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1. INTRODUCTION

Aromatherapy means “treatment using scents”[1]. Using essential oils is an effective way to experience sensational aromas and benefit from their healing properties[1].

Aromatherapy is one of the most popular forms of complementary medicine[2]. The “aroma” in the therapy is the fragrant essence, or essential oil, secreted by the cells of plants and trees[2,3]. Essential oils have been used since ancient times, for cleaning and treating the body and mind, and act through the skin and the olfactory system (the sense of smell), which makes them an ideal, gentle medicine that is not only therapeutic but also enjoyable[2,4].

They have been used for thousands of years for religious and magical rituals, embalming, and healing[4]. Dr Rene-Maurice Gattefosse, the French chemist who was the first to give the term “aromatherapy”, discovered accidentally that lavender oil has healing properties, when he burned his hand in his laboratory and applied the oil to the wound – the lavender soothed the pain, speeded the healing, and prevented scarring[2]. Today, medical doctors and aromatherapists still do researches on essential oils, as they grow ever-more popular as an integral part of modern living[5].



Figure 1. Aromatherapy oils.

2. AIM OF THE THESIS

The aim of this study is to gain an understanding:

- of what aromatherapy is
- what are the benefits of aromatherapy
- what substances can be used and where can be found
- where and how can be applied to
- the healing effects of aromatherapy
- on five specific essential oils that used extensively on aromatherapy; what are their healing effects and how do these achieved.

In other words, the aim of this study is to become more familiar with this form of complementary medicine, which in a modern busy lifestyle like the one we all have today, it could offer a great benefit as it can offer great relaxation, re-energize ourselves and treat colds, earaches, tension headaches and many more.

3. AROMATHERAPY

3.1 History of Aromatherapy

“The origins of aromatherapy can be traced through the religious, medical and social practices of all the major civilizations. It is likely that the Chinese were the first to discover the remarkable medicinal powers of plants around 4500 BC. However, it is the Egyptians who must take the credit for recognizing and fully exploiting the physical and spiritual properties of aromatic essences. From hieroglyphs and paintings we know that aromatic preparations were used as offerings to the gods”[3]. In ancient Egypt, resins were burned in the morning, myrrh at noon, and kyphi at sunset as an offering to the sun god Ra[4]. Kyphi, a famous blend of 16 or so essential oils, including myrrh and juniper, was thought to heighten the spiritual awareness of the priests[2,4]. Moreover the natural antibacterial and antiseptic properties of essential oils and resins, specifically cedarwood and frankincense, made them ideal for the purpose of preserving corpses in preparation for the next world[3]. When Tutankhamen’s tomb was opened in 1922, pots with the sarcophagus were found to contain precious myrrh and frankincense[4]. The scent, although faint, was still apparent[4].

“By around 3000 BC, priests that had been using the oils in religious ceremonies and embalming rites became aware of the usefulness of their properties for the living, too. Closely guarding their secrets, they became the healers of their time, mixing and prescribing “magic” medicinal potions”[3]. They used herbal preparations and infused oils, for medicinal, spiritual, cosmetic and fragrant use[3,4]. It is believed that they coined the term *perfume*, from latin *per furum* which means “through the smoke”[4]. The use of essential oils gradually got through all levels of society as cosmetics and perfumes became widespread[3].



Figure 2. Herbal preparations.

We know from Hippocrates that the Greeks had some awareness of the therapeutic properties of the oils and their value as sedatives and stimulants was certainly recognized[3]. A greek perfumer named Megallus, created a perfume called megaleion, which included myrrh in a fatty-oil base and was used for several purposes such as an anti-inflammatory, for its aroma, and to heal wounds[4]. Discorides wrote a book “*De material medica*” which describes the properties of approximately 500 plants. He also studied distillation[3,4]. The Greeks and Romans used aromatic essential oils widely in rituals and ceremonies and the oils played an important role in

the popularity of baths and massage, and body-culture generally[3]. However, with the fall of the Roman empire the use of essential oils died in Europe[3].

The art of aromatherapy flourished elsewhere, though, particularly in Arabia, where Avicenna was the first to distil rose essence around 11th century[2]. He introduced the cooling system in the distillation process, making the extraction of essential oils more efficient and refined[2]. Arabia became the world's centre for production of perfume, importing raw materials from Egypt, India, Tibet and China, and trading their products internationally[3].

With the Crusaders the art of perfumery was reintroduced in Europe around the 12th century[3]. An indication of the antiseptic properties of essential oils, from what we know now, it is the obvious immunity that the perfumers had to the plague and cholera, which killed many people in Europe in the Middle Ages and the wide use of essential oils in medicine in the late 17th century[2,3]. The 15th century saw the rise of the great European perfumers, and their wares were widely used to disguise body smells and ward off sickness[3]. Around the 17th century the aphrodisiac properties of essential oils, were well recognized, and with the work of the great herbalists, such as Culpeper, their therapeutic properties also started to be recorded, laying the foundation for modern-day aromatherapy[3].

Unfortunately, instead of broadening the use of essential oils, they tried to mimic their properties and made chemical equivalents[2,3]. By the end of the 19th century, scientific experiments on the antibacterial properties of plants began to clarify the chemical composition and potential healing power of molecules[2,4]. A French chemist, Renie-Maurice Gattefosse was the first that gave the name of aromatherapy, in this branch of herbal medicine[2]. Later, some other French, Dr. Jean Valnet, was interested about the healing properties of the essential oils, after their use in World War II for soldiers healing[1,2]. The next information we have for aromatherapy, is that it has earned official and valid identification of treatment in France, where today many doctors prescribe essential oils for internal or external use[1,2].

In recent years, the scientific research has been accelerated in universities and hospitals around the world, resulting in both improved knowledge of essential oils, and also in the extensive information on their excellent properties[2].

3.2 Substances used in Aromatherapy – Essential oils

So as herbology, and aromatherapy is concerned with the healing properties of plants, but instead of using all or part of the plant, it only deals with the essential oil[6]. This effective, fragrant component, is contained in tiny external glands, or glands located deep within the roots, the wood, leaves, flowers, or the fruit of the plant[5,6]. It is a dynamic, concentrated representation of its therapeutic properties[2]. It is believed, that it contains the life force of the plant, therefore, the extraction of the oil should be done carefully to pick up the genuine form[2,6].

There is a worldwide revival in the art of aromatherapy and contemporary research is beginning to understand the scientific foundations of the oils' properties and applications, discovered over thousands of years[3].

The vital element in any aromatherapy treatment is the pure essential oil[6]. These oils are very different from the oils we use for cooking: they are concentrated essences, much lighter than water and highly flammable[3]. Their volatility means that

they evaporate quickly, so they are usually mixed with other ingredients to preserve their effectiveness[3]. Because they are so concentrated, essential oils are measured in drops[3,6].

3.2.1 Sources of Essential oils

An essential oil is usually the active ingredient, or life force, of a plant or tree[1]. Their presence vary in the leaf, stem, flower, bark, sap, heartwood, root and fruit peel, and the oil is generally responsible for a plant's fragrance, however subtle or potent[1,2]. It is a natural living substance: the "living" element of a plant which is captured or capsuled[3]. It is a quite delicate operation[3]. For example, certain petals and leaves must be picked at the exact right moment, or the quality of oil is affected[3]. Only the purest essences are used in aromatherapy, so that the therapeutic properties will be the maximum and the effects predictable[1,3].

3.2.2 Composition of Essential oils

Essential oils are considered to be so special because some of them contain phyto-hormones, or plant-hormones, that can affect our body systems, just as our own hormones can control body temperature, heart rate, sleep patterns or appetite[1]. And since plant fragrances are designed to attract pollinators, essential oils have also been likened to human pheromones (a type of hormone which is responsible for our personal body smell, or "chemistry", that stirs up a reaction, such as sexual attraction or a sense of calm, in others)[1].

As well as seducing pollinators, the essential oils of a plant act in a way that repel leaf-munchers and other destructive pests[1,2]. The so-called allelopathy, or else the effect of one plant's chemistry to another, describes the way in which some plants even talk to each other[1]. Plants such as the sunflower, or trees such as eucalyptus, can tell others to "go away" by using their special chemistry as an invisible weapon to deplete the growth of any encroaching competitors[1]. *Chamomilla* conversely, is known as the "plants' physician", because it acts in a way that encourages the health of any other plant that grows beside[1].

It is no surprise therefore, to learn that these powerful oils have complex chemical structures and may contain up to hundreds of different natural chemicals[1,2]. An essential oil is thought to contain at least 100 individual components, which can have several actions – calming aldehydes or energizing alcohols and phenols, for example – all working together in synergy: in other words they produce a result which is greater than the sum of the parts[1,2]. In general, the essential oils that are high in alcohol and esters have mild medicinal properties and are considered as quite safe[1,2]. Ketones, phenols and aldehydes are more powerful chemical compounds and they also act therapeutically[2].

It is virtually impossible to create a perfect synthetic version of an essential oil, because the imitation cannot obviously contain the life force that is exclusive to the original[1]. Furthermore, all the components of some essential oils, such as rose, are not known, which makes it even harder to mimic them artificially[1].

3.2.3 Production of Essential oils – Methods of extraction

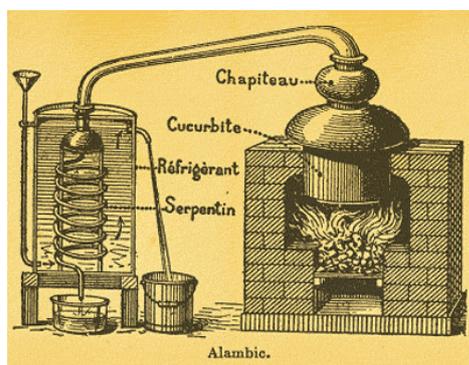


Figure 3. Extraction of essential oils.

Distillation: The steam distillation is a distillation of the compounds that are sensitive to high temperature[₆]. This process involves the use of the released steam through a heated mixture of the raw material[₆]. Under the law of Raoult, some of it is vaporized (according to their partial pressure)[₆]. The mixture of vapor is then cooled and condensed, producing a layer of essential oil and a layer of water[₃]. The steam distillation of various herbs and flowers can result in two products: an essential oil as well as a botanical aqueous distillate (steam rose)[₆]. Essential oils are often used in perfumery and aromatherapy while the watery essences have many applications in aromatherapy, food processing and skin care[₆]. The mechanism for simple distillation, consists of a circular based distillation flask with distillation condenser and a distillation adapter that connects the condenser with the receiving flask[₆]. The condenser is a tube surrounded by a barrel for cooling and condensing vapors[₆]. On the distillation cap, there is a thermometer to check the temperature of the vapor during the distillation process[₆]. Distillation is one of the oldest and still most common methods for cleaning fluids[₆]. It has been used for centuries to obtain the dilute alcoholic beverages and to take the aroma from the fruits and flowers[₃].

Maceration: Flowers are soaked in hot oil to break down the cells, releasing their fragrance into the oil which is then purified and the aromatics extracted[₃].

Enfleurage: This method uses a fixed oil, usually an animal or vegetable fat[₆]. It involves using a glass mounted on a wooden frame[₃]. Part of the plant of which the oil must be extracted (flower petals) should be placed on the sheet and then mixed with a fixed oil[₃]. Then the whole package is placed in sunlight[₆]. Later, this mixture is dissolved in alcohol and this evaporates during the final process[₃]. Rose, Neroli, Jasmine and Violet are usually obtained by this method[₃]. However this is quite rare way of extraction because is very labor-intensive and very costly[₃].

Pressing: This simple method literally squeezes the skin of fruit to produce spirits[₃]. Most of the citrus fruits like orange, lemon, mandarin, bergamot and lime are extracted by this method[₃].

The type of the extraction method that will be used depends on the type of the plant material[_{3,6}]. The extraction of essential oils plays a crucial role on the quality of them, since a wrong or wrongly executed extraction, may damage the oil and alter its chemical composition[₃].

3.2.4 Quality of Essential oils

In order to act therapeutically, the essential oils should be of top quality, genuine, fair and preferably from plants cultivated organically, in ideal conditions[5].

When herbal plants are produced for perfumery and food industries, the use of pesticides and fertilizers is acceptable as it gives larger and more uniform yields[2]. For aromatherapy, natural or organic farming methods are preferable, since the agrochemicals is possible to enter the extraction process of the essential oils[2,5]. Once the flowers and plants are harvested they are usually processed and stored quickly to preserve their freshness[2]. Climate, soil and altitude can all affect the character of an oil[2]. Lavender for example, that grows in high altitude, in rocks and dry soil, gives oil of much higher therapeutic levels from the lavender that grows in rich and moist conditions at low altitude[2,5]. The harvesting time is also important, since it does not only affect the concentration of essential oil, but also its chemical composition[2].

The quality of the essential oil of a plant, may also be affected by the concentration of the individual compounds that is constituted[5]. In the species of *Thymus*, for example, the chemical composition of essential oil that is preferred by professional aromatherapists is such, that a high content of carvacrol (a strong antiseptic) is required[2]. On the contrary, linalool, geraniol and thouganiol which are also contained in thyme, have much milder properties[2].

3.3 Applications of Aromatherapy

The pleasure and versatility of aromatic oils make them one of nature's kindest gifts[3]. Essential oils contain the active ingredients of a plant in a highly concentrated and potent form[3]. Therefore they need to be treated with care and should never be applied directly to the skin undiluted. However, there are many ways of dispersing their fragrance and utilizing their therapeutic properties, and most do not require any special equipment[3].

Holistic aromatherapists believe that essential oils enter and attracted by the mind and the body by two main ways: the respiratory system and the skin[2]. The researchers have already proven it. It is believed that the essential oils act as drivers in the central nervous system when inhaled and penetrate the capillary walls when applied onto the skin[2,3].

The perfumers grade essential oils depending on their volatility, eg. the speed in which they evaporate when found in the air[2]. So, there are extremely volatile oils, very volatile, moderately or a bit volatile essential oils[1,2]. This classification interests aromatherapists because it seems to be a connection between the evaporation and the effects on the oils in the mind and body[2]. For example, the highly volatile oils, because they evaporate very quickly, usually stimulate the mind, while the less volatile oils, that are released more slowly, act more as sedatives[1,2]

Inhalation – When inhaled the particles of an essential oil, travel through the roof of the nose, where the sensory cells of the olfactory system are^[2,3]. From each sensory cell fine hair (cilia) flow that record and transfer information about perfumes, through the olfactory valve in the center of the brain^[2,3]. From there electrochemical messages are being sent associated with smell^[2]. This causes the release of neurochemicals that can be soothing, relaxing, stimulating or induce euphoria^[3]. Aromatic molecules also travel downwards into the lungs^[2,3]. Inhalation is the quickest way for oils to enter the body, and is the most effective way to deal with fragile emotions, and negative states of mind such as stress and depression^[3]. It is very useful for respiratory conditions, especially those that may present an emergency situation, such as bronchitis or asthma^[3]. Although essential oils may be inhaled directly from the bottle, other methods are preferred^[3].

- Steam inhalation is an excellent method for treating respiratory problems, colds and so forth, but should not be used by asthmatics^[2,3]. Breathing in the therapeutic oils, the steam acts to open up the pores and release the impurities^[3]. Add 6-8 drops (eucalyptus, peppermint or pine oil) to a bowl of hot but not boiling water^[2,3]. Place a towel over your head and breathe deeply^[2,3]. This is also a great way of deep-cleansing the face^[3].

- The hands: this method is useful for emergencies. Put one drop of essential oil into your palm and rub your hands briefly together. Then cup your hands over the nose, avoiding the eye area and take a deep breath^[3].

- *Handkerchief* – The most portable way of using essential oils. Add 3-4 drops to a handkerchief and inhale when you have a cold or headache, or for clearing your head at work^[3].

- A vaporizer. This is one of the most popular methods of all, for oil inhalation^[2]. Electric vaporizers are available, and are the safest type to use^[3]. Night – light vaporizers (or oil burners) are inexpensive and readily available in different sizes and designs^[3]. The basic model involves a night-light candle standing under a tiny cup filled water, to which a few drops of oil are added^[3].

Therapeutic massage – The massage is used in aromatherapy to help the passage of essential oils into the body and to increase the therapeutic effect^[2]. It is the most classic aromatherapy treatment, triggering the body's natural healing processes by using lymphatic massage and essential oils to stimulate the flow of blood and lymph fluid^[3]. Massage itself can relax the muscles, allowing the blood and the lymph fluid to circulate more freely, and also calms the mind^[2,3]. If these benefits combined with the healing power of essential oils, the results can be great^[2,3]. Normally, a massage can increase energy levels, reduce the symptoms of daily stress, may cause pain relief and can also restore the spiritual balance^[2]. A carrier is used or base oil, in which essential oils are diluted before being massaged into the skin^[2,3].

Baths – This is one of the most popular ways to enjoy aromatherapy^[2,3]. Essential oils do not dissolve well in water, and it is important that the molecules are evenly distributed^[3]. Bathing can enhance the effects of essential oils: the oils are not only absorbed through the skin but their aroma is also inhaled. Run a bath, then add a few drops (5-10) of your chosen oil^[2,3]. Close the door to keep in the vapours, and soak for 15 minutes. For sensitive skins it is better to dilute the oil in a base oil first, such

as sweet almond, apricot or peach kernel. Oils suitable for bathing include geranium (wonderful for lifting the spirits in the morning) and lavender (a great soporific before going to bed)[3].

-Foot and hand bath. For sprains, localized swelling, bruising or similar general discomforts, ten minutes in a foot or hand bath containing 4-5 drops of the chosen oil will bring welcome relief. To refresh tired feet, add 4-5 drops of peppermint, rosemary and thyme to a large bowl of hot water (foot bath) and soothe with lavender. For hand bath, soothe chapped skin by soaking in a bowl of warm water (not hot) with 3-4 drops of patchouli or comfrey before a manicure[2,5].

-Sitz-bath. For vaginal thrush a sitz bath with essential oils is an effective treatment. Fill a large bowl 1/3 full with warm water and add 3-4 drops of the chosen oil. Sit in the bath for ten minutes[3].

Saunas – Add two drops of eucalyptus or pine oil per 330ml of water and through it over the coals to evaporate. These are great cleansers and detoxifiers[2,3].

Perfumes – The finest perfumes are traditionally blended from pure essential oils, particularly the flower extracts, though these days synthetic aromas tend to be used, particularly for cheaper perfumes. The art of the perfumer is subtle and skilled, and difficult to emulate at home as it is hard to find a medium to use as a substitute for alcohol[3].

Pomanders – Hang porous corked bottles in the wardrobe. The essential oil is absorbed by the clay and released slowly. Try Melissa or bergamot, or cedarwood to keep away moths[3].

Wood fires – Add your chosen oils to the wood a few hours or so before lighting the fire. In this way, the oils sink into the wood itself. Sage is used traditionally in space clearing, or “smudging”, rituals, in which sage smoke is wafted around a room to purify negative energy[2].

Compresses – A compress brings effective relief in cases such as insect bites, arthritic joints, period or stomach pain, headache, sprains and varicose veins[2,3]. Cut a piece of non-medical gauze or a clean cotton cloth to the desired size. Adjust the number of drops of essential oil and the size of the container in accordance with the condition. Two drops with water in a small container for the infected finger to eight drops in a bigger container for pain in the wrist. Use a cold compress if there is inflammation and/or heat and for sprains and headaches, and a warm compress if there is a pain or a dull ache or a muscle pain. Dampen the cloth in water, and then squeeze it lightly and put it onto the affected area and cover with clear film to hold it firmly in place. For a cold compress, place a sealed, plastic bag of crushed ice cubes over the treatment area and hold it in place. For a warm compress, wrap a strip of material such as scarf, thermal garment or a small towel around the cling film. Leave the compress in place for at least one hour, or overnight for a specific wound[2,3].

Creams and oils – These can be used daily to nourish the skin[2,3].

Gargles and mouthwashes – For sore throats, voice loss and colds which may go on to the chest, gargling with one or more essential oils can be very helpful. Add 3 drops of

the essential oil (eg. Cedarwood, petitgrain) in a glass of water. A drop of a soothing oil can also be added. Stir well, take a mouthful, gargle and spit out^[2,3]

Drinks – To use essential oils in drinks, oils must be organic and mixed in a suitable carrier^[3].

3.4 Therapeutic Aromatherapy Treatments

Essential oils work on the mind and body simultaneously, and so we respond to their presence both physically and psychologically. This reaction begins when we smell an essential oil's aroma or absorb it through our skin, which is the body's largest organ^[1,4].

When we inhale an essential oil, the molecules it contains enter our lungs and from there pass into the bloodstream. There they interact with the hormones and the enzymes of the blood to affect our entire body chemistry. The molecules affect our body systems too, calming or stimulating the immune system, gastrointestinal, nervous, endocrine and urinary systems, as well as our skin. In addition the smell stimulates the brain's limbic system, which triggers feelings and so affects our mood^[5].

When an essential oil is applied onto the skin, the oil molecules are so small that penetrate the skin and readily enter the circulation. Later, they are easily excreted from the body – usually within 6-14 hours – leaving no toxic residues^[2].

Generally, all essential oils are antiseptics and usually specialize in treating particular types of infection – viral, bacterial, fungal and parasitical. Some oils and herbs, such as lavender and ginseng, act in the body in a specific way. Known as adaptogens, they support the function of the adrenal glands to help the body adapt to and deal with stress^[5].

So there is much more to aromatherapy than a few nice scents; essential oils have an intelligent physical and psychological effect on the body, acting therapeutically to help calm, energize and heal^[1,2].

In this section some therapeutic aromatherapy treatments to alleviate common health conditions including headaches, mood swings, stress, pre-menopause syndrome and the symptoms of the menopause will be discussed.

3.4.1 Stress relievers

Stress, or rather our inability to cope with too much of it, is one of the biggest health problems today. We all react to excess stress in different ways, perhaps through anxiety, depression or exhaustion, but we can all benefit from the wonderfully balancing and calming effects provided by aromatic oils^[2,3].

Our bodies are emerged to cope with a stressful situation by producing various hormones that eventually trigger a series of physiological actions in the body; they are known collectively as the “fight or flight” response, and serve to place the body in a state of alert in a potentially dangerous situation^[7]. Extra blood is shunted to the

muscles, and the heart rate speeds up while the digestion slows down[7]. In order to help in reducing the impact of stress on the whole system, it is necessary to find ways both to avoid getting overstressed in the first instance, and to let go of the changes that occur internally when under stress. Aromatherapy can be a great help in each case[7].

Anxiety: Whether it's a temporary bout of nerves caused by something like an impending examination or interview, or an ongoing response to a persistent problem, anxiety can be a debilitating response to stress. It prevents us from dealing effectively with a problem, and makes us feel tense. Essential oils, when inhaled, stimulate the limbic portion of the brain which is responsible for all our feelings of well being and discontent. They can balance the senses before deep depression sets into a more serious state. Temporary anxiety can also trigger skin eruptions. Anxiety can be alleviated with a combination of uplifting and calming oils. The following oils can be used individually or to be mixed in a blend, using two relaxing oils to one uplifting oil: *Basil* (uplifting) , *Bergamot* (uplifting), *Geranium* (relaxing), *Lavender* (soothing), *Neroli* (sedative), *Sandalwood* (calming)[3].

An efficient mixture could be: 2 drops of Pelargonium, 2 drops of Lavender, 2 drops of Sandalwood and 1 drop of Ylang ylang[2].

Headaches: The severe headaches derived from the daily tension and overwork are often one of the first signs of stress for many people. Cold compresses of lavender, marjoram or geranium across the forehead could provide pleasant relief. To ease a headache caused by tension in the neck, sandalwood compress across the neck is even better[2,3].

Insomnia: Sleeplessness is a common response to stress. Learning to relax has to be built into a daily pattern with a healthy diet, regular exercise, and a calming routine to wind down before bedtime. Essential oils that have soothing and sedative properties like cypress, lavender, chamomile and Melissa are the most appropriate. A bath with one of these sedative oils helps to induce sleep. The oils of juniper, rose otto, and Ylang ylang and sandalwood will help for a deeper sleep[2,3].

A good mixture for insomnia would be: 3 drops of lavender oil, 3 drops of Ylang ylang and 2 drops of chamomile oil[2].

Essential oil	Treatment
Stress	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming
Lemon, <i>Citrus limon</i>	Calming, hypotensive
Melissa, <i>Melissa officinalis</i>	Calming, sedative
Ylang ylang, <i>Cananga odorata</i>	Balancing, calming, hypotensive
Depression	
Basil, <i>Ocimum basilicum var. album</i>	Neurotonic
Frankincense, <i>Boswellia carteri</i>	Energizing, immunostimulant
Juniper, <i>Juniperus communis</i>	Neurotonic
Neroli, <i>Citrus aurantium var. amara</i>	Tranquilizing (nervous depression, fatigue)
Niaouli, <i>Melaleuca viridiflora</i>	Tonic
Peppermint, <i>Mentha piperita</i>	Neurotonic
Pine, <i>Pinus sylvestris</i>	Neurotonic
Rosemary, <i>Rosmarinus officinalis</i>	Neurotonic, sexual tonic

<i>Stress With Depression</i>	
Bergamot, <i>Citrus bergamia</i>	Balancing, calming, sedative, tonic to central nervous system
Clary sage, <i>Salvia sclarea</i>	Balancing, relaxing, neurotonic
Lavender, <i>Lavandula angustifolia</i>	Balancing, calming, sedative, tonic
Marjoram, <i>Origanum majorana</i>	Balancing, calming, neurotonic
Rose otto, <i>Rosa damascena</i>	Balancing, relaxing, neurotonic, sexual tonic
<i>Poor concentration</i>	
Basil, <i>Ocimum basilicum var. album</i>	Neurotonic
Bergamot, <i>Citrus bergamia</i>	Balancing, tonic
Thyme (sweet), <i>Thymus vulgaris</i>	Cardiotonic, neurotonic, immunostimulant

Table 1. Essential oils that are effective in alleviating symptoms related to Stress.

3.4.2 Emotional insecurity

The emotions we express or feel can be separated into two groups: primary and secondary. Some primary emotions are positive, such as the feeling of love, tolerance and happiness, and these are not a problem. Difficulties arise with the negative primary emotions, such as fear, anger, guilt and jealousy. Secondary emotions are usually concerned with our personality. These may be shown as moodiness, confusion, timidity and inferiority, for example[3].

Essential oils are very useful for treating emotional problems. Essential oils which have relaxing and anti-inflammatory properties are known to be soothing for anger, while oils with stimulating and digestive properties are better able to overcome fear[3].

Anger: The state of anger can range from mild irritability and impatience to intense outbursts and fury. The ability to cope with anger varies from one person to another, depending on each personality. When under stress, anger is more easily aroused and our ability to deal with our own feelings may be severely tested. It is important to have the ability to come to terms with our own anger and to handle it in a positive, constructive way. Otherwise, we may jeopardize both professional and personal relationships. The oils which help are, principally, calming, antispasmodic, anti-inflammatory and healing.[3]

Fear: Stress and fear are sometimes related, and can be acute or chronic. If a person oversleep for example and is running late for an important meeting, the body goes into a temporary state of fear and the adrenal glands produce extra adrenaline in order to deal with the situation. However, when the state of fear lasts longer than normal, it can become a chronic condition that can lead to illness. Living in a state of fear creates tension and anxiety which have a detrimental effect on our outlook and upon our bodies. The helpful essential oils are those which are analgesic, calming and soothing, and those that are stimulating to the mind, as well as to the respiratory and digestive systems[2,3,7].

Jealousy: Most jealous feelings are negative as jealousy is often linked with anger and/or resentment. Although jealousy is often the most difficult emotion to admit to, it is one of the most deadly, where we stand to hurt not only others but also ourselves.

Positive thinking and the use of essential oils which will detoxify or destroy fungi and kill viruses can help to overcome this self-destructive emotion[2,3].

Lack of confidence: Positive thinking is also necessary here, along with neurotonic essential oils which will boost the morale by strengthening the nervous system. Sweet thyme might help to promote bravery and instill drive and assertiveness due to its many tonic properties. The most effective methods of use are by tissue or vaporizer inhalation, and in the bath[2,3].

The following essential oils can benefit the emotions mentioned above.

Essential oil	Treatment
Anger	
Basil, <i>Ocimum basilicum var. album</i>	Analgesic, anti-inflammatory, carminative, calming to the nervous system
Bergamot, <i>Citrus bergamia</i>	Antispasmodic, calming, cicatrizant
Geranium, <i>Pelargonium graveolens</i>	Analgesic, anti-inflammatory, antispasmodic, cicatrizant, relaxant
Juniper, <i>Juniperus communis</i>	Analgesic, anti-catarrhal, anti-inflammatory
Lavender, <i>Lavandula angustifolia</i>	Analgesic, anti-inflammatory, antispasmodic, calming and sedative, cicatrizant
Lemon, <i>Citrus limon</i>	Anti-inflammatory, antispasmodic, calming, carminative
Fear	
Basil, <i>Ocimum basilicum var. album</i>	Antispasmodic, cardi tonic, neurotonic
Bergamot, <i>Citrus bergamia</i>	Antispasmodic (indigestion), calming, sedative (agitation), nerve tonic
Geranium, <i>Pelargonium graveolens</i>	Antispasmodic, relaxant
Juniper, <i>Juniperus communis</i>	Digestive tonic, nerve tonic
Lavender, <i>Lavandula angustifolia</i>	Antispasmodic, calming, cardi tonic, hypotensive, sedative
Lemon, <i>Citrus limon</i>	Antispasmodic, calming, hypotensive, nausea relief
Jealousy	
Basil, <i>Ocimum basilicum var. album</i>	Antibacterial, antiviral, decongestant
Bergamot, <i>Citrus bergamia</i>	Antibacterial, antiviral, cicatrizant
Geranium, <i>Pelargonium graveolens</i>	Antibacterial, antifungal, cicatrizant, decongestant
Juniper, <i>Juniperus communis</i>	Detoxifying, litholytic
Lavender, <i>Lavandula angustifolia</i>	Antibacterial, antifungal, cicatrizant
Lemon, <i>Citrus limon</i>	Antibacterial, antifungal, antiviral, litholytic
Lack of confidence	
Basil, <i>Ocimum basilicum var. album</i>	Neurotonic
Bergamot, <i>Citrus bergamia</i>	Balancing, tonic to central nervous system
Lavender, <i>Lavandula angustifolia</i>	Balancing, tonic

Marjoram, <i>Origanum majorana</i>	Balancing, neurotonic
Rosemary, <i>Rosmarinus officinalis</i>	Neurotonic
Thyme (sweet), <i>Thymus vulgaris</i>	Cardiotonic, neurotonic, immunostimulant

Table 2. Essential oils that are effective in alleviating symptoms related to Emotional Insecurity.

3.4.3 Mood changing

As well as being able to relax or stimulate the nervous system, essential oils can also be useful in slight mood changes. This makes the use of essential oils suitable for women who are inclined to be temperamental, and for the unpredictable mood swings and irritability suffered during PMS[3].

Uplifting oils: There are unfortunately times in our lives when we get depressed to some extent, whether due to a specific event or an accumulation of chronic tiredness. As part of a program of recuperation and restoring the vitality, aromatherapy can certainly be very effective in lifting the mood and giving a boost to the overall energy levels. For a strong but relatively short-lived effect a few drops of bergamot and neroli in the bath will be ideally. For a longer-lasting effect, either bergamot or neroli as a fragrance is used[5,6].

Revitalizing oils: Rather than having a coffee or even worse alcohol, revitalizing oils are much more effective. A few drops of rosemary or peppermint oil in a burner, or alternatively a mixture of those two in a bowl of steaming water. Give the oils plenty of time to evaporate in the room and breathe freely[6].

Invigorating oils: Chronic tension too often leads to a feeling of inescapable exhaustion. Many oils have a tremendous tonic effect, restoring vitality but without over-stimulating in any way. As a group the citrus oils are excellent for this purpose, ranging from the more soothing mandarin to the highly refreshing lemon oil[8].

3.4.4 Pre-Menstrual Syndrome (PMS)

PMS is a combination of emotional, psychological, physical and mood disturbances that occur after a woman's ovulation and typically ending with the onset of her menstrual flow. Some researchers estimate that PMS affects up to half of adult women living in modern society. No one knows exactly the cause of PMS, but it is believed that it results from the alterations in or interactions between the levels of sex hormones and brain chemicals known as neurotransmitters. PMS does not appear to be specifically associated with any personality factors or specific personality types. However, a contributory factor could be poor nutrition. The most common symptoms will be discussed here and some useful aromatherapy treatments[1,2,3].

Excessive water retention: Fluid retention is thought to be a crucial factor in PMS, as it affects all the cells in the body. PMS may be accompanied by weight gain and shows itself in the swelling of the abdomen, ankles and breasts, which can become very tender and swollen. Diuretic and decongestant essential oils can be used to help reduce swelling[2,8].

Persistent headaches and sleep disturbances: Both a lack of sleep and regular headaches are draining on the body, are common symptoms during PMS, and have as

a result to increase stress levels and the inability to cope. Calming, neurotonic and decongestant essential oils can be used to relieve the headaches and/or insomnia by balancing the whole body[2].

Emotional instability: Many women suffer from depression and irritability every month. In some cases, this can be severe and can lead to arguments and difficulties at and at work. Antidepressant and calming essential oils, taken as inhalation and baths can help.

Some essential oils have a tendency to normalize hormonal secretions, including those involved in the reproductive system. Cypress is helpful for all ovarian problems. Clary sage and niaouli are oestrogen-like, which makes them useful for the stages in a woman's life when oestrogen production is unstable[2,3].

An efficient mixture for balancing and relaxing massage for women suffering with PMS would be: 4 drops of Lavender, 2 drops of Melissa or Rose otto and 5 spoons of base oil[2].

In the following table examples of useful essential oils and their uses in the treatment of the common symptoms of PMS are being demonstrated.

Essential oil	Treatment
<i>Hormone-like essential oils</i>	
Chamomile (German), <i>Matricaria recutita</i>	Decongestant, hormone like
Clary sage, <i>Salvia sclarea</i>	Decongestant, oestrogen-like
Cypress, <i>Cupressus sempervirens</i>	Hormone-like (ovarian)
Niaouli, <i>Melaleuca viridiflora</i>	Oestrogen-like (regularizes menses)
Peppermint, <i>Mentha piperita</i>	Hormone-like (ovarian stimulant), neurotonic
<i>Painful periods and backache</i>	
Basil, <i>Ocimum basilicum var. album</i>	Analgesic, antispasmodic, decongestant
Eucalyptus, <i>Eucalyptus smithii</i>	Analgesic, decongestant
Geranium, <i>Pelargonium graveolens</i>	Analgesic, antispasmodic, decongestant
Lavender, <i>Lavandula angustifolia</i>	Analgesic, antispasmodic, calming, sedative, tonic
Marjoram (sweet), <i>Origanum majorana</i>	Analgesic, antispasmodic, calming, neurotonic
Peppermint, <i>Mentha piperita</i>	Analgesic, decongestant, hormone-like
Pine, <i>Pinus sylvestris</i>	Analgesic, decongestant
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, antispasmodic, decongestant
<i>Irregular, scanty and/or lack of periods</i>	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming, menstrual regulator, nervous menstrual problems
Melissa, <i>Melissa officinalis</i>	Calming, sedative, regularizes secretions
Rose otto, <i>Rosa damascena</i>	General reproductive system regulator
<i>Heavy periods</i>	
Cypress, <i>Cupressus sempervirens</i>	Astringent, phlebotonic, hormone-like (ovary problems)
Melissa, <i>Melissa officinalis</i>	Calming, sedative, regularizes secretions
<i>Fluid retention</i>	
Cypress, <i>Cupressus sempervirens</i>	Diuretic (oedema, rheumatic swelling)

Fennel, <i>Foeniculum vulgare</i>	Diuretic (cellulite, oedema)
Juniper, <i>Juniperus communis</i>	Diuretic (cellulite, oedema)
Sage, <i>Salvia officinalis</i>	Decongestant, lypolytic (cellulite)
Low spirits (depression) and fatigue	
Basil, <i>Ocimum basilicum var. album</i>	Nervous system regulator (anxiety), neurotonic (convalescence, depression)
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming (nervous depression, nervous shock)
Clary sage, <i>Salvia sclarea</i>	Neurotonic (nervous fatigue)
Geranium, <i>Pelargonium graveolens</i>	Relaxant (anxiety, debility, nervous fatigue)
Juniper, <i>Juniperus communis</i>	Neurotonic (debility, fatigue)
Marjoram (sweet), <i>Origanum majorana</i>	Neurotonic (debility, mental instability, anguish, nervous depression)
Pine, <i>Pinus sylvestris</i>	Neurotonic (debility, fatigue)
Tender, congested breasts	
Eucalyptus, <i>Eucalyptus smithii</i>	Analgesic, decongestant
Geranium, <i>Pelargonium graveolens</i>	Analgesic, decongestant
Headaches	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Antispasmodic, calming, sedative
Lavender, <i>Lavandula angustifolia</i>	Analgesic, calming, sedative
Marjoram (sweet), <i>Origanum marjorana</i>	Analgesic, antispasmodic, calming
Melissa, <i>Melissa officinalis</i>	Calming, sedative
Peppermint, <i>Mentha piperita</i>	Analgesic, antispasmodic
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, antispasmodic, decongestant
Insomnia	
Basil, <i>Ocimum basilicum var. album</i>	Nervous system regulator (nervous insomnia)
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming, sedative
Lavender, <i>Lavandula angustifolia</i>	Calming, sedative
Lemon, <i>Citrus limon</i>	Calming
Melissa, <i>Melissa officinalis</i>	Calmin, sedative
Irritability	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming, sedative

Table 3. Essential oils that are effective in alleviating symptoms related to Pre-Menstrual Syndrome (PMS)

3.4.5 Common health problems

There are several relatively common health problems which can occur at any age and with varying degree of severity. Stress generally makes all these conditions worse.

Irritable bowel syndrome (IBS): This disorder of the lower bowel usually occurs between the age of 20-40. The usual symptoms are colicky pains, diarrhea and/or constipation, and distention of the abdomen, giving rise to noisy rumblings and wind. Emotional factors can play an important part in this disorder, and those who are

anxious and over-conscientious are the most likely sufferers. Symptoms can be worse just before a period (for women), especially if PMS is present. Essential oils which balance the digestive system eg Fennel, Peppermint could be used in a variety of ways, such as, ingestion, application in a carrier base, compresses placed over the abdomen etc[2,3,10].

Cystitis: This is a common problem which can occur any time in a woman's life. Is an infection and inflammation of the bladder and urethra. It is characterized by a frequent, painful urge to urinate. Treatment is with antibacterial and antiseptic essential oils which have an affinity to the kidneys. Cystitis has been treated effectively using a tea with the relevant essential oils added and by application of the same oils in a carrier base to the abdomen and lower back. Juniper, eucalyptus, pine and sandalwood have antiseptic properties. Juniper is also detoxifier, while sandalwood can alleviate irritation[2].

An efficient mixture for Cystitis would be: 2 drops of juniper and eucalyptus oil, 2 drops of Sandalwood and 2.5 spoons of base oil[2].

Menstrual pain: Menstrual pain occurs in many women, just before or the first day of menstruation and may continue till the next one. The pain, which is usually located on the lower back and abdomen, is due to uterine cramps and may vary from month to month. Clary sage, cypress, marjoram, chamomile and rose otto, are effective as antispasmodics, while juniper oil is useful for cleaning and detoxifying. Marjoram, chamomile and rose otto, have also analgesic properties. Clary sage and Melissa oil they can be successfully combined with all the above, as stimulants, and because they regulate hormone production[2,9].

Sinusitis: Inflammation of the sinus area around the nose and/or eyes can occur at any time in life after puberty and is often difficult to cure, even with an operation. It is caused mainly due to infection, allergies or autoimmune issues. It causes chronic congestion, catarrh and sometimes headaches. Fortunately, sinusitis can be helped easily and successfully by adding the appropriate essential oils to the moisturizer. A mixture of eucalyptus oil, peppermint and lavender can help to air obstruction and to relieve any headache. Allergic reactions or colds can exacerbate the condition, in which case, neat essential oils should be inhaled on a tissue or used in the bath[2,3]. An efficient mixture would be: 2 drops of peppermint, 4 drops of eucalyptus, 3 drops of lavender and 2.5 tea spoons of lotion-base[2].

Throat infections: The sore throat may be one of the first signs of a respiratory disease or may occur in the secondary stage of infection as a result of mucus discharged with constant cough. Sometimes can happen some temporary loss of voice (laryngitis). Oils of Sandalwood, Lavender and Clary sage are soothing and great for a dry, sore throat, while the addition of some antiseptic oils such as lemon, geranium or teat tree oil helps to fight infection. And if there is mucus the addition of eucalyptus oil, peppermint and cedarwood will help. The therapeutic effects of those essential oils can be achieved either by gargling or by massage[2,3].

Colds and flu: The common cold is an infection of the upper respiratory tract, characterized by pain, inflammation of the nose and throat and mucus hypersecretion. The flu is more serious, viral attack, accompanied by fever, chills and swollen lymph glands. The aromatherapy when applied early, can help not to be settled germs. But in the common cold, the prevention is usually more effective than cure. Tea tree oil, lemon oil, geranium oil and black pepper oil may help to fight infection. The oils of lavender, rosemary and tea tree have general advantages and may stimulate the immune system. Gargling and inhalation of the mentioned essential oils are the methods used in order to achieve the desired therapeutic effect[2].

Chronic bronchitis and asthma: Exposure to tobacco smoke and other contaminants, may cause irritation of the bronchi, causing excessive secretion of mucus and constant cough that characterizes chronic bronchitis. Asthma can be derived from similar irritants, may be a result of stress or due genetic factors. The oils of cedarwood, peppermint and eucalyptus are decongestants and help to clear nasal passages. The oils of pine, tea tree oil, marjoram and sandalwood are also suitable. Asthmatics should not inhale essential oils from a cup with hot water because they might become suffocated[2,6].

Thrush: Infected *Candida albicans* can show as white ulcerous spots inside the mouth, which can be dealt with using a mouthwash including anti-infectious essential oils (being discussed later in more detail – mouth ulcers). The vagina can also be affected with thrush (vaginal thrush), giving rise to itching and discomfort. *Candida albicans* lives naturally in the colon, and its development is controlled by beneficial bacteria. The general depression, a treatment or overuse of antibiotics, the contraceptive pill, pregnancy, daily tension, diabetes and generally a low immune system condition, can all alter the balance of beneficial and harmful bacteria in the intestine, enabling the fungus to multiply extensively, affecting the vagina. It usually causes a watery, white discharge, which is irritating to the vagina and the surrounding skin. The yeast infection has satisfactory response, when treated with antiseptic essential oils. Tea tree oil, myrrh and lavender have antifungal properties[2,3]. An efficient mixture would be 2 drops of myrrh, 4 drops of lavender and 2.5 spoons of oil base[2].

Endometriosis: This condition is when tissue similar to that of the lining of the uterus (endometrial-like cells) is found elsewhere, most commonly in the ovaries. The tissue swells and bleeds, causing severe pain before a period and excessive blood loss during it. Conventional treatment may recommend removal of the ovaries (and therefore the hormone production) so that the uterus will not be longer stimulated to produce the extra tissue. The contraceptive pill is often prescribed but it is not always successful. Some women prefer to avoid surgery if possible, in which case it is worth trying hormone-like and decongestant essential oils first, as they have been known to help. If surgery is inevitable, the oestrogen-like essential oils will help the body to readjust itself to the loss of the ovaries[2].

Essential oils	Treatment
<i>Irritable bowel syndrome (IBS)</i>	
Fennel, <i>Foeniculum vulgare</i>	Analgesic, antispasmodic, digestive (constipation, diarrhea, flatulence)
Peppermint, <i>Mentha piperita</i>	Analgesic, anti-inflammatory, digestive (diarrhea, flatulence)
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, antispasmodic, digestive (constipation, flatulence)
<i>Cystitis</i>	
Eucalyptus, <i>Eucalyptus smithii</i>	Anti-infectious, antiseptic
Juniper, <i>Juniperus communis</i>	Anti-inflammatory, antiseptic
Lavender, <i>Lavandula angustifolia</i>	Anti-inflammatory, antiseptic
Thyme (sweet), <i>Thymus vulgaris</i>	Anti-infectious, anti-inflammatory, antiseptic
<i>Sinusitis</i>	
Eucalyptus, <i>Eucalyptus smithii</i>	Anti-inflammatory, antiseptic

Lavender, <i>Lavandula angustifolia</i>	Anti-inflammatory, anti-infectious, antiseptic
Peppermint, <i>Mentha piperita</i>	Anti-inflammatory, anti-infectious
<i>Thrush (Candida albicans) and vaginitis</i>	
Lavender, <i>Lavandula angustifolia</i>	Analgesic, antifungal, anti-inflammatory
Pine, <i>Pinus sylvestris</i>	Analgesic, antifungal, anti-infectious, anti-inflammatory, neurotonic
Tea tree, <i>Melaleuca alternifolia</i>	Analgesic, antifungal, anti-infectious, anti-inflammatory, immunostimulant, neurotonic
Thyme (sweet), <i>Thymus vulgaris</i>	Antifungal, anti-infectious, anti-inflammatory, immunostimulant, neurotonic
<i>Endometriosis</i>	
Clary sage, <i>Salvia sclarea</i>	Decongestant, oestrogen-like, phlebotonic
Cypress, <i>Cupressus sempervirens</i>	Astringent, hormone-like (ovary problems), phlebotonic
Geranium, <i>Pelargonium graveolens</i>	Analgesic, astringent, cicatrizant, decongestant, phlebotonic, styptic
Rose otto, <i>Rosa damascena</i>	Astringent, cicatrizant, neurotonic, styptic

Table 4. Essential oils that are effective in alleviating symptoms related to common health problems.

3.4.6 Skin and hair conditions

The skin is a defensive wall of the body against invading organisms such as viruses and bacteria. It is covered with a mixture of sebum – an oily material, which is secreted by glands located in the hair follicles – and sweat that comes out the pores. To keep skin soft and pliable, the sebum and sweat should be at proper proportion. A variety of factors, including frequent washing and an unhealthy diet, hormonal disturbances and the daily tension, can all affect the production of sebum and sweat, increasing or decreasing it, having as a result the oily or dry skin. Many essential oils have balancing properties and may play a key role in stabilizing the balance of the skin[2,3,5,10].

Eczema: Eczema or dermatitis is a non-contagious skin condition. Although there are different types, the typical symptoms include itching, dryness or exudation of the skin, which can often make it look as if it is scratched, to be in pain and sometimes bleeding. One common type of eczema is the “in contact eczema”, which develops as an allergic reaction with itching and redness, over the skin areas that are exposed to the irritant. Atopic eczema is common when there is a family history of general allergic reactions such as asthma and is characterized by very dry skin and intense itching. In both cases, the wounds may be opened and get infected. The daily tension also, may exacerbate the symptoms. The oils of chamomile and juniper, help in the decrease of the eczema, because of their anti-inflammatory properties. Geranium oil and lavender are therapeutic, while juniper oil helps to clean the blood[2,6].

Acne: Acne is usually due to hormonal imbalance or improper diet, which affect sebum secretion. Daily tension is possible to worsen the situation. When the sebum secretion is greater than the needs of the skin, it will become trapped in hair follicles, and in the oily areas of the nose and the chin, having as a result the appearance of

spots and redness in these areas. The essential oils that control sebum production and also clean the blood are the oils of juniper, lemon and cedarwood. The lavender and geranium oils, have therapeutic and antiseptic properties, while the oils of chamomile and bitter orange help in the weakening of the inflammation[2,6].

Herpes simplex: Herpes simplex, is a viral disease caused by both herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2). HSV-1 usually appears blisters around the mouth. HSV-2 causes similar symptoms around the genital area and can be sexually transmitted. The common cold, exhaustion and general poor health, facilitate the activation of the virus, which is always present in our body. In the first type (HSV-1), the blisters open, creating “cold ulcers”. If not cured, they will remain and will spread to larger area, before the death of the virus. If symptoms continue seek for medical advice. Herpes simplex may be transmitted to the eyes causing several ulcers. Geranium and lemon oil have antiviral properties, whilst eucalyptus and lavender oils have antiseptic properties, which may be useful. The combination of these oils may help in treating the symptoms[2].

An efficient mixture to apply in the affected area would be: 4 drops of lemon, eucalyptus and pelargonium in 2.5 spoons of calendula oil[2].

Athlete's foot: The swollen, moist skin between the toes, is the first sign of “athlete's foot”, a condition caused by the development of a fungus called *Tinea pedis*. After being infected, the skin becomes itchy, dry and red. Blisters may appear and a burning sensation. If it is very severe, the skin may start to crack and can sometimes expose the raw tissue underneath. This can be very risky for developing a secondary bacterial infection. Maigold, lavender and tea tree oil, have fungicidal properties which may help in this situation[2,6].

Dandruff: Dandruff may have the form of fine dried flakes or waxy scales that stick to the hair and skull causing severe irritation. In the latter type of dandruff, we should avoid scratching our head, because we might cause bleeding and infection. If the facial skin becomes oily followed by the appearance of spots or stains, we should wash the head frequently and do the hair in a way so that no hair falls on the forehead. This situation could easily be mistaken for eczema or psoriasis. For oily dandruff, essential oils with antiseptic and balancing properties are being preferred, such as juniper, cedarwood, rosemary and lemon oils. For very dry heads with flakes and dry hair, are being treated more effectively with softening essential oils, such as lavender, geranium and sandalwood[2,3].

An efficient mixture for dry heads would be: 5 drops of lavender, 5 drops of pelargonium, 2 drops of Sandalwood and 5 spoons of base oil. And for oily heads: 6 drops of cedarwood, 4 drops of rosemary, 4 drops of lemon and 5 spoons of lotion-base[2].

Hair loss: The temporary hair loss may be part of the response to sudden tension or shock. It can also occur after a serious illness or as a side-effect of drug therapy or to be a part of an allergic reaction. The daily tension, can decrease blood circulation to the head, due to the contraction of blood vessels, having as a result the insufficient supply of nutrients to the hair follicles. Thus, the hair that is not being nourished properly, will shrink inside follicles and the hair will start to fall. The male baldness appears in specific areas of the head. It is linked with hereditary factors, but it may be somehow minimized with proper lifestyle and diet. Rosemary and Ylang ylang oils, have tonic properties for the head (head toning), while lavender and cedarwood are balancing oils, which help to stop the hair loss. Head massage with a mixture of those oils is the recommended aromatherapy treatment for hair loss. Also a mixture with the same oils and the addition of Melissa can be used as a lotion[1,2,3].

A therapeutic and tonic mixture would be: 3 drops of rosemary and Ylang ylang, 2 drops of cedarwood, half spoon of vodka and 5 spoons of Melissa[2].

3.4.7 Pregnancy

Pregnancy is a special period in a woman's life, where many physical, psychological and hormonal changes happen. With the use of aromatherapy and the appropriate essential oils, can help the pregnant woman to accept the changes in her body, to combat various glitches that occur during those nine months, such as vomiting, backache, swollen feet, constipation and digestive problems (including heartburn, leg cramps, exhaustion etc.). Essential oils are not always safe and before any administration care should be taken in taking the history of the woman, in choosing the essential oil and in dosage. It is essential to know if the pregnant woman had any miscarriages, recurrent pregnancies, preterm labor in previous pregnancies, increased or low blood pressure, diabetes, varicose veins etc[2,10].

Some essential oils, for example Jasmine and lavender can be used as natural painkillers and can also cause strong contractions in the uterus, accelerating the delivery and removal of the placenta[2].

Morning sickness: Nausea, which typically occurs in the morning, is often one of the first signs that a woman is pregnant. Inhalations with a vaporizer can be helpful at bedtime and first thing in the morning. Ginger has been found to have antiemetic properties. However in some cases it has been found that it may exacerbate the nausea and vomiting in some women, which at best makes it ineffective and at worst harmful. The essential oil of mandarin may help as well in morning sickness[2,3].

Constipation: This is also another early sign of pregnancy. Preparing essential oils in a suitable carrier and applying them to the abdomen has been proven helpful[2].

Stretch marks: When the skin is stretched for long periods of time, during pregnancy for example, tends to lose some of its flexibility and it may appear white or silver-purple signs. The areas being affected the most are the lower abdomen and breasts. Overweight adolescent girls may also appear those signs in their thighs and breasts as well. Although it is not possible to return the overstretched skin to its normal state, essential have amazing regenerative properties and can improve the appearance of the skin. During the second trimester of the pregnancy, essential oils are used to prevent stretch marks on the skin of the abdomen. Through the correct and diligent application of appropriate essential oils it is possible to maintain a supple and undamaged skin. Regenerative oils, such as lavender, frankincense and myrrh are the best for the prevention and the minimization of the already existing signs. Geranium oil may also be used to stimulate the skin (skin-toning). However, the most appropriate for this situation, is the calendula oil. A mixture (including calendula oil) containing oils with regenerative and skin-toning properties, should be applied to the abdomen twice daily morning and night[2,3].

An anti-stretch mixture would be:3 drops of incense oil and myrrh, 6 drops of lavender, 4 drops of pelargonium and 10 spoons of calendula oil[2].

Preparing for labor: Mainly, the most of the pain of childbirth is due to the muscles at the neck of the uterus and the perineum being tense or/and inflexible. This can be eased by the application of muscle relaxing essential oils. There are some essential oils which have uterus stimulant and analgesic properties that help with the contractions such as aniseed, nutmeg, sage and clove bud. These oils are absolutely

not recommended for the first four months of pregnancy and should not be used until the last week, that labor is about to begin. Aniseed and lavender are calming and can help with contractions. Nutmeg is very useful oil for the last stages of labor as it relieves pain and can facilitate delivery^[2,3].

Essential oils can be of great benefit during pregnancy if used correctly and carefully. Ginger is commonly used for morning sickness but it is not appropriate for every woman and sometimes may worsen the problem; these women may have a better response to peppermint^[2,3].

Essential oils	Treatment
<i>Hormone-like essential oils</i>	
Chamomile (German), <i>Matricaria Recutita</i>	Hormone-like
Clary sage, <i>Salvia sclarea</i>	Oestrogen-like
Niaouli, <i>Melaleuca viridiflora</i>	Oestrogen-like (regularizes periods)
<i>Backache</i>	
Basil, <i>Ocimum basilicum var. album</i>	Analgesic, antispasmodic
Lavender, <i>Lavandula angustifolia</i>	Analgesic, anti-inflammatory, antispasmodic
Marjoram (sweet), <i>Origanum majorana</i>	Analgesic, antispasmodic
<i>Constipation</i>	
Ginger, <i>Zingiber officinalis</i>	Analgesic, digestive stimulant
Mandarin, <i>Citrus reticulata</i>	Antispasmodic, calming, digestive stimulant
Orange (bitter), <i>Citrus aurantium var. amara</i>	Calming, digestive stimulant
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, digestive stimulant
<i>Nausea</i>	
Basil, <i>Ocimum basilicum var. album</i>	Digestive tonic, nervous system regulator
Ginger, <i>Zingiber officinalis</i>	Digestive
Lemon, <i>Citrus limon</i>	Anticoagulant, antispasmodic, calming, digestive
<i>Stretch marks</i>	
Frankincense, <i>Boswellia carteri</i>	Cell regenerative, cicatrizant (scars)
Geranium, <i>Pelargonium graveolens</i>	Cell regenerative, cicatrizant (stretch marks)
Lavender, <i>Lavandula angustifolia</i>	Cicatrizant (scars)
<i>Fluid retention</i>	
Fennel, <i>Foeniculum vulgare</i>	Diuretic (cellulite, oedema)
Juniper, <i>Juniperus communis</i>	Diuretic (cellulite, oedema)
Lemon, <i>Citrus limon</i>	Diureric (obesity, oedema)
<i>Varicose veins</i>	
Clary sage, <i>Salvia sclarea</i>	Phlebotonic (circulatory problems, haemorrhoids, varicose veins)
Cypress, <i>Cupressus sempervirens</i>	Phlebotonic (haemorrhoids, poor venus circulation, varicose veins)
Niaouli, <i>Melaleuca viridiflora</i>	Phlebotonic (haemorrhoids, varicose veins)

Labor	
Aniseed, <i>Pimpinella anisum</i>	Analgesic, antispasmodic, calming (gentle narcotic), emmenagogue, oestrogen-like, uterotonic
Lavender, <i>Lavandula angustifolia</i>	Analgesic, antispasmodic, calming (anxiety), sedative
Nutmeg, <i>Myristica fragrans</i>	Analgesic, sedative (narcotic), neurotonic, uterotonic
Peppermint, <i>Mentha piperita</i>	Analgesic, antispasmodic, hormone-like (ovarian stimulant), neurotonic, uterotonic (facilitates delivery)
Perineum	
Geranium, <i>Pelargonium graveolens</i>	Analgesic, cicatrizant (wounds)
Lavender, <i>Lavandula angustifolia</i>	Analgesic, antiseptic
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, anti-inflammatory
Breast Milk	
Fennel, <i>Foeniculum vulgare</i>	Lactogenic, oestrogen like
Geranium, <i>Pelargonium graveolens</i>	Decongestant (breast congestion- for too much milk)
Peppermint, <i>Mentha piperita</i>	Antilactogenic (prevents milk forming)
Cracked nipples or mastitis	
Chamomile (German), <i>Matricaria recutita</i>	Cicatrizant (infected wounds, ulcers)
Geranium, <i>Pelargonium graveolens</i>	Cicatrizant (burns, cuts, ulcers, wounds)
Lavender, <i>Lavandula angustifolia</i>	Cicatrizant (burns, scars, varicose veins, wounds)
Nappy rash	
Patchouli, <i>Pogostemon patchouli</i>	Anti-inflammatory, cicatrizant (cracked skin, scar tissue)
Peppermint, <i>Mentha piperita</i>	Analgesic, anti-inflammatory, soothing (skin irritation, rashes)
Post-natal depression	
Basil, <i>Ocimum basilicum var. album</i>	Nervous system regulator (anxiety), neurotonic
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming (nervous depression, nervous shock)

Table 5. Essential oils that are effective in alleviating symptoms related to Pregnancy.

3.4.8 Menopause

Menopause is a natural and inevitable effect. All women will experience it. Some of them will hardly notice it, but some others will have troublesome symptoms lasting for months or even years. It occurs when the ovaries fail to produce the important hormones, such as oestrogen and progesterone, or when the ovaries have been removed for some reason. Menopause means the last menstrual period. It is derived from the Greek words *menos* which means month and *pausos* which means ending. During this period and because of the hormonal changing, many women experience an increase in their body heat (hot flushes), night sweats, palpitations, haemorrhaging,

insomnia, joint aches, weight gain, fluid retention and cellulite, breast tenderness, headaches, hair and skin dryness, vaginal dryness, fatigue, irritability, sexual problems. To overcome those symptoms many women are under hormone replacement therapy (HRT). But HRT is not right for every woman as there are some risks such as increased possibilities of developing breast cancer and blood clots. However, HRT has been proven very beneficial for many women and is the number one treatment for menopausal symptoms[2,3,11].

Aromatherapy and essential oils have also beneficial role in relieving menopausal symptoms as well. As we have already seen a lot of essential oils have hormone-like effects. Some of the symptoms mentioned above can be successfully treated using the correct essential oils[11].

Night sweats and hot flushes: The classic menopausal symptom that affects 60-85% of menopausal women. During a flush, the upper body, arms and face feel hot, the skin turns red and sweating may occur. It usually lasts 3-5 minutes, and is thought to be caused by a change, in the part of the brain that controls temperature. Adding a few drops of the appropriate essential oil into a bottle of still water and drinking and spraying the face as soon as a flush is coming could be effective. Vitamin E is also said to be effective[2].

Water retention and cellulite: To reduce water retention and cellulite, the relevant essential oils should be added to a suitable carrier base and applied daily to the affected areas. Juniper, lavender and rosemary oils have been found to have diuretic properties. In addition, juniper and geranium oils have detoxification properties, and along with the cleansing properties of rosemary they help in fluid reduction[2,11].

For cellulite a mixture for massaging the affected areas would be: dissolve 4 drops of juniper and rosemary oil, 3 drops of cypress and patchouli in 5 spoons of base oil[2].

Haemorrhaging: Occasional and sudden bleeding may occur. Although essential oils can reduce the amount of blood loss, they don't seem to stop it from happening. As a preventative measure a styptic or an astringent essential oil can be used[2,3].

Vaginal dryness: This can cause both emotional and physical discomfort. There are no known essential oils to increase vaginal fluid. Vitamin E is used to improve vaginal secretion and daily application of sunflower oil around the area[2].

Weight gain: Water retention can lead to bloating and weight gain, which in turn will exacerbate any feelings of low self esteem. Essential oils used for low spirits may help weigh loss by stimulating the nervous system[3].

Sexual problems: For some women, the menopause is marked by a decrease in sex drive (for some others also report the opposite). The reduction of vaginal fluid can make intercourse painful and this can lead to a change in sexual desire. Several essential oils are reputed to help with sexual problems and to increase desire. These oils relax the mind and stimulate the emotions[2,3].

Essential oil	Treatment
<i>Hot flushes and sweating</i>	
Clary sage, <i>Salvia sclarea</i>	Antisudorific (inhibits the secretion of sweat), oestrogen-like
Cypress, <i>Cupressus sempervirens</i>	Antisudorific
Peppermint, <i>Mentha piperita</i>	Cooling
Pine, <i>Pinus sylvestris</i>	Antisudorific
<i>Reputed sexual stimulants</i>	

Peppermint, <i>Mentha piperita</i>	Neurotonic, reproductive tonic
Rosemary, <i>Rosmarinus officinalis</i>	Neurotonic, sexual tonic
Rose otto, <i>Rosa damascena</i>	Neurotonic, sexual tonic
Thyme (sweet), <i>Thymus vulgaris</i>	Cardiotonic, immunostimulant, neurotonic, sexual tonic
Ylang ylang, <i>Cananga odorata</i>	Reproductive tonic
Low spirits (depression) and fatigue	
Basil, <i>Ocimum basilicum var. album</i>	Neurotonic debility, mental strain, depression
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming (nervous depression, irritability, nervous shock)
Clary sage, <i>Salvia sclarea</i>	Neurotonic (nervous fatigue)
Cypress, <i>Cupressus sempervirens</i>	Neurotonic (debility)
Frankincense, <i>Boswellia carteri</i>	Antidepressant (nervous depression)
Geranium, <i>Pelargonium graveolens</i>	Neurotonic (debility, nervous fatigue)
Juniper, <i>Juniperus communis</i>	Neurotonic (debility, fatigue)
Marjoram (sweet), <i>Origanum majorana</i>	Neurotonic (debility, anguish, agitation, nervous depression)
Rosemary, <i>Rosmarinus officinalis</i>	Neurotonic (general debility and fatigue)
Fluid retention and cellulite	
Cypress, <i>Cupressus sempervirens</i>	Diuretic (oedema, rheumatic swelling)
Geranium, <i>Pelargonium graveolens</i>	Decongestant (lymphatic congestion)
Headaches and sleep problems	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Antispasmodic, calming (migraines, insomnia, irritability)
Lavender, <i>Lavandula angustifolia</i>	Analgesic, calming (headaches, migraines, insomnia – low dose)
Marjoram (sweet), <i>Origanum majorana</i>	Analgesic, calming (agitation, migraines, insomnia)
Headaches and migraines only	
Peppermint, <i>Mentha piperita</i>	Analgesic (headaches, migraines)
Rosemary, <i>Rosmarinus officinalis</i>	Decongestant (headaches, migraines)
Irritability	
Chamomile (Roman), <i>Chamaemelum nobile</i>	Calming (irritability, nervous depression, nervous shock)
Cypress, <i>Cupressus sempervirens</i>	Calming (irritability), regulates sympathetic nervous system
Haemorrhage	
Cypress, <i>Cupressus sempervirens</i>	Astringent, phlebotonic (broken capillaries, varicose veins)
Rose otto, <i>Rosa damascena</i>	Astringent, styptic (wounds)

Table 6. Essential oils that are effective in alleviating symptoms related to Menopause.

3.4.9 Cancer

Aromatherapy cannot cure cancer, but it can be used in a supportive role and can greatly improve the quality of life for many cancer patients. Aromatherapy massage

can confer an improvement in anxiety and depression that appear to cancer patients. The oils that can be used are those that are good for stress conditions, such as Chamomile, Geranium, Jasmine, Lavender, Marjoram, Neroli, Patchouli, Rose, Sandalwood, Ylang ylang, Melissa^[10,12].

However, due to the diversity of the therapeutic potential of essential oils, several researches have been made to test their anticancer activity. Some reports have shown, that some of their components, particularly monoterpenes, have several pharmacological effects on mevalonate metabolism, which may account for the terpene-tumor suppressive activity. Monoterpenes have shown to exert chemopreventive and chemotherapeutic activities. For instance, Nutmeg has shown hepatoprotective activity. On the other hand, Geraniol, a monoterpene alcohol, showed a reduced expression in the amounts of thymidylate cyclase and thymidine kinase in colon cancer. Both these two enzymes are involved in 5-Fluorouracil toxicity; therefore a decrease in these enzymes enhances the cytotoxicity of the drug. Furthermore Geraniol, lowered the resistance of cancer cells to the drug^[12,13].

These results, make the essential oils promising agents for new medical applications and as adjuvants to current medications.

3.4.10 Dementia

Some people, most often in older ages suffer behavioural and psychological symptoms of dementia. These are deterioration of their mental faculties and inability to think clearly or to concentrate for any length of time. Memory can become confused and unreliable, and some speech difficulties may develop. Even though most patients with dementia also have anosmia, it is unclear whether the route of administration influences response. The effectiveness of aromatherapy in patients with anosmia may be reduced if the mechanism of action is through smell and the patient has a psychological response through this or may be not if there is a pharmacological effect of the oil after it has been absorbed through the lungs or the skin^[14,15].

The essential oils used for patients with dementia are those that stimulate the mind and improve memory.

Essential oil	Treatment
Basil, <i>Ocimum basilicum var. album</i>	Neurotonic (mental strain)
Clove bud, <i>Syzygium aromaticum</i>	Mental stimulant (memory loss, mental fatigue), neurotonic
Marjoram (sweet), <i>Origanum majorana</i>	Neurotonic (mental instability)
Peppermint, <i>Mentha piperita</i>	Mental stimulant (concentration), neurotonic
Rosemary, <i>Rosmarinus officinalis</i>	Neurotonic (loss of memory, concentration)

Table 7. Essential oils that are effective in alleviating symptoms related to Dementia.

3.4.11 Parkinson's disease

The basal ganglia and the extrapyramidal pathways play an important role in modulating and smoothing voluntary muscular movement. An imbalance between excitatory and inhibitory influences in these structures, can result in disorders of movement and tone, collectively termed extrapyramidal syndromes (EPS). Idiopathic Parkinson's disease is the most common form and characterized by tremors, muscular rigidity, emaciation, and difficulties in speech and movement. The cause of this chronic, progressive and neurodegenerative disease is unknown. It involves destruction of the dopaminergic cells. In other words, there is a reduction in the number of dopamine – secreting cells and hence lack of dopamine, which is needed for the co-ordination of brain muscles. Strong drugs are available to replace the dopamine levels, which have many side effects such as nausea, insomnia and constipation, all of which can be helped with aromatherapy.

A study has also shown that essential oils can alleviate muscular problems, and sometimes to reduce the degree of slurred speech and tremors. Daily application of a lotion containing essential oils, plus daily aromatherapy baths (whenever possible) were used in the study[16].

Essential oil	Treatment
Clary sage, <i>Salvia sclarea</i>	Antispasmodic, calming, regenerative (cellular, aging), neurotonic
Lavender, <i>Lavandula angustifolia</i>	Analgesic, antispasmodic, calming, sedative (anxiety, headaches, insomnia), neurotonic
Marjoram (sweet), <i>Origanum majorana</i>	Analgesic, antispasmodic, digestive tonic, calming (anxiety, insomnia)
Rosemary, <i>Rosmarinus officinalis</i>	Analgesic, antispasmodic, digestive (constipation, sluggish digestion), neurotonic

Table 8. Essential oils that are effective in alleviating symptoms related to Parkinson's Disease.

3.4.12 Diabetes

Diabetes is one of the most serious and probably the most common of multisystem diseases. The hall mark of diabetes is hyperglycaemia, owing to abnormalities in insulin secretion or action. There are two primary causes of diabetes: in type 1 diabetes (insulin dependent diabetes mellitus, IDDM) there is usually gross destruction of the pancreatic beta-cells; in type 2 diabetes (non-insulin dependent diabetes mellitus, NIDDM) insulin is secreted but is either insufficient or insufficiently effective to meet metabolic needs.

A few studies have been made to see the role of essential oils as antidiabetic agents. Some essential oils such as rosemary, may aggravate diabetes as it has showed hyperglycaemic effects and insulin release inhibitory effects in diabetic rabbits.. Some reports have indicated that a combination of the essential oils of fennel, oregano, cinnamon, cumin, myrtle and some others, has the ability to enhance the sensitivity of insulin in type 2 diabetes. But yet, more research has to be done in order to confirm these results[13].

3.4.13 Gastrointestinal disorders

The normal functioning of the gastrointestinal system, can be easily be disrupted by bad eating habits. A natural diet with regular meals, rich in fiber and liquids will promote compact but soft stools and facilitate their exit from the body. Furthermore, many essential oils, through their stimulating and antispasmodic properties, can help maintain or restore normal functioning of the gastrointestinal system. Inhalation or massage of the appropriate essential oils can be as effective in gastrointestinal disorders, as when taken orally, even though the latter is not recommended as self-medication^[2,3].

Heartburn: Heartburn is a form of dyspepsia, characterized by a burning sensation in the middle of the sternum. The unpleasant taste that often accompanies it, it is due to the gastric acid that comes from the stomach. This may be due to quick meals, bad food combinations or might be an emotional reaction. In pregnancy and in overweight women, the increased pressure on the stomach can cause heartburn. Peppermint and lemon oil have digestive properties, while sandalwood helps in the relaxation of the stressed objects^[2,3].

A lotion which may control acidity could be the mixture of: 2 drops of lemon and peppermint oil, 3 drops of sandalwood and 2.5 spoons of lotion-base^[2].

Indigestion and flatulence: Frequent indigestion and flatulence are often the result of poor eating habits, among which is overeating, hasty eating, and long periods without food. Essential oils such as lemon, peppermint, ginger, juniper, rosemary and marjoram help to fight indigestion^[2].

Mouth ulcers: Mouth ulcers can be caused by poor nutrition, vitamin deficiencies, stomach or intestinal disorders or food allergies. Usually occur in the mucosa of the gum and cheek or around the tongue and they develop when someone is tense or exhausted. Mouth ulcers may also occur as a result of bacterial, viral or fungal infection. These ulcers can be treated with aromatherapy. The potent antiseptic oils such as tea tree oil, lemon and geranium are effective against ulcers caused by viruses, bacteria and fungi. Additionally, myrrh, lavender as well as tea tree oil is believed to have fungicidal properties^[2]

An efficient mixture for mouth gargling would be: 1 drop of tea tree oil, pelargonium and lavender in a half glass of water^[2].

Diarrhea: Consumption of bacterial infected food is a common cause of diarrhea. It can also be due to viral infection, intolerance in food or drinks, diet changes or strong emotions such as anxiety or fear. The daily tension could also deregulate the process of digestion, causing a chronic form of diarrhea. Useful oils are cypress, juniper, geranium, lemon and sandalwood as they have contraction properties. Peppermint and chamomile oils, are good as antispasmodics, while the tea tree oil has important antibacterial properties. Sandalwood, chamomile and geranium are also relaxing oils and can therefore be useful in cases where the daily tension contributes to the symptoms of diarrhea. Massaging in the lower abdomen using a mixture of the above, and also bathing in a mixture of geranium, juniper and peppermint oil will help the symptoms to go away^[2,3].

A contractile and stabilizing mixture would be: 3 drops of teat tree oil and peppermint, 2 drops of sandalwood and pelargonium and 5 spoons of lotion or base oil^[2].

Nausea: Nausea often causes vomiting, but a lot of times it does not cause vomiting. Heavy or fatty foods, bad tastes and odors in comparison with daily tension can cause nausea. Nausea is common when travelling either by car, by plane or boat and is also

an early sign of pregnancy, where women experience the so-called morning sickness (already mentioned above). Emotional nausea often responds well to the relaxing oils, such as sandalwood, lavender, rose otto, while peppermint and black pepper will help in the relief from the nausea caused by food. For travel sickness ginger and peppermint oils maybe helpful as they have antiemetic properties, but as mentioned above, care need to be taken with ginger. Additionally Melissa oil helps with mood swings that accompany nausea. If the treatment is not successful the first time, include an oil for every type of sickness, for example, lavender, peppermint and ginger[2,3] For inhalation an effective mixture would a be a few drops of lavender and peppermint oil in a cloth or tissue. For massage or rubbing on the stomach 3 drops of peppermint and black pepper and 3 drops of Rose otto and 5 spoons of lotion base[2]. Constipation: Constipation can be a result of insufficient exercise, lack of fiber in the diet, drug therapy, or simply may be due to a change in daily habits. It may also be a result of everyday tension. Chamomile, bitter orange, black pepper, mandarin and rosemary help digestion. If daily tension plays a role in constipation, massaging with marjoram and chamomile oils will be useful.

3.4.14 Heart and circulation problems

Efficient circulation of blood and lymph is vital for help. The blood nourishes the body, carrying nutrients and oxygen to cells. The lymph removes toxic waste from the pituitary glands. Both contain white blood cells, which fight invading microorganisms like bacteria and viruses. Unhealthy eating habits, lack of exercise and daily tension can affect adversely the circulation and decrease the body's immune response. In developed countries, arterial disease is the commonest cause of death for women over 50, killing one in four. This is almost twice as high as the death rate from cancer. Essential oils can be passed directly into the bloodstream through the capillaries. Some will help in stimulating and improving circulation, while others can effectively reduce high blood pressure and others have been found to reduce cholesterol levels. Garlic essential oil, has shown a decrease in serum cholesterol levels and triglycerides and on the same time an increase in HDL. Moreover the intravenous administration of the essential oil of basil, causes the induction of hypotension and bradycardia, which it's due to its vasodilator effects. Lavender was found to have antiplatelet effects as well as onion, *Allium cepa*[2,3,13].

Arrhythmia: The heart may flutter or beating more rapidly, after stimulant beverages, some drugs or nicotine. The soothing essential oils can bring quick relief. Neroli, Melissa, lavender, mandarin or Ylang ylang may help. If the arrhythmias remain or return you should seek for a doctor[2].

Low blood pressure: The optimal is the systolic 120mmHg and the diastolic 80mmHg, which is commonly written 120/80. Low blood pressure is a reading of around 90/60 or less. However, low blood pressure is normal for a few people. In general is supposed to be a protection against the diseases that caused by high blood pressure, but when accompanied by dizziness and/or weakness should, you should seek for medical advice. These symptoms may be a result of a transient drop in blood pressure, which in this case they respond well to aromatherapy. Tonic essential oils, such as rosemary and black pepper, will help in the improvement of the circulation[2,3].

High blood pressure: Blood pressure varies slightly from person to person. It changes during the day, increasing during exercise and/or when intense emotions take place. When blood pressure remains high constantly, causing hypertension, it is not necessary to be accompanied by other symptoms. For this reason it must be checked by a doctor or a pharmacist. A variety of lifestyle factors, which include the daily tension (stress), smoking, overconsumption of salt, alcohol intake and fatty foods, lead indirectly to high blood pressure. Clary sage, lemon, marjoram, mandarin, Melissa and Ylang ylang can all help to reduction of blood pressure, while the lavender oil causes relaxation and juniper oil improves kidney function[2,3].

Varicose veins: Blood flow from the legs to the heart is supported by heart muscle contractions and from the valves of the veins. The long standing or sitting, along with lack of exercise and physical weakness of the valves, complicate blood circulation, causing accumulation of blood and increase the surface of the walls of the veins. The result is, the long, tortuous, blue veins, often painful varicose veins that occur in legs. Haemorrhoids are a type of varicose veins, that either appear into the rectum (internal) or around the anus (external). It is possible to bleed, and they can often cause anaemia and should be examined by a doctor. Peppermint, lemon and cypress oils, have contractile properties and help to the reduction of varicose veins. Lemon, juniper and rosemary will stimulate the blood circulation, while peppermint or sandalwood, will sooth any irritation[2,3].

3.4.15 Musculoskeletal problems

The bones of our skeleton, are covered by muscles, that constrict or relax, according to our will. On the other hand, the muscles of our heart and gastrointestinal system are not directly controlled by our will. A healthy, balanced diet, will help to maintain healthy bones and tissues, but specifically the muscles need oxygen to function properly. Therefore, they will be benefited with regular exercise and by deep breaths. Sometimes radical lifestyle changes in order to be healthy. It relieves from chronic muscular and skeletal problems, such as rheumatoid arthritis and osteoarthritis. Essential oils can be used in order to relax the muscles, to relieve pain and to cleanse and detoxify the body[2,13].

Cramps: Cramps during or after physical exercise happen frequently. More serious problem is the cramps of the muscles of the legs and feet that happen during the afternoon and at night. It is believed to be due to poor blood circulation, and lack of calcium, sodium and/or potassium, and be treated effectively with aromatherapy. Bathing and/or massaging with marjoram, chamomile and/or mandarin can help alleviate muscle spasms and prevent recurrence of cramps. Cypress is useful as well, for its tonic properties[2,6]

A mixture which could be used either in the bath or for rubbing or massage would be: 3 drops of marjoram and 2 drops of chamomile and mandarin. Either dissolved in the water for bath or in 2.5 spoons of base oil or lotion[2].

Sprains: Sprains happen when the joints are stretched or torn by a sudden reflex. Sprains respond well to aromatherapy. Marjoram and rosemary have analgesic properties and help to alleviate pain, while lavender oil is calming[2].

Rheumatism and arthritis: Rheumatism is a term that covers a variety of rheumatic and arthritic conditions, but is used especially where muscle pain exists as well. Arthritis is a term that is specifically used for the inflammation of the joints.

Rheumatoid arthritis is a chronic, progressive, inflammatory, systemic disease, that primarily affects synovial joints. It is characterized by pain, swelling and morning stiffness of the affected joints, and usually accompanied by weight loss and fatigue. The peak period of onset of RA is between 35 and 55 years of age and it is more frequent to premenopausal women, although among the elderly the incidence is equal in both sexes. In serious conditions the joints paralyze and deform. Osteoarthritis is the progressive deterioration of cartilage, which results in severe pain and decreased flexibility. Connective tissue gets thinner and the joint is filled with fluid and swells. Aromatherapy can help in the relaxation of the muscles and to relieve pain, but cannot renew the damaged cartilage and cannot always help to relieve the pain of the bone. In most cases, the same oils help for both rheumatic and arthritic disorders. When inflamed, the oils of chamomile and lavender are useful, while juniper, eucalyptus, cypress, lemon and rosemary oils are useful in swelling limitation. The heating properties of black pepper, marjoram and ginger, help in muscle relaxation and relieve mild pain. For more intense pains the analgesic properties of chamomile oil are advantageous^[2,3]

A mixture that could help in muscle relaxation and thus relieve pain would be: 2 drops of lavender and rosemary oil, and 3 drops of eucalyptus in water^[2].

3.4.16 Problems of children

The first months of the child's life, digestive disorders, such as indigestion, colic, constipation and/or diarrhea, minor infections and nappy rash, are common health problems that babies are subject to. Wounds and bruising are also possible, as the child begins to walk and explore. At school, the child will be exposed to a range of infectious disease. Aromatherapy can be very effective preventive measure, because it strengthens the immune system and moreover, most essential oils have mild cleansing properties^[2,3].

Infant colic: The term describes short painful crises in the stomach, which occur in babies during the first five months. The pain may be periodic, lasting a few hours and return every day. Massaging with chamomile and/or juniper oils will help in gas reduction, while marjoram and sandalwood will help to relax the spasms and stimulate digestion^[2,3]

Two drops of marjoram and chamomile dissolved with 10 spoons of lotion or base oil if used rubbed gently when the colic happen, may be quite relieving.

Head lice: The head lice, is a small mite, which overwhelms the scalp and sometimes eyebrows, leaving its eggs at the base of the hair. It's being fed by sucking blood from the skull and its bites may cause itching and sometimes infection. Children are easily infected and is being transported from head to head. Eucalyptus, geranium and lavender oil, are antiseptic and effective^[2,3].

An effective antiseptic mixture for the head would be: 2 drops of eucalyptus, lavender and pelargonium in 2.5 spoons of vinegar and a quantity of water^[2].

Nappy rash: Nappy rash is very common to babies, and appears as a red rash around the areas that are in contact with urine. Tea tree oil is antiseptic and is used for nappy rash. For baby's skin, sandalwood, lavender and chamomile oil, dissolved in calendula oil are soothing. Specifically, lavender oil, has the ability to heal the cracked skin, enhancing cellular renewal^[2,3].

A soothing baby oil or lotion could be the mixture of 4 drops of lavender oil, 2 drops of chamomile, 1 drop of sandalwood and 10 spoons of calendula oil or lotion[2].

3.5 SAFETY

So far, several therapeutic applications of essential oils have been discussed, and many others are being investigated. But the issue of safety is still a great concern. These products are not licensed and in general there is no much information on their safety. Essential oils are powerful agents and all of them – even those nominated as safe- must be used in the correct amounts and for the conditions to which they are best suited. One or two pure essential oils, and most synthetic and adulterated ones, may cause irritation and skin sensitivity[3,5].

Except in emergencies, as in cases of burns, stings or wounds, essential oils should not be applied undiluted to the skin, but should be mixed first in a base carrier oil. Citrus oils are photosensitive and should not be used before sunbathing. Therefore, before any application with a specific essential oil is important to get advise from a professional aromatherapist. There are very few reported contraindications of essential oils, but in some cases some of their constituents may harm the patient. For instance, essential oils that contain high quantities of ketones, such as camphor, should not being used by epileptics, as they have been found to cause epileptic seizures in high doses. So, essential oils should be used with the same caution as any other drug and only under the advice of an aromatherapist. Should not be used undiluted, large doses should be avoided, storage directions should be followed. For kids older than 3 years old, half the quantity of essential oils that are being advised for use in adults should be used. For kids less than three years old, one quarter of the quantity that is being used by adults should be used[2,3,5].

4. ESSENTIAL OILS AND EUROPEAN PHARMACOPOEIA

Pharmacopoeia is a book that contains directions for the identification of samples, and the preparation of medicinal compounds, and it is published by the authorized governmental bodies or a medical or pharmaceutical society.

“The definition of essential oils that is given from European Pharmacopoeia is “An odorous product, usually of complex composition, obtained from a botanically defined plant raw material by steam distillation, dry distillation, or a suitable mechanical process without heating. Essential oils are usually separated from the aqueous phase by a physical process that does not significantly affect their composition. Essential oils may be subjected to a suitable subsequent treatment. Thus an essential oil may be commercially known as being deterpenated, desesquiterpenated, rectified or ‘x’-free.

- A deterpenated essential oil is an essential oil from which monoterpene hydrocarbons have been removed, partially or totally.
- A deterpenated and desesquiterpenated essential oil is an essential oil from which mono- and sesquiterpene hydrocarbons have been removed, partially or totally.
- A rectified essential oil is an essential oil that has been subjected to fractional distillation to remove certain constituents or modify the content.
- An ‘x’-free essential oil is an essential oil that has been subjected to partial or complete removal of one or more constituents.”[9]

5. FAVORITE ESSENTIAL OILS

In this section five selected essential oils will be discussed in detail. Their sources, composition, therapeutic application, safety index, and many more concern these essential oils.

5.1 Lavender oil – *Lavandula angustifolia*

5.1.1 Sources and composition

Name and origin: Lavender is the most widely used aromatherapy oil.

Its name comes from the Latin verb *lavare* which means “wash”, because the Romans used lavender flowers to flavor their bath water. This habit it is said that came from ancient Greeks, who instead, they used to call it valerian. In the middle ages it was used for wound care. The origin of lavender is mostly the countries of southern Europe^[3].

Botanical classification: With the general name lavender (*lavandula*), which all belong to the family of *Lamiaceae*, many species are known (around 39) from which the most important are the following:

1. *Lavandula angustifolia* (a stockier plant with a fuller flower, also known as: English lavender, lavender, true lavender)
2. *Lavandula latifolia* (a Mediterranean grass-like lavender, hybrid of lavender, lavandin)
3. *Lavandula stoechas* (which has butterfly-like bracts on top of the flowers and is sometimes known as French lavender)

They have similar botanical properties and chemical constituents, however some differences have been found in their reported therapeutic properties. For example, *Lavandula stoechas* is usually used for headaches, *Lavandula latifolia* is used as an abortifacient and *Lavandula angustifolia* as a diuretic. The Lavender that we are going to

discuss in more detail here, and has the most applications in aromatherapy is *Lavandula angustifolia*^[18].

Botanical description: It is a small shrub with dense branching. The shoots are squares that rapidly become woody. The leaves are about 5cm in length and are linear. The flowers are colored purple. According to altitude, it is blooming from late June till mid-August. The flowering shoots of *Lavandula angustifolia*, contain 1.5-3% of essential oil and its quality is very good, especially grown at an altitude of 650 meters. The quality of essential oil depends on the percentage content of the desirable and undesirable components, e.g. high percentage of linalool is desirable, while a high percentage of camphor is undesirable^[8,18].



Figure 4. *Lavandula angustifolia*, parts of the plant.

Demands on climate, soil, nutrients and water: Climate, soil, altitude and even the position of crop, if it is in the north – south or east – west, plays a role in plant growth and in the content and composition of the essential oil. So the same variety, it is possible to give essential oils of different composition, depending on the location is being grown. Lavender thrives in microclimates, with quite low winter temperatures. All types of lavender prefer full sunlight conditions and soils which have good drainage. It can be grown in irrigated fields, where it rains two or three times in the spring and a couple of times in the summer^[18].

Mode of propagation: The lavender species are multiplied by seeding, shooting and cutting. In order for the lavender seeds to germinate, they should be in low temperature conditions. The most appropriate method is by cuttings and shoots. Cuttings are pieces of stems 10-12cm, cut from old plantations. After rooting the cuttings they are planted during spring or autumn.



Figure 5. *Lavandula angustifolia*, bush.

Method of cultivation: Planting distances for *Lavandula angustifolia* is 80-100cm between rows and 60-70cm between plants on line. The years that there are no rains during spring and summer, the growing must be irrigated. Organic farming of all kinds and types is relatively easy, because it requires only mulch.

Harvest and yielding of lavender: To all types of lavender, only the flower is used for the extraction of essential oil. The best time for harvesting, is considered to be the final stage of development of flowering stems and the beginning of flowering, because then the content of the flower with essential oil is greater. The cut is made with special lavender harvesters. The harvesting, in any way that is being made, it should be initiated in the late morning, after the morning dew. The collected flowering shoots, can be distilled at the location of the harvesting especially when the farming is located in high altitude^[18].

5.1.2 Therapeutic applications

The essential oil: It is also being called as the “true lavender”. It is considered one of the top essential oils and is arguably the most harmless. The oil is derived from the aboveground plant parts at the time of flowering and is almost colorless, sweet-smelling flower. It is a skin rejuvenator, and helps to normalize both dry and greasy skin. It works in combination with other oils to alleviate arthritis and rheumatism, psoriasis and eczema, and soothes burns and insect bites. It aids sleeps, relieves tension headaches, and is good for calming nerves, lifting depression, relieving anger and soothing fear and grief. It helps the body’s resistance to allergic conditions and acts as an antiseptic[2,3,18].

The essential oil of lavender, has repellent and antioxidant properties, and is one of the most widely used industrial perfumes, soaps, cosmetics and aromatherapy. The market value depends on the composition and especially on the components linalyl acetate and linalool, that must be at 30-43% and 36-43% respectively. Its other main components are limonene, the terpin-4-ol, α -terpinol, 1.8 cineole, and alpha- and beta-pinene[3,18,19].

Properties: The essential oil of lavender has balancing and regulatory properties, bringing health and harmony in body and mind. It has also been found that lavender can promote relaxation by increasing parasympathetic activity and decreasing sympathetic. It is not toxic and has a characteristic smell.

Emotionally: Tonic and sedative. Relieves daily tension, anxiety, depression and general debility. Useful in insomnia, headaches and migraines. Used for inhalation, evaporators, compresses, baths or massage[19,20].

Respiratory system: Antiseptic and anti-inflammatory. Relieves colds, flu, sinusitis and throat infections. Used in inhalers, evaporators and bath[2,3,18].

Skin: Balancing, antiseptic, anti-inflammatory and regenerative. It treats acne, eczema, dandruff, hair loss, head lice, rash, sunburn and insect bites. It is also effective in athlete’s foot, and cold sores (herpes simplex). It is effective in burns, because it stimulates the growth of cells and helps to minimize scars. It is used in facial masks, compresses, baths and rubbing[2,5,6,19].

Gastrointestinal system: Cleansing and sedative. It helps in bad breath, mouth ulcers, indigestion, flatulence, nausea and gastroenteritis. Used in compresses, rubbing or massage[2].

Circulatory system: Sedative and decongestant. It lowers blood pressure and reduces heart rate. It also relieves water retention, contributing to the elimination of waste products from the lymphatic system. It is mainly used in baths, rubbing or massage[19,21].

Musculoskeletal system: Analgesic and anti-inflammatory. It helps in dislocation, inflammation, pain and rheumatisms. It is used in baths, compresses, rubbing or massage[2].

Gynecological problems: Sedative and balancing. It helps to restore normal menstrual cycle. It is suitable for premenstrual and menopausal symptoms. It also relieves fungal infections. It is used in compresses, inhalation, vaporizers, bath or rubbing[2,3,5,6].

5.1.3 Lavender oil and European Pharmacopoeia

“Definition: Lavender oil is obtained by steam distillation from the fresh flowering tops of *Lavandula angustifolia*.

Characteristics: Colorless or pale yellow, clear liquid, with a characteristic odor, being miscible with ether, alcohol and fatty oils.

Constituents: The content for each constituent should be as follows:

Limonene-less than 1.0%

Cineole-less than 2.5%

3-octanone –less than 2.5%

Camphor-less than 1.2%

Linalool- 20.0% to 45.0%

Linalyl acetate- 25.0% to 46.0%

Terpinen-4-ol – 1.2% to 6.0%

Lavandulyl acetate – more than 1.0%

Lavandulol – more than 0.1%

α – terpineol – less than 2.0%”[22]

5.1.4 Safety

No known contraindications in normal aromatherapy use. However, is listed as a substance to be avoided in pregnancy, even though there is no evidence to support this claim. It is probable due to the belief that lavender oil is emmenagogue and therefore able to promote and regulate menstruation[2,3,19].

5.2 Citronella oil – *Cymbopogon spp.*

5.2.1 Sources and composition

Name and origin: Citronella is mostly known as lemongrass. The citronella grass comes from the species *Cymbopogon citratus*. The essential oil from *Cymbopogon nardus* is commercially known as Ceylon-type citronella oil and the oil from *Cymbopogon winterianus* is called Java citronella oil. The origin of citronella oil is mostly Asiatic countries such as Sri Lanka, India, China, Java, Formosa, Taiwan, Indonesia and also Argentina.

Botanical classification: There are two major types of citronella oil which mentioned above. The Ceylon-type and the Java-citronella.

1. Ceylon type (*Cymbopogon nardus*) consists of geraniol, limonene, methyl isoeugenol, citronellol and citronellal.
2. Java type (*Cymbopogon winterianus*) consists of citronellal, geraniol, geranyl acetate and limonene.

The Java type has a higher proportion of geraniol and citronellal which makes it a better source for perfumery derivatives.

Botanical description: Citronella essential oil is extracted by steam distillation from the leaves and stems of diverse species of Cymbopogon. The *Cymbopogon nardus* has narrow, long, shiny leaves. Leaf sheaths are reddish purple in color and dried leaves curled down at the base of the bush. Plants are erect, and height of the bush is about 1-2 meters. Roots penetrate into deep soil. Its panicles are narrow, 15-30cm long, with clusters of 8-10mm long. *Cymbopogon winterianus* is quite similar with the *Cymbopogon nardus*. It has wide, flat long leaves. The bush is large and grows up to 15.2meters in height. Roots do not penetrate into deep soil[23,24].



Figure 6. *Cymbopogon winterianus*.

Cymbopogon winterianus

Demands on climate, soil and nutrients: *Cymbopogon nardus* can be grown in a wide variety of soils and even grow in sandy soils. But for *Cymbopogon winterianus*, fertile acidic loam soils are preferred. Citronella grows well in tropical and sub tropical conditions, from sea level up to an elevation of about 600meters. A humid and hot environment with ample sun light it is necessary for its growing. An average rainfall of 1500-1800mm per year is adequate as it bears dry and harsh conditions well.



Figure 7. *Cymbopogon nardus*.

Mode of propagation: Citronella is propagated by using suckers or rooted stem cuttings.

Method of cultivation: The planting should be done in the months of April to August or October to January with the onset of monsoon rains. 90cm X 90cm and 60cm X 60cm is the recommended planting spacing for *Cymbopogon winterianus* and *Cymbopogon nardus* respectively.

Harvest and yielding of Citronella: The harvesting can be done 6-8 months after planting and to be repeated in every three months intervals. The aerial part of the plant, is harvested 12-20cm above the ground level and allowed to winter in the field for a couple of days before processing. Up to 20,000kg/ha of fresh leaves can be harvested and the yield may vary with the agronomic practices and the age of the plants. The citronella oil yield, can be 60-80kg per hectare and 100kg for *Cymbopogon nardus* and *Cymbopogon winterianus* respectively[23,24].

5.2.2 Therapeutic Applications

The essential oil: Citronella oil is used as a fragrance in cosmetic industry, detergent and soap manufacturing, paint, polish and as an insecticide. It is also used for

flavoring foods and alcoholic drinks in certain countries. However it is a common mosquito repellent and has several other therapeutic uses.

Properties: It has insect repellent properties, antimicrobial, antiseptic, parasitic, tonic and stimulant. It helps clear the mind. It is also helpful with colds, flu and minor infections.

Citronella oil repels insects preventing their bites. It is used in humans and their clothing, in the form of oil, patch or liquid. Citronella is also an astringent and may help with the oily skin areas. In Chinese medicine it is used for rheumatic pain. It is considered to have warming and activating properties in both mental and physical levels. Mentally, the aroma of citronella oil may help with nervous fatigue due to its clarifying properties. It has been found that Citronella oil has some fungicidal and bactericidal activity, but it is still under investigation, as Citronella oil was most extensively used as an insect repellent and its other properties are still being investigated^[23,24].

Antimicrobial: It has antiseptic properties and can safely be used on wounds. It heals the wound by promoting formation of scar tissue and also protects the area from a bacterial attack. Its fungicidal properties help in the treatment of various forms of fungal infections onto the skin.

Astringent: As mentioned above, citronella oil can also be used as astringent for oily skins. Adding a few drops of citronella oil on a cotton ball and rubbing it onto the oily area (face mainly), will remove excess oil from the skin.

Cosmetic: Citronella oil, especially from *Cymbopogon winterianus*, is extensively used in perfume industry. It is a vital ingredient for manufacturing various perfumes. This is due to the presence of geraniol, which serves as the basic building block in the perfumery work^[23,24].

5.2.3 Citronella oil and European Pharmacopoeia

Definition: Citronella oil is obtained by steam distillation from the fresh or partially dried aerial parts of *Cymbopogon spp.*

Characteristics: It is pale yellow to brown-yellow liquid, with a very strong odor of citronellal.

Constituents: The content for each constituent should be as follows:

Limonene – 1.0% to 5.0%

Citronellal – 30.0% to 45.0%

Citronellyl acetate – 2.0% to 4.0%

Neral – less than 2.0%

Geraniol – less than 2.0%

Geranyl acetate – 3.0% to 8.0%

Citronellol – 9.0% - 15.0%

Geraniol – 20.0% to 25.0%”^[22]

5.2.4 Safety

There is not a lot of pharmacological information regarding citronella oil, and because it has been found quite irritant, it should not be used in massage, especially on sensitive or damaged skin. It may be harmful if ingested in quantity and may irritate the skin and eye. During pregnancy and lactation use of citronella oil should

be avoided or should be used with caution (as all the essential oils), as it has been noticed a loss of spontaneous contractions in the uterus when citronella oil was applied *in vitro*. It is inadvisable for use in babies and young children in the form of massage, due to immaturity and the delicate nature of their skin. Instillation or administration near the baby's nose is not only not recommended, but is distinctly inadvisable, as there have been reported numerous cases of severe toxicity and even death from such applications^[23,24].

5.3 Tea tree oil – *Melaleuca alternifolia*

5.3.1 Sources and composition

Name and origin: Tea tree oil is one of the best-known and most frequently used of all the essential oils. It comes from Australia, including the off-shore state of Tasmania, and was used by the Aborigines; the leaves were picked and either chewed or boiled in water to make cures for colds and flu. Captain James Cook in 1770 found this sticky bush growing in Botany Bay, New South Wales, and made a herbal tea from it.



Figure 6. *Melaleuca alternifolia*, flowers.

This became known as “tea tree” and was a popular remedy used by early immigrants. Tea tree was recognized by the *British Medical Journal* in 1933 as a “powerful disinfectant”^[2,3,5,6].

Botanical classification: It belongs to the family of *Myrtaceae* and comes from the specie *Melaleuca alternifolia*. The main components of tea tree oil are α -pinene, β -pinene, myrcene, sabinene, α -terpinene, α -phellandrene, 1,8-cineole, limonene, γ -terpinene, terpinolene, p-cymene, linalool, α -terpineol and terpinen-4-ol.

Botanical description: It is a shrub, up to 7m tall, with layered, papery bark. Its leaves are variously arranged, with needle like shape. The petiole is 1mm long; the blade is linear-acute 10-35mm X 1mm, puberulent and grabrescent, dotted with oil glands which are visible with a lens. Many flowered; the flowers are sole within each bract with tubular calyx up to 3mm long and white corolla 2-3mm long; stamens 30-60. Fruit is many-seeded, globular woody capsule, which is 2-3mm in diameter^[2,8,25].

Demands on climate soil and nutrients: *Melaleuca alternifolia* grows in the warm, wet east coast of Australia. It grows in altitude up to 300m, and its mean maximum summer temperature is 27-31 °C, mean minimum 17-19 °C; the mean winter maximum is 18-21 °C and the mean winter minimum is 6-7 °C. The specie is frost sensitive and the oil content is highest in warm months. The average annual rainfall should be around 1000-1600mm and it can grow in a range of soils with pH 4.5-7. Although tea tree needs ample moisture to grow, it can survive in very dry conditions.



Figure 7. *Melaleuca alternifolia*, tea tree.

Mode of propagation: *Melaleuca alternifolia* can be propagated by either cuttings or seed. After flowering *Melaleuca alternifolia* produces seed capsules either in rows or in more or less globular shaped clusters, which in these cases the seed remains in the capsule and can easily be collected. The capsules need to be collected and placed in an open container in a warm place until the fine seed is released. This will occur in about 2-3 days. The capsules should be at least 12 months old for best results.

Method of cultivation: *Melaleuca alternifolia* as mentioned above needs moist and sunny places for better results and it responds readily to cultivation from seed.

Harvest and yielding of Tea tree oil: The harvesting starts 15-18 months after establishment and subsequently at 12-15 months intervals. The shoots are cut when they are less than 2cm in diameter and at 5-10cm above the ground. The oil yield is considered to be 1%, but it has been found that the yield is lower in the winter months than in the summer[25,26,27].

5.3.2 Therapeutic applications

The essential oil: The oil is white to pale-yellow, with a spicy aromatic odor, combining elements of sweet marjoram, cardamom with a slightly bitter and spicy taste. The essential oil of tea tree was used from Aborigines for medicinal purposes, as a treatment for headaches, colds and other pains[3].

Properties: Nowadays, tea tree oil is known for a variety of properties including its strong antiseptic properties (about twelve times stronger than phenol), and its excellent antimicrobial and antifungal action. It is powerful stimulant to the immune system. The unadulterated essential oil has been found to be non-toxic and non-irritating to the skin, and is one of the few essential oils that can be applied directly and undiluted on the skin and all mucous surfaces. The antifungal activity of tea tree oil is much used against *Candida albicans*. It is also effective against some viruses, such as enteritis, and its aroma has insect repellent properties[2,3,4,5,6].

Antiungal: Tea tree oil has recently been recognized for its potent antifungal properties. It contains terpinen-4-ol which is anti-inflammatory and helps in the activation of the immune system against infections. Several studies have been made for its action against *Candida* and fungal infections, and it was found that tea tree oil is effective against *Candida albicans* and it prevents it from growing and converting into yeast infections[2,27].

Respiratory: It also has bactericidal and antiviral properties. It helps in the treatment of colds and flu. It relieves sore throat, tonsillitis and gingivitis. It is used in gargles, mouth washes, patches, inhalers, evaporators or rubbing[2,3].

Skin: It has cleanser, refreshing and antifungal properties. It soothes rashes and sunburns. It is also wound healing and one of its great properties is that it penetrates pus, and mixing it with a manner which causes it to slough off, leaving a healthy surface. It is also effective in athlete's foot and nail infections. A double blind study was made in order to compare the effectiveness and safety of 25% and 50% tea tree oil on athlete's foot fungus. The result was that 74% of the patients using the 25% showed an improvement in symptoms, 68% of them using the 50% showed an improvement and there was a 64% cure rate. Moreover from other studies it was found that tea tree oil has 80% cure rate in nail fungus. Tea tree oil is also effective in oral thrush (candidiasis), fungal skin infections and yeast infections. It is used in facial masks, mouth washes (oral thrush), foot or hand baths and rubbing[25,26,27].

Gastrointestinal: As it is already been mentioned, tea tree oil is antibacterial, antiviral and antifungal. It relieves from mouth ulcers and gastroenteritis and it also helps in diarrhoea. It is used in mouth washes, rubbing or massage[2,3].

5.3.3 Tea tree oil and European Pharmacopoeia

“Definition: Tea tree oil is obtained by steam distillation from the foliage and terminal branchlets of *Melaleuca alternifolia* (Maiden and Betch) Cheel, *M. linarifolia* Smith, *M. dissitiflora* F. Mueller and/or other species of *Melaleuca*.

Characteristics: It is clear, mobile, colourless to pale yellow liquid with a characteristic odour.

Constituents: The content for each constituent should be as follows:

α -pinene – 1.0% to 6.0%

Sabinene – less than 3.5%

α -terpinene – 5.0% to 13.0%

γ -terpinene – 10.0% to 28.0%

α -terpineol – 1.5% to 8.0%

Limonene – 0.5% to 4.0%

Cineole – less than 15.0%

p-cymene – 0.5% to 12.0%

Terpinolene – 1.5% to 5.0%

Terpinen-4-ol – minimum 30.0%

Aromadendrene – less than 7.0%”[28]

5.3.4 Safety

Tea tree oil may be applied to affected areas without side effects[2,5].

5.4 Ginger oil – *Zingiber officinale*

5.4.1 Sources and composition

Name and origin: Ginger is native to the tropical parts of Asia. More specifically is said to be originated from China, India and Java. Most likely it was brought to Europe sometime between the 10th and 15th century as a spice and condiment. It has been used as a medicine since very early times and it is mentioned in Chinese texts as well as in ancient Greek, Roman and Arabic literature. Its name, Ginger, is said to be derived from the Gingi district in India, where it is used to make tea from ginger for stomach disturbances[2,3].

Botanical classification: Its botanical name is *Zingiber officinale* and belongs to the *Zingiberaceae* family. It has various constituents including camphene, b-pinene, linalool, borneol, γ -terpineol, neral, nerol, geraniol, 1,8-cineole, geranial, and zingiberene.



Figure 8. *Zingiber officinale*, flower.

Botanical description: Ginger is a perennial herb which grows to about 1m tall with a thick spreading tuberous rhizome. The shoots sprout upright from the rhizome at the base of the plant. The rhizomes are covered in ring-like scars. Although they grow underground, they are stems not roots. The flowering spikes sprout directly from the rhizomes and are about 30cm long. The flowers are yellow-green with purple lips marked in cream. The fruits are red in colour, and each of them has three chambers that contain several small black seeds. The ginger plants that are

cultivated in commercial plantations, they usually don't have fruits[29].



Figure 9. The rhizome (root) of Ginger.



Figure 12 . Parts of the plant.

Demands on climate, soil and nutrients: Ginger in order to grow properly, needs humid and warm climate. It is cultivated in tropic places from sea level to an altitude of above 1500m and it can grow both under irrigated and rainfed conditions. It requires a moderate rainfall, till the rhizomes sprout, heavy and well distributed showers during the growing period and dry weather for about a month before harvesting. It thrives better in well drained soils like clay or sandy loam, red loam or lateritic loam. Depending on the condition of the soil and the way of its cultivation, each variety of ginger possesses its own characteristic flavor and aroma. Africa has the most pungent variety of ginger, while in China grow milder varieties.

Mode of propagation: *Zingiber officinale* is propagated by division.

Method of cultivation: Ginger is mainly cultivated vegetatively, meaning that pieces of the rhizome (root) are planted in the appropriate soil and each of them sprouts and forms a new plant[29].

Harvesting and yielding of Ginger oil: The crop can be harvested in about 8-10 months. When it is fully mature, the leaves become yellowish. The rhizomes are lifted with a digging-fork and then cleaned. Then, the green ginger is soaked in water in order to facilitate the removal of the skin. The skin is scraped off with sharp bamboo pieces, and the product is then washed and dried in the sun for about 3-4 days hand-rubbed. It is then put in the water for a couple of hours, dried and then rubbed again to remove any remaining parts of the skin. The rubbing should be done with great care and skills, because the essential oil which provided ginger its aromatic character is present in the epidermal cells and therefore careless or excessive scraping will damage these cells having as a result the loss of the essential oil. The yield of dry

ginger is 15-25% of the fresh ginger depending on the crop. The average yield for ginger is about 6 to 10 tons per acre[2,29].

5.4.2 Therapeutic applications

The essential oil: The underground stem of ginger is the most familiar part of the plant and it is used extensively for commercial and domestic purposes. The oil is extracted by steam distillation from the dried or unpeeled rhizome (root) of the plant, and even though it has a spicy aroma, the heat does not come through into the essential oil during distillation. The pungency of ginger is due to gingerol[2,5,29].

Properties: The root, which is used in cooking, is renowned for its heat and its digestive properties. In general for cooking purposes is more likely to be used milder ginger varieties, while for therapeutic remedies and beverages the stronger and more pungent varieties are preferred[3].

Ginger essential oil, has properties which alleviate most digestive problems, including flatulence, constipation, nausea and loss of appetite. Its ability to dull pain is beneficial for muscular pain and sciatica, while its tonic properties are useful for emotions like fear and apathy, and will also help to draw out a reticent, withdrawn personality. This healing and replenishing oil is also used to help the recovery of postnatal women; in Malaysia, women traditionally eat ginger chicken for 40 days after childbirth as a uterine tonic. The practitioners of Ayurveda, Herbal medicine and Naturopathy, consider ginger as one of the most important elements. It clears congestion of the body and detoxifies it, promoting elimination of waste products through the skin, mainly by sweating. It is also believed that acts as a catalyst to the body, improving the effectiveness and absorption of other herbs[2,3,5,6].

Circulatory system: It stimulates the circulatory system. It increases blood flow in the surface of the skin, therefore it helps in chilblains and also helps in the treatment of impaired circulation along the feet and hands. It also helps to dissolve blood clots in the arteries and to lower the cholesterol levels. Sometimes it is used as a substitute in patients taking high doses of warfarin, as warfarin itself is very potent and can cause hemorrhage[2,3,29].

Respiratory: It is very useful in nasal congestion, coughs, cold and flu due to its warming and soothing properties. Infusion of a spoonful of dry root in water will eliminate the congestion and gargles will help in sore throat[2].

Anti-inflammatory: Ginger oil may help in severe arthritis, as it contains gingerol which has been found that is suppressing the inflammatory effect. Moreover, ginger compresses are used to treat other pains such as headaches, abdominal cramps, kidney stone attacks, neck stiffness, tooth ache, bladder inflammation[3].

Gastrointestinal: Ginger is well known for its digestive properties. Several researches have showed that it stimulates pancreas and increases the production of some enzymes which promote digestion. Additionally due to its antibacterial properties, it is effective in preventing several intestinal problems that result from the alteration of intestinal flora. Ginger has a great ability to alleviate nausea and vomiting. It helps in flatulence and in diarrhea caused due to infection from bacteria such as *Escherichia coli*. Due to its antibacterial action it is ideal in order to prevent the formation of ulcers, caused by the *Helicobacter pylori* and for other stomach problems, such as gastritis. However it has been suggested by herbalists, that people who do not tolerate heat well, such as people with gastritis or peptic ulcers, should avoid the remedies made from ginger[2,29].

Gynecological: Ginger has also been found to promote menstruation and to alleviate delayed or scanty periods. It also relaxes muscular spasms and relieves the pain caused during menstrual periods and ovulation. It also invigorates the reproductive system[2].

Anti-tumor: Ginger is one of the herbs, that possesses the highest antitumor activity. Gingerols that account for its distinctive flavor, they also inhibit the growth of colorectal cancer cells. From several researches that were made, the conclusion was that ginger compounds may be very effective chemo-preventive and chemotherapeutic agents for colorectal cancers[29].

Depression: Due to its tonic properties it helps in depression.

Anti-oxidant: It stimulates bile and protects the liver by helping it not to develop cancerous tumors. It is useful in hepatitis[2,29].

5.4.3 Ginger oil and European Pharmacopoeia

“Definition: Ginger consists of the dried, whole or cut rhizome of *Zingiber officinale* Roscoe, with the cork removed, either completely or from the wide flat surfaces only. Either whole or cut, it contains not less than 15ml/kg of essential oil, calculated with reference to the anhydrous drug.

Characteristics: Ginger has a characteristic odour and a spicy and burning taste.”[22]

5.4.4 Safety

In general, when ginger is used in the recommended doses the side effects are quite rare. But for some individuals symptoms such as heartburn may appear when using ginger. No safety issues seem to exist in short term use of ginger to treat morning sickness during pregnancy, even though in some cases it has been found that it may exacerbate the nausea and vomiting. Ginger may enhance the anticoagulant effect of Warfarin, leading to an increased risk of bleeding. When combined with anti-hypertensives, it may cause additional hypotensive effects. More over when combined with antidiabetics it may cause additional reduction in blood glucose. Therefore, whenever using ginger oil remedies, the doctor should be informed in order to avoid any drug interactions or several sensitivities to the individual due to ginger[2,5,29].

5.5 Eucalyptus oil – *Eucalyptus spp.*

5.5.1 Sources and composition

Name and origin: The name Eucalyptus means “well-covered” which described the bud cap. Eucalyptus comes from Australia and Tasmania, and it can also grow in Spain, Portugal, Brazil, France and Algeria, California and Russia. There are more than 700 different species of eucalyptus, but only 500 give some type of essential oil and only 50 grow in Mediterranean countries. The essential oil used in aromatherapy is extracted mainly from the eucalyptus of Australia. The oil is extracted by distillation from the leaves of which are rich in essential oil[2,3].

Botanical classification: The eucalyptus trees belong to the family of *Myrtaceae*. There is a great number of species of Eucalyptus trees that yield essential oils, and the oils from the various species differ widely in character. *Eucalyptus globulus* is one of the best known varieties and the others that are mainly used are *Eucalyptus smithii* and *Eucalyptus fruticetorum* (*Eucalyptus polybractea*).

1. *Eucalyptus globulus*, or else the Blue Gum Tree of Tasmania and Victoria. Its most important constituent is Eucalyptol (cineole), which is present in the specie up to 70% of its volume. It also consists of a terpene and a cymene.
2. *Eucalyptus smithii*, or gully gum. The oil distilled from its leaves is equally beneficial to, and much gentler than, *Eucalyptus globulus*, which needs care in use. The oil derived is high in cineole (75-84%), and it has been stated from Pharmacopoeias, that the oil must have minimum quantity of cineole of 70% to have pharmaceutical benefit.
3. *Eucalyptus polybractea*, or else Blue Mallee. Its leaves are used in order to produce eucalyptus oil very high in content of cineole (94%)[2,3,27].

Botanical description: Eucalyptus trees grow quite fast and many species reach a great height. *Eucalyptus globulus*, attains a height of about 375feet, ranking as one of the tallest trees in the world. Its first leaves are broad, without stalks, of a shining white-green colour, and are opposite and horizontal, but after 4-5 yeas they are succeeded by others with a more sword-shaped form, 15-35cm long, which are covered by a blue-



Figure 13. *Eucalyptus globulus*.

green waxy bloom which is the origin of the common name “blue gum” and are alternate and vertical. The flowers are single or in clusters and cream-coloured. The fruits are woody and are 1.5-2.5cm in diameter.



Figure 14. *Eucalyptus globulus*, flowers.

Eucalyptus smithii, is a tall tree as well, that

may attain a height of 45m and a diameter of 0.5 to 1.5m. The bark of old trees has dark colour grey to black up to the branches. Abnormal leaves sessile, lanceolate – cordate, 12-15cm long, not glaucous. Normal leaves are narrow-lanceolate, with the same colour in both sides, not shining; the venation is distinct and characteristic of cineol-pinene oil yielding leaves. The petiole is about 2.5cm long. The peduncles are flattened, about as long as the petiole with numerous flowers from 3-15. The fruit is hemispherical, inkling occasionally to pyriform.



Figure 15. *Eucalyptus smithii*, leaves.



Figure 16. *Eucalyptus polybractea*.

Eucalyptus polybractea, is a small multi-trunked sclerophyll tree. The bark is smooth and fibrous near the trunk base. The leaves are disjunct and linear to narrow-lanceolate. The young leaves are glaucous and the older leaves are grey-green. The flowers are followed by woody capsules 3-6mm long^[27,30].

Demands on climate, soil and nutrients: Eucalypts trees, can only grow in warm climates. They flourish in a variety of soils and are usually tolerant of wet sites and drought. Most species will suffer from chlorosis (yellowing of the leaves, followed by death) in shallow, alkaline soils. Cold, frost and harsh wind may kill an Eucalyptus^[30].

Mode of propagation: Eucalypts trees are usually propagated from seed. The seed capsules need to be collected and then placed into an open container in a warm position until the fine seed is released; this occurs in 2-3 days. The capsule should be at least 12months old. As soon as the seed is collected it can be sown.

Method of cultivation: Eucalyptus is also cultivated vegetatively, by cuttings.

Harvesting and yielding of Eucalyptus oil: Harvesting is done by clear felling the tree in 6-7 years. Once the tree is felled, the stump throws many shoots. These, should be singled out in order to keep only the vigorous stem per stump, which will then form the second crop. Yields of oil from leaves vary from specie to specie, but it is approximately on the scale of 1% on fresh basis. Production of *Eucalyptus smithii*, yields approximately 15tones/ha of leaf, which corresponds to about 150l/ha of oil^[27,30].

5.5.2 Therapeutic Applications

The essential oil: The Eucalyptus essential oil, is extracted by steam distillation of the leaves. It is a clear to light yellow liquid, with a characteristic odour and taste. The oils extracted from Eucalyptus, that are of commercial importance are 1) the medicinal oils, that contain sufficient amounts of eucalyptol, 2) the industrial oils, that contain terpenes, and used for flotation purposes in mining operations, and 3) the aromatic oils, which are characterized by their strong aroma. A small amount of medicinal oil is distilled from *Eucalyptus globulus*, however nowadays Eucalyptus polybractea and Eucalyptus smithii are most favourites for distillation, because they contain high percentage of eucalyptol. Useful eucalyptus oil, contains not less than 70% of eucalyptol (cineole). It must also be free from oils containing large amounts of phellandrene, which is removed by refrigeration. Eucalyptus oil intended for medicinal use, contains about 70-85% of eucalyptol, plus lesser amounts of volatile oil aldehydes, terpenes, sesquiterpenes, aromatic aldehydes and alcohols and phenols. Many of these minor components have irritant properties and are removed by redistillation of the oil. Oils intended for industrial purposes have piperitone and/or phellandrene as their principal components. Other eucalyptus oils used in perfumery are rich in geraniol and its esters and citronellal^[27,30].

Properties: The essential oil of Eucalyptus, is one of the most powerful antiseptics and cleansers when burned or evaporated into rooms to clean the air and to speed up recovery. It is good for muscular pains and is effective against colds and coughs, both

as a preventive and as a remedy. It can be very effective in many bacterial and viral infections[2,5].

Respiratory: It is antiseptic and expectorant. For centuries chest rubbing with eucalyptus oil, was used to improve breathing in colds and sinusitis and has been proven an excellent antipyretic. In bronchitis (acute and chronic) and in asthma attacks, eucalyptus oil stops the excessive secretion of the bronchi. It soothes coughs, influenza and tuberculosis. It is also ideal for the treatment of sinusitis, nasal obstruction, catarrh and nasopharyngitis. It used in gargles, inhalations, evaporators, baths, rubbing or massage[2,5,6].

Emotionally: Invigorating and refreshing. It cleanses and stimulates the mind and helps in the treatment of sleepiness. It is used in gargles, inhalations, evaporators, baths, rubbing or massage[2].

Skin: Refreshing, antiseptic and insect repellent. It is effective in treating pimples, head lice and herpes simplex. It is used in rubbing or dressings[2,5].

Circulatory: Cleansing. It stimulates and strengthens the kidneys. It is used in bath, massage or rubbing[2].

Musculoskeletal: Anti-inflammatory. It reduces swellings and helps fight muscle inflammation and pain of rheumatism and arthritis. It is used in dressings, baths, rubbing or massage. The eucalyptus oil, also helps in relieving cystitis when used in baths[5].

Gastrointestinal: It has been found also effective for diarrhea and bladder infections. Moreover it also has a hypoglycaemic effect which might be useful for diabetics[5].

5.5.3 Eucalyptus oil and European Pharmacopoeia

Definition: Eucalyptus oil is obtained by steam distillation and rectification from the fresh leaves or the fresh terminal branchlets of various species of *Eucalyptus* rich in 1,8-cineole (eucalyptol). The species that are mainly used are: *Eucalyptus globulus* Labill., *Eucalyptus fruticetorum* F. von Mueller (*Eucalyptus polybractea* R.T. Baker) and *Eucalyptus smithii* R.T. Baker.

Characteristics: Eucalyptus oil is a colourless or pale yellow liquid with an aromatic and camphoraceous odour and a pungent and camphoraceous taste.

Constituents: The content for each constituent should be as follows:

α -pinene – 2 to 8%

β -pinene – less than 0.5%

α -phellandrene – less than 1.5%

limonene – 4 to 12%

1,8-cineole – not less than 70%

Camphor – less than 0.1%”[22]

5.5.4 Safety

It shouldn't be used on skin if it hasn't been diluted properly, as it may be irritant. There have been reported symptoms when eucalyptus oil is taken orally, such as nausea, diarrhea, dizziness and more severe such as muscle weakness, slurred speech, pneumonia and headache. Some reports describe various abnormalities in heart functioning such as low blood pressure, loss of heartbeat. Due to known side effects

of Eucalyptus oil, and its unknown effects during pregnancy or breastfeeding, it should be avoided during these periods.

Several reports have shown that eucalyptus oil when taken orally may slow the mind and the nervous system. Therefore these symptoms might get worse when taken with medicines with sedative action, such as benzodiazepines, barbiturates, some antidepressants and may be alcohol.

It has been stated that for internal use, the daily dosage must be in the range of 0.3 to 0.6g. It is also not advisable to take eucalyptus oil for a long period of time (a year or more) as it may cause liver damage. Australia is the only country so far, that legislated, that the products containing 25% or more of eucalyptus oil must be labeled as poisons and must be packed in poison containers.

Eucalyptus oil is extremely concentrated and should always be diluted before any use^[2,3,5,27,30].

6. CONCLUSION

So far we have talked about the essential oils, their composition, the ways they are produced, their therapeutic effectiveness in every level- physical, emotional and spiritual – and their application methods.

Essential oils have been used since ancient times, therefore a lot of information on their chemical composition and properties can be found in the old Pharmacopoeias. Some of the information used on this paper, were taken from current European Pharmacopoeia (2008, 2002), and that is a great example that essential oils are traditional and modern at the same time, and their therapeutic effects are still being recognized from the medicinal community.

If used as recommended by the professionals, they won't have any side effects and their therapeutic effect will be even greater. The aromatherapists consider the patient as a whole, taking into account the emotional and mental state which is often partly responsible for the physical symptoms. Therefore, the essential oils are chosen and mixed to suit a particular patient.

Nowadays, more and more the positive effects of aromatherapy, gain the respect of the orthodox doctors. Some institutions and hospitals encourage nurses to use essential oils on patients. Some also employ fully trained aromatherapists. This is very good and encouraging and eventually essential oils will be used from a high percentage of the population for common health problems such as stress, cold, headaches and many more.

To conclude, the point of aromatherapy is that its therapeutic and balancing properties, if applied in everyday basis, will help us to restore our emotional and physical balance.

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The articles from 31-45 were not used as main references in the text (that's why they are not mentioned) but they were studied in order to get more information on Aromatherapy subject.

8. APPENDIX

8.1 APPENDIX I: Figures

Figure 1: Available at:

http://www.nirvanawoman.net/html/fashion_articles.php?id=104 (last accessed 8/10/2010)

Figure 2: Available at: <http://www.aromaweb.com> (last accessed 8/10/2010)

Figure 3: Available at: <http://www.essentialoils.co.za/extraction-methods.htm> (last accessed 13/10/2010)

Figure 4: Available at: <http://www.plant-lore.com/1760/lavender/> (last accessed 1/11/2010)

Figure 5: Available at:

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Figure 6: Available at: <http://www.centre-arome.fr/5-huiles-essentielles-pures> (last accessed 5/11/2010)

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8.2 APPENDIX II: Tables

All of the existing tables were constructed by myself, using the help of the listed books:

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