

Safe Essential Oil Practice in Cancer Centers



Cancer and cancer treatment can result in a multitude of side effects and symptom burdens that are prevalent not only during treatment but also well after treatment has concluded. Fatigue, sleep disturbances, pain, cognitive disturbance, and depression are all symptoms that can persist, even years after treatment.¹

Because of symptom burden, it is not surprising that many survivors turn to complementary and alternative medicine (CAM) therapies to help manage the symptoms and gain a sense of control over their own health.^{2,3} One study found that 36.4 percent of cancer survivors reported using at least one CAM modality other than vitamins and minerals in the past 12 months.³ Wellness-related reasons for using CAM included general wellness and general disease prevention and improving energy and immune function, and the top health condition reasons were back pain and problems, joint pain and stiffness, cardiovascular condition, and neck pain.³ Very few cancer survivors (3.9 percent) were using CAM therapies to treat their cancer. Essential oils, a specific CAM modality, are increasing in popularity,⁴ and there is a growing practice of using essential oils to support patients in cancer centers^{5,6} and acute care.^{7,8}

Defining Essential Oils

The National Association for Holistic Aromatherapy defines essential oil therapy or, more commonly, aromatherapy as “the art and science of utilizing naturally extracted aromatic essences from plants to balance, harmonize, and promote the health of body, mind, and spirit.”⁹ Clinical aromatherapy is about targeting a specific clinical symptom, such as nausea, and measuring the

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outcome, and it can be subdivided into medical aromatherapy, which would include oral use, and nursing aromatherapy, which would not include oral use. Oral use is defined as using gelatin capsules or dilution in honey or another dispersant. Mouthwashes, gargles, douches, or suppositories would fall under clinical nursing aromatherapy.⁵

With the growing use of CAM, safe practices must be part of the expanding enthusiasm; essential oils are substances that can have harmful effects if not used safely. Understanding safety is necessary in the clinical and cancer center setting. Just as hand hygiene is part of everyday safe clinical care, safe practice of essential oils needs to become part of everyday use. Many factors

Table 1. Chemical Constituents and Essential Oils^{11,12}

Chemical Constituent	Examples of Constituent	Essential Oil–Containing Constituent
Alcohols	Linalool	Lavender (<i>Lavandula angustifolia</i>)
	Citronellol	Geranium (<i>Pelargonium graveolens</i>)
Aldehydes	Cinnamaldehyde	Cinnamon bark (<i>Cinnamomum zeylanicum</i>)
	Geranial	Lemongrass (<i>Cymbopogon flexuosus</i>)
Furocoumarins	Bergapten	Bergamot (<i>Citrus bergamia</i>)
Esters	Linalyl acetate	Lavender (<i>Lavandula angustifolia</i>)
	Nerylacetate	Helichrysum (<i>Helichrysum angustifolia</i> var. <i>italicum</i>)
Ethers ^a	Methyleugenol	Basil (<i>Ocimum basilicum</i>)
Ketones	Thujone	Sage (<i>Salvia officinalis</i>)
	Carvone	Spearmint (<i>Mentha spicata</i> , CT <i>carvone</i>)
Oxides	1,8-Cineole (eucalyptol)	Eucalyptus globulus (<i>Eucalyptus globulus</i>)
	Bisabolol oxide	German chamomile (<i>Matricaria recutita</i>)
Phenols	Eugenol	Clove (<i>Syzygium aromaticum</i>)
	Carvacrol	Oregano (<i>Origanum vulgare</i>)
Terpenes	Alpha pinene	Frankincense (<i>Boswellia carteri</i>)
	Limonene	Orange (<i>Citrus sinensis</i>)

^aEthers rarely occur alone but rather in relationship to phenyl methyl ethers.

affect the safe use of essential oils including chemical constituents, quality, application methods, and patient characteristics.¹⁰

Chemical Constituents

Major chemical constituents of essential oils include alcohols, aldehydes, furocoumarins, esters, ethers, ketones, oxides, phenols, and terpenes (see Table 1, above). In general, alcohols, esters, and terpenes are non-irritating to the skin. Essential oils with high concentrations of aldehydes can be irritating and/or sensitizing to the skin. Essential oils with furocoumarins are phototoxic and should not be used prior to ultraviolet exposure.^{11,12} Ethers are strong compounds, and essential oils containing ethers should not be used in high concentrations or extended periods of time.

Some ketones are not easily metabolized by the liver, so caution should be used in those with liver diseases.¹¹ Essential oils high in ketones can also be neurotoxic.¹² Not all ketones are toxic, such as verbenone in rosemary verbenone (*Rosmarinus officinalis*,

CT *verbenone*). Essential oils containing ketones that are of concern are sage (*Salvia officinalis*), thuja (*Thuja occidentalis*), and hyssop (*Hyssopus officinalis*), primarily if taken internally.¹³ Oils high in ketones should also be used with caution by pregnant women.¹²

Oxides can cause skin irritation, especially in young children.¹² Essential oils that contain phenols can be irritating to the stomach lining and mucus membranes, can cause skin sensitivity, should always be diluted prior to topical applications, and should only be used over short periods.^{11,12} Phenols can also be toxic to the liver if used in large amounts or an extended period of time.¹²

The chemical constituents that make up the essential oil can also help guide what oils to use in a clinical setting. For instance, essential oils high in methyl salicylate (an ester) would not be used with someone taking blood thinners, and oils high in isopinocampnone (a ketone) would not be used in those with a low threshold for seizures.

Table 2. Identifying Reputable Companies for Essential Oils¹¹

Question	Why It is Important
Does the company have published literature in peer-reviewed journals?	This demonstrates that the company is taking a clinical approach to essential oils.
Is the company experienced in the distillation process?	Distillation processes for each essential oil varies. Companies should have knowledge of this fact.
Is the company involved in the farming, cultivation, and harvesting process, or do they inspect supplier farms?	It is important that the plants are organic and not contaminated with chemicals during any part of the process.
What type of testing does the company conduct to verify essential oil purity?	Companies that do not test their oils cannot verify essential oil purity.
Is the company willing to share testing results?	Test results demonstrate that the essential oil meets quality standards.

Quality of the Oil

In the United States, most essential oils used for aromatherapy are fabricated or adulterated, affecting the quality for clinical practice.¹³ Adulteration is an extension of the essential oil with less expensive materials such as solvents, and fabrication is the chemical engineering of the essential oil. Common adulterations in essential oils include synthetic menthol added to peppermint, synthetic methyl salicylate added to wintergreen, synthetic phenyl ethyl alcohol added to rose otto, and lavandin added to lavender.¹¹ Analysis of essential oils may detect gross adulterations, but it can be challenging to prove actual authenticity.

To help authenticate the purity of an essential oil, companies should conduct testing on every batch of oils. Essential oils should be from a reputable supplier who can state the following: country of origin, botanical name, part of the plant, organic or wild-crafted, method of extraction, chemotype (when relevant), and safety data sheet.^{5,13} Table 2, above, lists quality factors to consider when selecting a company.

It is recommended that unadulterated essential oils be used in the clinical setting to prevent possible side effects that may be related to solvents or residues.^{5,13} Patients with cancer already have compromised immune systems and therefore genuine, unadulterated essential oils will be safest. Often, patients going through radiation and/or chemotherapy notice skin changes. Adulterated essential oils, which contain synthetics or have not been harvested or distilled correctly, may further irritate the skin and create other harmful effects.¹³

Application Methods

There are three major methods of application for essential oils use: inhalation, topical, and internal.

Inhalation

Inhalation is the fastest method of getting essential oils into the system. Inhalation can be broken down into direct and indirect inhalation. Direct inhalation consists of breathing in the scent of an essential oil that has been placed on a cotton ball, tissue, or inhaler wick. Indirect inhalation is breathing in the scent of an oil that has been dispersed into the air via a diffuser.¹⁴ Diffusers allow the essential oil to be broken into smaller molecules that can be easily absorbed through the mucosa.¹⁵ A diffuser should not heat the essential oil, because this will alter the chemical makeup of the oil.¹⁶

In general, inhalation is a very low-risk method for using essential oils.¹⁰ The only safety concern would be prolonged exposure (an hour or more) to a high concentration of an essential oil, which could lead to headaches, vertigo, nausea, and lethargy.^{10,17} When using inhalation, use caution with those who have respiratory concerns or disease.^{5,11}

In the clinical setting, all essential oils should be labeled and safety data sheets should be available. A safety data sheet provides detailed information about materials that may pose a safety risk and furnishes employees with procedures for safe handling of essential oils and what to do if a spill or accident occurs.

Essential oils should be stored in a locked container or cabinet that is cool, dry, and away from ultraviolet light.⁵ Unopened essential oils that are stored properly maintain their potency for a very long time, with the exception of citrus oils, which are more prone to degradation because of their high limonene content.¹¹ Once an essential oil is opened, the shelf life can vary (one to five years), depending on type of oil. Specific literature has not been found to warrant shorter or longer use of an essential oil once opened in a clinical setting.

A one-size-fits-all approach does not apply to essential oils. Aspects to consider are age (infant, child, adult) and pregnancy, as well as characteristics such as weight, skin integrity, and frailty.

When preparing for patient inhalation use, proper handwashing should occur before and after handling the essential oil.⁵ If oils are used for several patients, then the bottle should not be carried into patient rooms to avoid cross-contamination of organisms. If using a diffuser in the clinical setting, follow the facility infection prevention and control policies and any cleaning recommendations to prevent harboring of microorganisms.¹⁸

Topical

These methods are anything that touches the skin, including lotions, sprays, and baths. Although a neat application (undiluted oil) can be a safe practice for some oils, in a clinical setting, using a diluted essential oil would be a safer practice.¹³ Essential oils can be diluted in witch hazel, coconut oil, jojoba oil, and organic creams, to name a few.

Suitable dilution may depend upon the essential oil and its chemical constituents. Some essential oil constituents are absorbed through the skin faster, some more slowly, and some not at all.¹³ When using essential oils in a bath, the essential oils should not be placed directly in the water because oil and water do not mix. It first should be mixed with an emulsifier, such as bath salts or a bath gel.

Topical application safety centers on phototoxicity, irritation, and sensitization. Phototoxicity occurs when a photosensitizing oil is applied to the skin and is exposed to natural or artificial ultraviolet light, resulting in potential skin pigmentation changes.^{10,12} Photosensitivity can be a concern with cold-pressed citrus oils, such as lemon.¹³ Skin irritation is usually an immediate reaction and appears as redness, blistering, or a burn and is usually a result of an essential oil high in phenols or aldehydes being applied to the skin.¹³ To stop the reaction, immediately apply vegetable oil or milk (e.g., dilution) to the exposed skin.⁵

Unlike skin irritation, skin sensitivity does not occur with first exposure to an essential oil. It is a clinical response, occurs when an essential oil is used over a period of time, and is usually a response to a chemical constituent. The skin may appear bright red or have darkened pigmentation. Patients are more prone to sensitivity reactions when they are taking multiple medications or have an allergy-like illness such as asthma, eczema, or hay fever.⁵ An example of sensitivity is with tea tree (*Melaleuca alternifolia*), which is now used in so many products that sensitization may become a problem if undiluted tea tree is used repeatedly over time.

As a safe practice for topical application, skin patch testing can be done on the forearm or the hand, and reactions usually manifest quickly.¹³ However, be observant for up to 24 hours for any delayed reactions. Further caution must be taken when applying essential oils to damaged skin, which may include infection, systemic disease, and dehydration. Damaged skin lacks the protective barrier and can be more absorbent, possibly leading to adverse reactions.⁵ In addition, caution must be used if the skin has been exposed to medications or other lotions or creams. It is not recommended that essential oils be used topically over skin areas where medication was applied; essential oil and medication interaction is not known. The interaction of essential oils



with synthetic and/or chemically based products can create harmful interactions on the affected skin area. Consult a certified clinical aromatherapist if considering using essential oils for compresses, dressings, or any type of wound care.

Internal

There are differing definitions of what internal use means. For example, the Alliance of International Aromatherapists includes oral, vaginal, and rectal as part of internal therapeutic use, whereas others consider mouthwashes, gargles, vaginal douches, and suppositories as an extension of the external skin route and relevant to nursing care.⁵ Ingesting essential oils can be a safe practice if using authentic or genuine essential oils.¹³ An internal route allows for quicker metabolism and elimination of the essential oil.¹³ However, not all essential oils are safe for oral use (e.g., wintergreen [*Gaultheria procumbens*], hyssop [*Hyssopus officinalis*], wormwood [*Artemisia absinthium*]), and others, such as those high in phenols (e.g., clove [*Syzygium aromaticum*], oregano [*Origanum vulgare*], and thyme [*Thymus vulgaris*]), should be diluted before taken by mouth.

National organizations do not promote internal use of essential oils unless one has received recommended education for certified clinical aromatherapist from an accredited aromatherapy school. The Alliance of International Aromatherapists “does not endorse internal therapeutic use (oral, vaginal, or rectal) of essential oils unless recommended by a healthcare practitioner trained at an appropriate clinical level. An appropriate level of training must include chemistry, anatomy, diagnostics, physiology, formulation guidelines, and safety issues regarding each specific internal route (oral, vaginal, or rectal).”¹⁹ In the clinical setting, internal use may be considered a medical practice and fall under prescription medications and pharmacy oversight.

Patient Characteristics

A one-size-fits-all approach does not apply to essential oils. Aspects to consider are age (infant, child, adult) and pregnancy, as well as characteristics such as weight, skin integrity, and frailty. Dilutions and types of oils used can vary depending on any of these factors. For instance, the dilution ratio may vary between a 250-pound healthy adult and a 100-pound frail adult, and the dilution ratios for infants and children are lower than those for adults. In general, essential oils should be diluted between one and five percent (one to five drops of essential oil per 5 ml of carrier oil), and reduced dilutions may be indicated for infants, young children, and frail adults.¹⁰ Similarly, the same oil cannot be used on all individuals. For example, it is not recommended to use peppermint with children under the age of 30 months due to its high menthol content.

In women who are pregnant, some essential oils are contraindicated because of chemical components such as phenols.²⁰ In addition, due to raised melanin-stimulating hormone levels and the increased potential for sunburn, phototoxic essential oils are not recommended for women who are pregnant.²⁰ As discussed earlier under Topical Application, skin integrity is an important consideration when using essential oils. Impaired skin integrity will enhance absorption of an essential oil, having a more pronounced effect on the patient.

There are essential oils that may affect the effectiveness of some medications. Individuals with estrogen-dependent cancers should avoid essential oils with phytoestrogen-like activity such as aniseed (*Pimpinella anisum*), clary sage (*Salvia sclarea*), bitter fennel (*Foeniculum vulgare* var. *amara*), myrtle (*Myrtus communis*), and star anise (*Illicium verum*).⁵ Peppermint (type unknown) and eucalyptus (*Eucalyptus globulus*) should be avoided topically near an intravenous catheter site administering 5-fluorouracil because of a potential increase in medication absorption.⁵



Conclusion

Essential oils are much more than substances that smell good. Essential oils can provide physical, emotional, mental, and spiritual support to a patient diagnosed with cancer, and there is a growing body of literature to support this. Some current areas of research include:

- Nausea and vomiting^{21,22}
- Pain²³
- Relaxation^{24,25}
- Sleep.²⁶⁻²⁸

Many healthcare providers are not knowledgeable about essential oils and their application because they are not typically covered as part of the educational curriculums in nursing or medical schools.⁴ When used in a cancer center or in any clinical setting, there should be a comprehensive understanding of not only the benefits for patients but also how to keep patients safe, whether they are using essential oils in the clinical setting or in their own home. As a step toward ensuring safe practice, many organizations are consulting with a certified clinical aromatherapist for education and policy development.⁸

Educational standards should be consistent in clinical settings to address the many safety factors. If only using inhalation, which is a low-risk method, the educational needs might be less rigorous, whereas if topical application is going to be used, the standard of education would need to be more rigorous. Having a certified clinical aromatherapist as part of a clinical team would help to ensure that safe practices are being taught and utilized within a clinical setting. 

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