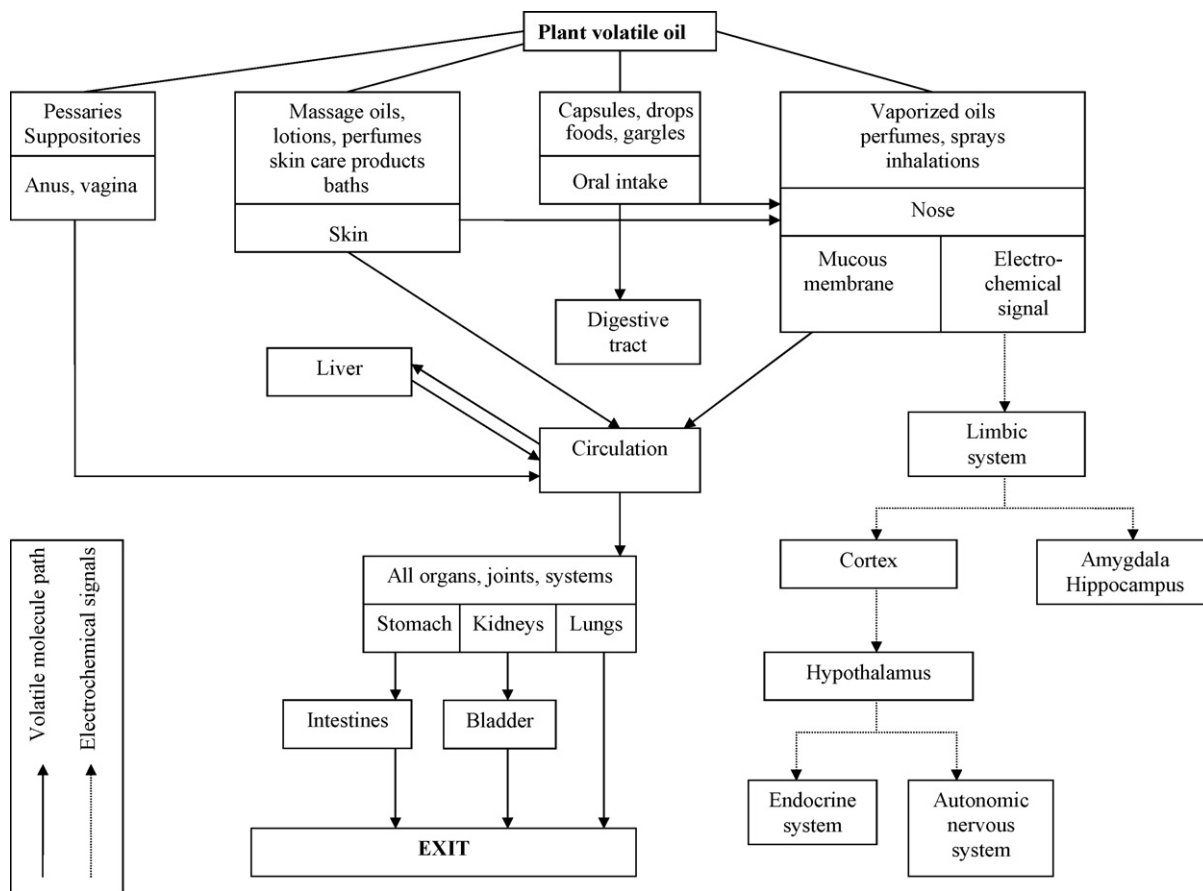


Figure 1 Schematic diagram showing the potential pathways of action for plant essential oils in a clinical aromatherapy context. Source: Price & Price (1999) [6].

Many essential oils can improve sexual desire. Examples are ylang ylang, sandalwood, geranium, hoshho, black pepper, nutmeg, jasmine, cardamom, rose, patchouli, vetiver, honey and clary sage.

Conclusions

The main action of essential oils is probably on the unconscious, limbic system of the brain (see Fig. 1), which is not under the control of the cerebrum or higher centres and has a considerable subconscious effect on the person. Aromatherapy can be effective in reducing stress and improving mood. Many plant essential oils are extremely potent antimicrobials and can positively affect different bacteria, viruses and fungi. Many are also strong antioxidant agents and have recently been shown to stop some of the symptoms of ageing in animals.

The use of camphor, turpentine oils and their components as rubefacients, causing increased blood flow to a site of pain or swelling when applied to the skin, is well-known. There is also long-standing evidence for the benefits of inhaling certain essential oils to relieve coughs and congestion and to prevent or treat infections of the upper and lower airways.

Some essential oils have also been shown in studies to alleviate sleeping disorders and could, apparently, save on the use of diazepam and other sleep-inducing drugs. Various oils, mostly those derived from plants of the Umbelliferae family, are used for treating indigestion, flatulence and dyspepsia. There is also evidence and experience regarding the direct action of essential oils applied through massaging of the skin on specific internal organs and, of course,

regarding indirect action (on the limbic system, sympathetic and parasympathetic pathways). Not forgetting the various indications mentioned previously in this article.

The future clinical application of aromatherapy will probably be as an adjunct to clinical medicine, especially in hospitals, hospices, geriatric wards and general practice, under the guidance of consultants and senior nursing staff. Future studies may reveal the individual benefits of different essential oils for many more different ailments, as essential oils exhibit their pharmacological, physiological, antimicrobial, psychological and miscellaneous effects.

Further information

Austrian Society for Scientific Aromatherapy and Aroma Nursing Practice (ASsA)

The ASsA was founded in Vienna in 2006 to unite the leading forces in holistic aromatherapy and aroma nursing practice in Austria. Its aim is to promote the fields of aroma-culture and aroma science. The interdisciplinary power of the ASsA is based on having excellent experts in the areas of 'pharmacy', 'nursing', 'medicine', and 'science and research,' together with a rapidly growing number of members, supporters and partners in Austria and worldwide.

As the representative Society for high quality in Clinical Aromatherapy and Aroma Nursing Practice, the ASsA is setting internationally recommended standards in education and good clinical and nursing practice.

For more information, visit the website at: www.oegwa.at (in German).

Recommended reading

- [1] Price S, Price L., Aromatherapy for Health Professionals London: Churchill Livingstone; 1995.
- [2] Buckle J. Clinical Aromatherapy – Essential Oils in Practice, 2nd Edition. London: Churchill Livingstone; 2003.
- [3] Lis-Balchin M. Aromatherapy Science. Pharmaceutical Press; 2006.
- [4] Steflitsch M, Steflitsch W. Aromatherapie: Wissenschaft – Klinik – Praxis. Springer Verlag; 2007.
- [5] Harris Bob. Essential Oil Research Database. Available at: www.essentialoilresearch.com.
- [6] Harris R. (editor). The International Journal of Clinical Aromatherapy. Available at: www.ijca.net.

References

- [1] Buchbauer G. Methods in Aromatherapy Research. *Perf Flav* 1996;21:31–6.
- [2] Valnet J. The Practice of Aromatherapy. Saffron Walden, UK: CW Daniels; 1990.
- [3] Pahlow M. Living Medicine. The Healing Properties of Plants. How to Prepare and Use Plants with Scientifically Proven Properties. Northants: Thorsons Publishers Ltd; 1980, 96 pp.
- [4] Pénoël D. The immune system of mankind. In: *Aroma 93 Conference Proceedings*. Brighton, UK: Aromatherapy Publications; 1993.
- [5] Harborne JB, editor. *Flavonoids: Advances in Research since 1980*. New York: Chapman & Hall; 1988.
- [6] Price S, Price L. *Aromatherapy for Health Professionals*. London: Churchill Livingstone; 1999.
- [7] Lawless J. *Encyclopedia of Essential Oils*. Shaftesbury, UK: Element Books; 1992.
- [8] Malowan SL. *Zeitschrift für Hygiene* 1931; 1(1):93.
- [9] Rideal S, Rideal EK, Sciver A. An investigation into the germicidal powers and capillary activities of certain essential oils. *Perf Essent Oil Rec* 1928;19:285.
- [10] Verdet, Why Phytotherapy? *Aromatherapy Study Trip Lecture Notes*. Hinckley: Price Publishing; 1989.
- [11] Berkarda B, Bouffard-Eyuboglu H, Derman U. The effect of coumarin derivatives on the immunological system of man. *Agents Actions* 1983;13(1):50–2.
- [12] Rovesti P, Columbo E. Aromatherapy and aerosols. *Soap Perfum Cosmet (Lond)* 1973;46:475–7.
- [13] Mitchell S. Aromatherapy's effectiveness in disorders associated with dementia. *Int J Aromather* 1993;5(2):20–3.
- [14] Roullet G. *Les Huiles Essentielles Pour Votre Santé*. St. Jean-de-Braye, France: Dangles; 1990.
- [15] Wagner H, Wierer M, Bauer R. In vitro inhibition of prostaglandin biosynthesis by essential oils and phenolic compounds. *Planta Med* 1986;52(3):184–7 [In German].
- [16] Mailhebiau P. The thymus folder. *Cah Aromather* 1995;1:38–60.
- [17] Olness K, Ader R. Conditioning as an adjunct in the pharmacotherapy of Lupus erythematosus. *J Dev Behav Pediatr* 1992;13(2): 124–5.
- [18] Carle R, Gomaa K. The medicinal use of *Matricaria* flos. *Br J Phytother* 1992; 2(4):147–53.
- [19] Safayhi H, Sabieraj J, Sailer ER, Ammon HP. Chamazulene: an antioxidant-type inhibitor of leukotriene B4 formation. *Planta Med* 1994;60(5):410–3.
- [20] Franchomme P, Penoël D. *L'Aromatherapie Exactement*. Limoges, France: Jollois; 1991.
- [21] Juergens UR, Stober M, Vetter H. Inhibition of cytokine production and arachidonic acid metabolism by eucalyptol (1,8-cineole) in human blood monocytes in vitro. *Eur J Med Res* 1998;3(11):508–10.
- [22] Tambe Y, Tsujiuchi H, Honda G, Ikeshiro Y, Tanaka S. Gastric cytoprotection of the nonsteroidal anti-inflammatory sesquiterpene, beta-caryophyllene. *Planta Med* 1996;62(5):469–70.
- [23] Re L, Barocci S, Sonnino S, Mencarelli A, Vivani C, Paolucci G, et al. Linalol modifies the nicotinic receptor-ion channel kinetics at the mouse neuromuscular junction. *Pharmacol Res* 2000;42(2):177–82.
- [24] Lorenzetti B, Souza G, Sarti S, Santos Filho D, Ferreira SH. Myrcene mimics the peripheral analgesic activity of lemongrass tea. *J Ethnopharmacol* 1991;30(4):43–8.
- [25] Tyler V, Brady L, Robbers J. *Pharmacognosy*. Philadelphia: Lea & Febiger; 1988, pp. 113–19.
- [26] Aydın S, Öztürk Y, Beis R, Hüsnü Can Başer K. Investigation of *Origanum onites*, *Sideritis congesta* and *Saturegia cuneifolia* essential oils for analgesic activity. *Phytother Res* 1996;10:342–4.
- [27] Almeida R, Hiruma C, Barbosa-Filho J. Analgesic effect of rotundifolene in rodents. *Fitoterapia* 1996;67(4):334–9.
- [28] Deans SG, Ritchie G. Antibacterial properties of plant essential oils. *Int J Food Microbiol* 1987;5:165–80.
- [29] Blackwell R, Smith M. Aromatograms. *Int J Aromather* 1995;7(1):22–7.
- [30] Mann C, Markham J. A new method for determining the minimum inhibitory concentration of essential oils. *J Appl Microbiol* 1998;84(4):538–44.
- [31] Wilkinson S. Aromatherapy and massage in palliative care. *Int J Palliat Care* 1995;1:21–30.
- [32] Arnold L. The use of aromatherapy and essential oils in palliative care: risk versus research. *Pos Health* 1995;32–4.
- [33] Corner J, Cawley N, Hildebrand S. An evaluation of the use of massage and essential oils on the well being of cancer patients. *Int J Palliative Nurs* 1995;1(2):67–73.
- [34] Evans B. An audit into the effects of aromatherapy massage and the cancer patient in palliative and terminal cancer. *Comp Ther Med* 1995;3(4):239–41.
- [35] Dimas K, Kokkinopoulos D, Demetzos C, Vaos B, Marselos M, Malamas M, et al. The effect of sclareol on growth and cell cycle progression of human leukemic cell lines. *Leuk Res* 1999;23(3):217–34.
- [36] Miyake Y, Murakami A, Sugiyama Y, Isobe M, Koshimizu K, Ohigashi H. Identification of coumarins from lemon fruit (*Citrus limon*) as inhibitors of in vitro tumor promotion and superoxide and nitric oxide generation. *J Agric Food Chem* 1999;47(8): 3151–7.
- [37] Bellanger JT. Perillyl alcohol: applications in oncology. *Altern Med Rev* 1998;3(96):448–57.
- [38] Zheng G, Kenney P, Lam K. Potential anticarcinogenic natural products isolated from lemongrass oils and galanga root oil. *J Agric Food Chem* 1993;41(2):153–7.
- [39] Zheng G, Kenney P, Lam K. Anethofurane, carvone and limonene: potential cancer chemopreventive agents from dill weed oil and caraway oil. *Planta Med* 1991;58(4):338–41.
- [40] Dunn C, Sleep J, Collett D. Sensing an improvement: an experimental study to evaluate the use of aromatherapy, massage and periods of rest in an intensive-care unit. *J Adv Nurs* 1995;21(1):34–40.
- [41] Burns E, Blamey C. Soothing scents in childbirth. *Int J Aromather* 1994;6(1): 24–8.
- [42] Burns A. Might olfactory dysfunction be a marker for early Alzheimer's disease? *Lancet* 2000;355(9198):84–5.
- [43] Weibrecht L. A comparative study on the use of *Lavandula angustifolia* and its effect on insomnia. Unpublished dissertation. Hunter, NY: RJ Buckle Associates; 1999.
- [44] Henry J, Rusius C, Davies M, Veazey-French T. Lavender for night sedation of people with dementia. *Int J Aromather* 1994;6 (2):28–30.
- [45] Hudson R. The value of lavender for rest and activity in the elderly patient. *Comp Ther Med* 1996;4(1):52–7.
- [46] Ballard CG, O'Brien JT, Reichelt K, Perry EK. Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia: the results of a double-blind, placebo-controlled trial with *Melissa*. *J Clin Psychiatry* 2002;63:553–8.
- [47] Holmes C, Hopkins V, Hensford C, MacLaughlin V, Wilkinson D, Roseninge H. Lavender oil as a treatment for agitated behaviour in severe dementia: a placebo controlled study. *Int J Geriatr Psychiatry* 2002;17:305–8.
- [48] Burns A, Byrne J, Ballard C, Holmes C. Sensory stimulation in dementia: An effective option for managing behavioural problems. *BMJ* 2002;325:1312–3.
- [49] Bowles EJ, Griffiths DM, Quirk L, Brownrigg A, Croot K. Effects of essential oils and touch on resistance to nursing care procedures and other dementia-related behaviours in a residential care facility. *Int J Aromather* 2002;12:1–8.
- [50] Schillmann S, Siebert J. New frontiers in fragrance use. *Cosmetics Toiletries* 1991;106(6):39–45.
- [51] Komori T, Fujiwara R, Tanida M, Nomura J, Yokoyama MM. Effects of citrus fragrance on immune function and depressive states.

- Neuroimmunomodulation 1995;2(3):174–80.
- [52] Itai T, Amayasu H, Kuribayashi M, Kawamura N, Okada M, Momose A, et al. Psychological effects of aromatherapy on chronic hemodialysis patients. *Psychiatry Clin Neurosci* 2000;54(4):393–7.
- [53] Edge J. A pilot study addressing the effect of aromatherapy massage on mood, anxiety and relaxation in adult mental health. *Complement Ther Nurs Midwifery* 2003;9:90–7.
- [54] Coleta M, Campos MG, Cotrim MD, Proença da Cunha A. Comparative evaluation of *Melissa officinalis* L., *Tilia europaea* L., *Passiflora edulis* Sims and *Hypericum perforatum* L. in the elevated plus maze anxiety test. *Pharmacopsychiatry* 2001;34(Suppl 1):S20–1.
- [55] Burnett KM, Solterbeck LA, Strapp CM. Scent and mood state following an anxiety-provoking task. *Psychol Rep* 2004;95:707–22.
- [56] Louis M, Kowalski SD. Use of aromatherapy with hospice patients to decrease pain, anxiety, and depression and to promote an increased sense of well-being. *Am J Hosp Palliat Care* 2002;19:381–6.
- [57] Hadfield N. The role of aromatherapy massage in reducing anxiety in patients with malignant brain tumours. *Int J Palliat Nurs* 2001;7:279–85.
- [58] Dolaro P, Corte B, Ghelardini C, Pugliese AM, Cerbai E, Menichetti S, et al. Local anesthetic, antibacterial and antifungal properties of sesquiterpenes from myrrh. *Planta Med* 2000;66(4):356–8.
- [59] Krall B, Krause W. Efficacy and tolerance of *Mentha arvensis aetheroleum*. Paper presented at the 24th International Symposium on Essential Oils, July 21–24, 1993. Berlin, Germany.
- [60] Therapeutic Research Faculty. *Natural Medicines Comprehensive Database*. 4th ed. Stockton, CA: Therapeutic Research Faculty; 2002.
- [61] Friedman M, Henika PR, Mandrell RE. Bactericidal activities of plant essential oils and some of their isolated constituents against *Campylobacter jejuni*, *Escherichia coli*, *Listeria monocytogenes* and *Salmonella enterica*. *J Food Protect* 2002;65:1545–60.