

Essential oils applications safety – conflicting views for consumer use

In this universe more than 400,000 species of plants exist, of which approximately 200 yield essential oils. Tiny glands present at the petals, leaves, stems, roots, bark and wood of plants and trees produce essential oils. They are produced in the inner most cell membranes of the parenchymatous tissue of leaves and petals of flowers or in the cytoplasm or separate cell centres when found in other plant parts.

Essential oils

Plants release essential oils slowly to the surroundings under normal natural conditions. Essential oil containing glands break when we heat it or crush it releasing the plant aroma. Essential literally means the presence of an essence or odour and oil because they leave an oily spot on paper. Natural essential oils are complex volatile chemical compounds having a small molecular structure. The individual chemical substance present in this complex mixture determines the essential oil property and its fragrant odour quality. Essential oils do not leave any oily residue on skin and are neither greasy nor fatty. They are freely soluble in alcohol, water and vegetable oils and evaporate or volatilise on coming in contact with the air giving out a strong smell. It is easy to spot the difference between good quality oil and a bad one. When we keep a bottle of oil on the table and open the lid, it will give a whiff of its aroma. If one has to move closer to sniff it is poor quality oil.

Essential oils are terpenes or hydrocarbons with unsaturated straight chain molecules based on isoprene (C_4H_8) ring structure. Terpenes easily combine with other organic groups and act as a carrier of aromatic substances. Essential oils are complex



mixtures consisting of actives like monoterpenes (10 carbon atoms/mono-), sesquiterpenes (15 carbon atoms/sesqui-), monoterpenoids and sesquiterpenoids that contribute to their medicinal benefits. Apart from being rich in terpenes and oxygenated terpene derivatives, essential oils

Table 1
Distribution of essential oils in nature

Plant part	Plant name
Bark	Cinnamon, Cassia
Beans	Vanilla
Bulb	Garlic
Bud	Clove
Entire plant	Oak moss, Tree moss
Aerial plant parts	Geranium, Spike Lavender, Lavender, Rosemary, Labdanum
Flowers	Jasmine, Orange Flowers, Rose, Tuberose, Clove (dried bud)
Flower Stigma	Saffron
Fruit	Coriander, Pepper
Fruit Peel	Lemon, Lime, Bitter Orange, Sweet Orange, Bergamot
Kernel	Nutmeg
Leaves	Cinnamon, Citronella, Clove, Lemongrass, Palmarosa, Patchouli, Mint, Basil
Rhizomes	Ginger, Turmeric
Roots	Vetiver
Stems	Benzoin, Styrax, Peru Balsam, Tulu Balsam
Seed	Cardamom
Wood	Sandalwood, Cedar wood

may also contain alcohols, phenols, aldehydes, ketones, oxygenated and sulphouretted oils. They also possess a few unstable carbon-carbon double bonds characteristic of an unsaturated fatty acids. Essential oils being natural antioxidants normally do not get rancid however; they generally react with water and oxygen.

The composition of an essential oil alters on extraction from its original plant source even when the extraction process and procedure is most gentle, and on further processing, become vastly different from what it was when in the living plant. Some plants in their natural living state are odourless, but become fragrant on drying or on enzymatic fermentation under suitable conditions. A good example is that of the natural odourless green clove buds, which turns fragrant only on sun drying. Subsequently, the distillation of these buds yields clove bud oil with a distinct spicy odour. Similarly, Iris pallida rhizome when dug up fresh has a faint uninteresting vegetable kind of smell. The rhizome when peeled and dried at a moderate temperature develops a very interesting appreciable powdery violet-like fragrant note. Oleoresins and oleo-gum-resins that contain essential oils are resinous plant exudations exuded naturally during the plant life cycle, viz., Olibanum Frankincense, Opoponax, Myrrh, etc., however, Benzoin, Styrax, Tulu Balsam and Peru Balsam yields are due to the pathological response to wounds inflicted on the tree trunks or on removal of the bark. The perfumery industry earlier obtained all the important natural aromatic materials from the wild, but now most of them are cultivated.

Essential oils are liquid products of steam or water distillation of plant parts, viz. stems, bark, seeds, fruits, leaves, roots and plant exudates. We get citrus oil from the fruit peel by ex-

pression alone as application of heat damages the chemical components present in citrus fruits. Citrus oil today is a by-product of the fruit juice industry.

The characteristic fragrance and flavour of any essential oil is due to the presence of several hundred chemical compounds that give rise to a specific complex odour. An essential oil on fractionation yields its individual natural components. Extraction with organic solvents of plant parts produces oleoresins, concretes and absolutes. Extraction with a near or supercritical solvent such as carbon dioxide produces very high quality extracts. Oleoresins and its extracts in addition to containing the relevant volatile essential oil also have the concentrated non-volatile flavour components that have diverse uses in the food industry.

All natural plant materials are prone to spoilage and deterioration due to bacterial, viral or fungal infection, in addition to destruction from insects and pets. It is important to use appropriate preventive measures to keep the plants in a healthy state, throughout the period of cultivation, during and after harvesting. Similarly, other critical factor for high yields of good quality aromatic ingredients includes the correct time and condition for harvest. Subjecting the gathered flowers to quick extraction within an hour's time is also important to prevent spoilage due to fermentation and loss of essential oil due to natural environmental evaporation.

Complexity & versatile healing properties

People right from ancient times have recognized the healing properties of plants. Modern day scientists after understanding the chemical constituents of plants scientifically recognize how all these synergistically contribute to its healing effect

results better than synthetic drugs that actually repress both beneficial as well as pathogenic organisms indiscriminately and thus weakening our natural immune system. Essential oils in plants are highly potent actives responsible as the healing chemical component needed to feed, nurture and repair plant cells. The plant part from which we extract, the soil condition, the climate, the altitude, the harvesting method, the time of harvest and the distillation processes we employ to extract the essential oil all together determine its constituents.

Essential oils owing to its extremely complex chemistry are very versatile. Lavender oil for instance has multiple healing properties due to the presence of 200 different chemical constituents at varying proportions that determine its suitability for specific application and use. Correct harvesting and extraction of the essential oil can maintain the true therapeutic qualities.

Essential oils are all not equal

Many factors affect the therapeutic properties of herbal plants and it is critical that essential oils for aromatherapy and for other medical use actually have the therapeutic chemical constituents present in them. '100% Pure' essential oil does not mean all the vital therapeutic and medicinal chemical components are present there. We get true therapeutic essential oils from the first distillation only. Second and third distillation even though maintaining the overall essential oil smell, significantly reduces the potency. The temperature and time of distillation is also vital to bind the full chemical potential of the plant. Distilling large batches at high temperatures and pressure destroys the therapeutic properties left, even though it is able to maintain the desired fragrance or smell. In addition, for getting essential oil with optimum

desired chemistry the plants selected need to be of the highest quality, grown in virgin soil uncontaminated by chemicals, and harvested during the correct time of the year (even precise time of day) under strict environmental condition. In this respect essential oil plants when distilled immediately on harvesting at farms have better therapeutic properties.

'Therapeutic essential oil' standard thus encompass everything from planting to marketing of the essential oil. It means verifying the correctness of the plantation species, the purity of the soil, manner of cultivation (without use of synthetic chemicals), the proper time of harvest, the mode of the distillation process to capture the right chemical therapeutic compound compositions thereby optimizing the healing properties in the oil and the purity of the packaging.

A plant grown in one region might have slightly different chemistry than that grown in another region. Similarly, distilling a plant when too green or harvesting at the wrong time of day may yield chemical constituents at incorrect levels, not meeting the therapeutic essential oil quality even though the oil may be '100% pure'. Essential oils for aromatherapy use apart from being therapeutic essential oil should also be unadulterated without addition of any synthetic chemicals or potentially toxic compounds. It is vital to use only essential oil that meets the rigorous standards and contain the medicinal plant potential to treat any health issues. It is also obvious that essential oils having therapeutic benefit are significantly more expensive and work more efficiently at lower dosage levels.

Organic & natural

The chemistry of essential oils falls within the dominion of organic chemistry under the broader field of general chemistry. Since the advent

of chemistry organic means the study of life compounds. Carbon forms the basis of all compounds created by living processes and therefore we define organic chemistry as 'the study of carbon compounds.' Today, scientists synthesize thousands of carbon compounds outside of the natural processes of living organisms and call them as 'organic' regardless of their origin. Consequently, petrochemicals (motor fuels, industrial solvents), pesticides, fungicides, herbicides, disinfectants, cleaning fluids, plastics, Styrofoam, paints, other toxic products important for modern living, pharmaceuticals, etc., are 'organic' since virtually all of them are composed of carbon molecules. Carbon is a most adaptable element, capable of forming long chains and complex ring structures with another carbon atom. It an ideal building block for not only making industrial products, but also innumerable living forms, including essential oils, artificially. Seeing the word 'organic' on a package label, a consumer assumes the marketed products (or its ingredients) are free of herbicides, pesticides, chemical fertilizers, hormones, antibiotics, etc., although to an expert chemist, the term only means that the product contains carbon compounds including the presence of synthetic. The legally defined phrase 'Certified Organic' is a much better word than 'organic' to mean what most consumers think of it.

Consumers also believe that the term 'organic' implies that the product was grown in healthy soil under sunlight in a clean atmosphere very naturally and not in a chemical factory or synthesized inside a laboratory. The reality is however different as government regulations do not restrict use of the word 'natural' in a label if the product contains compounds produced by natural plants even though the content of that particular product may have been produced

synthetically equating a natural living plant with that of a factory, or in other words, a manufacturing plant. In case of essential oils chemistry alone is not responsible for therapeutic and/or nutritional properties, but also the vitality of a life force shaped by living processes that is absent in synthetic products manufactured in a dead environment like a laboratory or manufacturing plant. This becomes crucial in case of essential oils use with synthetics becoming ineffective for aromatherapy healing. However, numerous examples of products exists in the market erroneously labelled as containing natural ingredients when, in reality it is totally manufactured in a laboratory namely fruit flavours in drinks, chewable vitamins, candies, etc. Combining the right type of esters, we can create the taste of bananas, orange, lime, watermelon, apple, peach, raspberry, papaya, kiwi and just about any fruit we desire. We find small amounts of methyl anthranilate ester in many essential oils, as also in grapes and cherries. While producing natural flavourings for beverages and confectionaries, making use of synthetic methyl anthranilate ester, adding a little colour and labelling it as a grape or cherry is quite common. Knowledge is power and being aware of the true meaning of 'organic' and 'natural' is important to decipher product labels correctly.

Shelf-life for essential oils

Aromatic or scented essential oils available in the market are of four types:

1. Expressed oils (usually citrus);
2. Solvent extracted oils (absolutes);
3. Carrier blended oils (essential oils in a carrier fatty base); and
4. Steam distilled essential oils.

The shelf-life of these four classes is different. Expressed, solvent extracted and carrier blended oils contain both large and small aromatic

molecules. Essential oils obtained entirely by steam distillation contain only small molecules. Larger molecules are less stable than smaller ones. Shelf-life addresses the chemical stability of aromatic oils that are mixtures of many compounds. If this mixture remains stable without decomposing and/or change in its chemistry over a long period during storage, we can say that it has a long shelf-life. Carrier blended aromatherapy essential oils containing large molecules of fatty vegetable oils are not as stable as the tiny molecules available in unblended distilled essential oils. Fatty oils, unlike essential oils, contain traces of proteins, polypeptides, amino acids, etc., that breaks down to decompose into smaller molecules, 'going rancid' over time, letting out an unpleasant smell, thus having a shorter shelf-life. Expressed, solvent extracted absolutes and essential oils blended with carrier oils accelerate chemical reactions, as they are all sensitive to heat. Large molecules present therein are prone to gradual decomposition even at normal temperatures. Exposure to heat shortens the shelf-life of expressed, solvent extracted absolute and carrier blend oils and keeping it in refrigeration can extend its shelf-life. Pure, steam distilled essential oils, on the other hand, have a long shelf-life. Researchers find that essential oils kept in moderately cool, dark places tightly sealed (from exposure to air/elements, e.g. in the Egyptian tombs) were aromatic and therapeutically effective even after thousands of years giving rise to a contested view that pure unadulterated steam distilled essential oils do not expire and can last for centuries. Proper storage alone is required to maintain the potency of steam distilled pure essential oils. Pure steam distilled essential oils will remain stable at normal room temperatures and will be unaffected even when occasionally stored in hot environ-

mental conditions, provided we do not open the bottle until it has cooled down to normal room temperatures. Refrigeration may not extend their shelf-life, nor does cooler environment hurt them.

The above claim that distilled essential oils can last indefinitely without degradation has its basis on 2001 and 2004 articles in the journal *Nature* about the composition of mummy embalming fluids (preservatives). Continuation studies of the embalming process did reveal the use of fragrant plant materials, but they do not even remotely suggest that essential oils do not degrade or oxidize. Coniferous trees and myrrh resins used as embalming materials are not pure essential oils. We do not find the few diterpenoid acids (present in resins) in essential oils. Detailed chemical analysis of the materials does show numerous degradation products. Monoterpenoids and sesquiterpenoids on exposure to air undergo oxidation. Alcohols transform to aldehydes, which in turn may turn into acid. Similar process is responsible for wine turning into vinegar when it accidentally encounters air during improper storage. Some monoterpenoids like geraniol found in geranium oil (*Pelargonium graveolens* - L'Her.) and grapefruit (*Citrus paradisi* - Macfad.) are more prone to oxidation. Linalool found in lavender oil (*Lavandula angustifolia* - Mill.) and immortelle oil (*Helichrysum italicum* - Roth) are more stable. Additionally, carbon-carbon double bonds can split into single bonds grabbing oxygen atoms forming oxides, epoxides and peroxides. Virtually all essential oil constituents are unsaturated compounds having carbon and therefore can undergo this same reaction to spoil or oxidize.

Dangers of using an oxidized essential oil

Oxidation spoils essential oils,

degrading their aromatic quality and therapeutic properties, further leading to the formation of skin irritants and powerful allergens. Using spoiled essential oils may cause skin rashes and serious allergic reactions. Radical change in the aroma and consistency (darkening, clouding, stiffening etc.) indicate that the essential oil is spoiled and oxidized. Geraniol, an oxidation product of geraniol, is much more likely to cause an allergic reaction than the parent compound. Tea tree essential oil can oxidize and form allergic epoxides triggering allergic reactions much stronger than reactions to the fresh oil. Likewise, air exposure of lavender essential oil oxidizes linalyl acetate to hyperoxides and epoxides that are strong allergens. In short, spoiled (oxidized) essential oils have a greater risk of triggering an allergic reaction during human use.

Since oxidation requires oxygen, it is important to store essential oils in an airtight bottle in a cool (preferably fridge), dark place away from light and using it up before 2-3 years is ideal. It is also important to understand the often-misunderstood word "sensitization" which actually means preparing or readying the inherent human immune system prior to afflicting the individual to an adverse allergic skin reaction. Incidentally, Agarwood oil (*Aquilaria Agallocha* / *Aquilaria Malaccensis*), Patchouli oil (*Pogostemon cablin* - Blanco), Sandalwood oil (*Santalum album*) and Vetiver oil (*Chrysopogon zizanioides* - L) are exceptions as they do not spoil with time. All other essential oils have a limited shelf-life.

Adulterated oils

True therapeutic quality essential oil should contain hundreds of compounds, necessarily in a proper balance to possess healing power. Few of these numerous compounds alone significantly matter commercially in

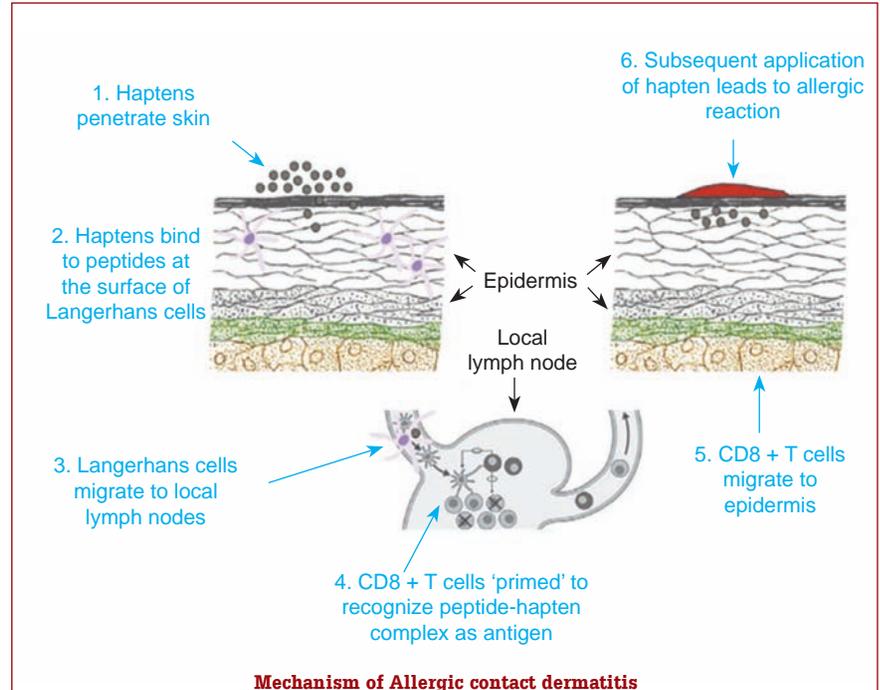
contributing to aroma and/or taste, for use in fragrances or flavours. Manufacturers and consumers do not care whether flavours or fragrance are natural or synthetic, provided they are inexpensive and smell and taste like naturals. Hence, fragrance and flavours are usually incomplete in composition, in comparison to the chemical profile of a complete therapeutic essential oil.

Additionally, to increase volumes and profitability it may also contain synthetic compounds, adulterants or diluted with petrochemicals. One can have adverse skin reactions when using such oils, but these are not reactions to true essential oils, as these reactions are due to the adulterants and not due to the natural essential oil components of the oil. Adulterants can be very many. Some common ones are diluents like diethyl phthalate (DEP), synthetic extenders that mimic natural essential oils, non-organic raw materials like artificial fertilisers, chemical pesticides, etc., that all have adverse effects on the skin, eyes, endocrine and nervous systems.

Irritant & allergic reactions

1. Irritant contact dermatitis – Irritation
2. Delayed hypersensitivity – Allergic contact dermatitis
3. Immediate hypersensitivity – Contact Urticaria

The above adverse reaction types occur when using essential oils and this become apparent in form of redness, itching, burning or formation of tiny blisters (Hives) within 5-10 minutes of application. Irritation reactions resolve itself within a few hours, whereas allergic reactions remain for days or weeks, sometime even spreading to those body parts where there is no direct essential oil application. One important point to note is that further dilution of the es-



1. Allergic reaction to a mix of helichrysum, lavender and tea tree oils.
2. Allergic reaction and to an extremely low dilution of cinnamon bark and peppermint oils in a shampoo formulation.

sential oil may prevent irritation reaction to recur during subsequent use, but will surely not prevent allergic reactions from recurring.

Allergic contact dermatitis – delayed hypersensitivity

Allergic contact dermatosis is an adverse skin reaction to essential oils that does not occur on first time use

but happens after subsequent uses due to the involvement of the body immune system. The schematic photograph (Courtesy: Tisserand Institute/Warshaw *et al*) explains the complex mechanism that takes place to specific persons not all. Literature states that essential oils like Cinnamon bark (cinnamaldehyde), Lemongrass (citral), Ylang-Ylang, Helichrysum,



Lavender and Tea Tree oils are prone to causing allergic reactions than others. (See photographs from Tisserand Institute Adverse Reaction Database, showing allergic reactions to essential oils). More dilute an essential oil, the lower the risk of suffering from allergic contact dermatitis and more concentrated an essential oil is, higher the risk. Females are at larger risk than are males due to hormonal differences. Frequency and duration of application are also responsible factors for allergy risk. Persons suffering from atopic dermatitis are at larger risk, so also persons with seasonal allergies and those prone to skin allergies, either due to genetic reasons or due to immune-reacting cells drifting from one portion of the body to a different part of the human body. Acute phase of allergic reactions usually lasts for hours, sometimes for weeks and in some rare cases for years before the skin calms down. Further re-application of the same product could lead to a relapse of another bout of allergic reactions. The use of steroids as a treatment procedure may be helpful. In any case, it is better safe for such individuals to avoid using essential oils throughout life.

Contact urticaria and anaphylaxis

Contact urticaria is similar to the allergic reaction one gets from a bee sting (see Photograph – Courtesy: Tisserand Institute). Contact Urticaria can be of two types namely immunological and non-immunological, namely IgE-mediated, Immunological Contact Urticaria (ICU) and Non-Immunological (NICU). ICU can involve

the respiratory system or the gastrointestinal tract sometimes causing fatal anaphylactic shock. (Bhatia et al, Davari & Maibach). Point to note is that there are reported cases of probable anaphylaxis to cinnamaldehyde (Diba & Statham). Persons suffering from anaphylaxis show the following signs:

- ☛ They have difficulty in breathing;
- ☛ They have swollen lips, tongue and throat;
- ☛ There is an alarming drop in blood pressure; and
- ☛ There are widespread hives, redness and itching.

Multiple hypersensitivities

Sometimes, people who are allergic to one essential oil may develop allergies to many other essential oils even though the different essential oils in question have no chemical relationship. In such cases, it is better to avoid using essential oils for some months till the skin becomes normal and reintroduce one oil at a time, thereby identifying the allergy causing essential oil for future avoidance. Sometimes, due to continuous long usage of essential oils, one can develop sudden widespread allergic reactions. It is a simple way for our body to indicate 'enough of essential oils', no more.

Human sensitivities to essential oils

A group of researchers led by Dr. David Stewart says that one can be sensitive to essential oils, but not allergic. Allergies are mistaken immune responses to nitrogen compounds like proteins, peptides and amino acids, none of which are present in essential oils. It claims that carrier blended oils in use as aromatherapy oils contains cold pressed vegetable oil such as olive, corn, coconut, peanut, walnut, almond, etc., which can have small amounts of proteins. Allergic reaction is possible in case of use of cold pressed citrus oils

like orange, lemon, lime, grapefruit and solvent extracted oils jasmine and neroli. This school believes that expressed and solvent extracted oils strictly speaking are not true essential oils as they can contain traces of proteins, peptides or amino acids. Steam distilled essential oils do not have those compounds critical to trigger allergies, as these compounds do not pass through the distillation process and hence sensitivities in the sense of allergic reactions are not possible with them. Allergic sensitivities happen when the human body develops antibodies as a response to nitrogenous molecules and antibodies do not form in humans from essential oils use. In case an individual has an adverse reaction to any essential oil, it is not an allergy but something else.

Robert Tisserand, however states, "Most cases of contact dermatitis to essential oils are allergic as distinct from irritant." (Tisserand & Young). This second group of scientists affirm that essential oils do contain a large number of small molecules (haptens) that can bind to proteins present in the human body forming complexes (haptened proteins) that will initiate an immune system response causing allergic reactions (Drs Purchon and Cantele). Hapten urushiol causes the famous allergic reaction to poison ivy. Similarly, Penicillin is another example of a hapten that can cause anaphylaxis, according to Dr. Scott Johnson. Allergic reaction to essential oils is uncommon; however, some common essential oils like tea tree (Australia *Melaleuca alternifolia* – Cheel) and lavender (*L. angustifolia*) show these reactions, according to confirmed reports available. One scientific study put forth a view that 35 different essential oils, including bergamot (*Citrus aurantium* (L.) var. *bergamia*), chamomile (German *Matricaria recutita* (L.)), geranium (*P. graveolens*) and ylang (*Cananga odo-*

rata (Lam.) var., genuine) may also trigger allergic reactions.

Detox reactions

Potentially poisonous or harmful material creating local or systemic adverse reaction and capable of causing serious debilitation or even death is termed as 'Toxin'. 'Toxicity', is 'the degree to which a substance can damage the body' and is dependent upon the dose. Water too when taken in a high dose can lead to water intoxication. A single very high exposure or continuous long-term exposure may lead to toxicity when a toxic material overcomes human body's detoxification systems. Toxicity may be aggravated either by individual sensitivity or through interactions with other substances present in the body (Tisserand & Young) and intensifies when multiple substances containing the same toxin combine, elevating the total risk to which an individual is exposed (Bates). The metabolic process by which toxins change into less toxic or more readily excretable substances is detoxification.

In humans, the organs of elimination are the liver and kidneys, along with skin and the digestive system, which provide for the ongoing detoxification. Detoxification thus encompasses most processes that eliminates or reduce the presence of a perceived toxin or harmful substance. Dramatic reduction of food intake (increasing liquid intake) for specific time and/or altogether eliminating specific foods or liquids from diets through fasts is one method to detoxify.

One scientific group believes that essential oil sensitivities producing skin rashes and other allergic-like symptoms like nausea and headaches is always a detox reaction. According to this school, allergic reactions worsen with every exposure to the offending substance (allergen), whereas in case of a detox reaction it

Table 2
Irritant & allergenic essential oils

Common name	Botanical name	Topical maximum limit, %
Irritant essential oils		
Ajowan oil	Trachysperum ammi	1.4
Garlic oil	Allium sativum	0.1
Massoia oil	Cryptocarya massoy	0.01
Oregano oil	Origanum vulgare	1.1
Summer Savory oil	Satureia hortensis	1.4
Thyme oil (thymol/carvacrol)	Thymus vulgaris	1.3
Winter Savory oil	Satureia montana	1.2
Allergenic essential oils		
Bay oil (West Indian)	Pimenta racemosa	0.9
Cassia oil	Cinnamomum cassia	0.05
Cinnamon bark oil	Cinnamomum verum	0.1
Cinnamon leaf oil	Cinnamomum verum	0.6
Clove bud oil	Syzygium aromaticum	0.5
Holy basil oil	Ocimum tenuiflorum	1.0
Jasmine absolute	Jasminum grandiflorum	0.7
Lemon myrtle oil	Backhousia citriodora	0.7
Lemongrass oil	Cymbopogon citratus or flexuosus	0.7
Massoia oil	Cryptocarya massoy	0.01
May chang oil	Listsea cubeba	0.8
Melissa oil	Melissa officinalis	0.9
Oakmoss absolute	Evernia prunastri	0.1
Opoponax oil	Commiphora guidotti	0.6
Peru balsam oil	Myroxylon balsamum	0.4
Tea tree oil (Lemon scented)	Leptospermum pertresonii	0.8
Ylang – Ylang oil	Cananga odorata	0.8

Courtesy: Tisserand Institute

eventually gets less severe with each exposure, finally disappearing once the toxins clear from the system. When an essential oil give a detox reaction (which is a positive sign), the individual needs to stop using oils for a short while, increase their water intake to get into a cleansing routine. It believes that in this case, the oils are detoxing faster than the colon and kidneys can handle that the toxins excrete through the skin. Temporarily stopping intake of the essential

oil and increasing water intake allows the body to increase the rate of detox down to levels easy for flushing out through the kidneys and colon. The detoxification process inspite of leading to uncomfortable symptoms like gastrointestinal upset, fatigue and headache is seen it as positive with respect to the elimination, cleansing and purification of the human body.

The above detox theory defies and contradicts conventional think-

ing suggesting that an adverse reaction is actually a sign of a positive (detoxification) favourable response aligning an additive process (topical use of an essential oil or blend) with an elimination process (detoxification). Elimination of unwanted substances through skin happens when fluids exit the human body through either sweat (perspiration) glands or sebaceous glands (boils, acne, etc.).

Recommendations

- National Association of Holistic Aromatherapy (NAHA) and the nursing textbook, Foundations of Nursing, strongly recommends at least carrying out a skin patch test prior to using a new essential oil to rule out the possibility of any potential allergic reaction. However, patch testing that requires a qualified dermatologist, specially prepared patches is also laborious in practice. Patch testing is not very reliable, with false positives or negatives, sometimes itself producing allergic reactions not likely to occur otherwise.
- In a high-risk individual, having an experience of topical allergic reactions or multiple chemical sensitivity, a dose escalation testing is advisable, instead of patch testing, wherein application of essential oil starts with a low dilution and then gradually increasing the concentration in infinitesimal stages to get the required aromatherapy effects.
- Moreover, most adverse reactions happen due to the presence natural constituents in an essential oil itself. Oregano oil contains 70-80% content of carvacrol, a confirmed irritant. Cinnamaldehyde, a recognised allergen, is present at 65-80% levels in Cinnamon bark oil. Bergamot oil contains 0.3% potent photosensitizer, bergapten. Even the 'most pure' essential oil could oxidise causing allergy, irritation, photo-toxicity, etc., and it would not be wise to dismiss this indica-

tive response and continuing the use of the allergen (essential oil) aggravating the situation further and putting health and happiness in jeopardy.

What should consumers do

1. Do not use concentrated, adulterated, impure essential oils.
2. Observe caution when using essential oils during bathing.
3. Always follow safety guidelines for high-risk essential oils.
4. Do not use the same essential oil, blend for very long period (months/years) or better avoid it totally.

Essential oils use – perceptions & reality

People wrongly believe that essential oils are harmless since they are natural and in use for long. Numerous essential oils can cause skin rashes and work like poison if absorbed through topical skin application or ingestion. Aspirating an essential oil can cause pneumonia; and the person can choke on swallowing. Every individual will react differently to essential oils and essential oils containing consumer products, similar to medicines, with children more susceptible to its toxicity than elders. It is important to understand that there exists no strict regulation for sale or marketing of essential oils and so difficult for consumers to know what is exactly present in the product purchased.

Important points to note

- Peppermint is good for use in gastrointestinal discomfort. However, pennyroyal (a peppermint species) oil is very poisonous, affecting human liver.
- Wintergreen oil is present in some OTC skin preparations to relieve pain. It creates a warm feeling by enlarging the blood vessels. Oil of wintergreen is a flavouring agent in small dosages, but a dangerous drug behaving like aspirin (acetyl-

salicylic acid) in higher consumption levels.

- We use nutmeg and mace in our food preparations. When in excess it can cause nausea, vomiting, agitation, prolonged drowsiness, hallucinations and coma.
- Eucalyptus vapours that are soothing during cough and cold can also cause seizures if swallowed.
- Sage oil that is a good seasoning agent can even in small amount lead to seizures in children.
- Camphor, a common ingredient in food, skin preparations, moth repellents, etc., can lead to seizures in children.
- Vanilla extract contains ethanol.
- Poppy seeds are a common food ingredient in cooking. However, when a person consumes lot of poppy seeds, a drug test on the individual could be positive for heroin as poppy seeds too breaks down into morphine or codeine similar to heroin.
- Tea tree oil coming from an Australian tree (*Melaleuca alternifolia*) leaves is historically in use as a natural remedy for skin ailments, bruises, burns, sores, corns, eczema, insect bites, psoriasis, rosacea, scabies, respiratory conditions like cough colds, bronchial congestion, nose and throat irritation, other conditions like melanoma, body odour and infections of the prostate and bone. Scientific studies also indicate some activity against microbes and fungi.
- Tea tree oil in higher concentrations can irritate the skin, cause allergic skin reactions and may have hormonal effects.
- Tea tree oil is not suitable for ingestion even though some traditionalists' use it as a mouthwash and as a treatment for bad breath, toothache and mouth ulcers. Tea tree oil is poisonous and is not for use in or around the mouth at all.
- Large quantities of tea tree oil

Table 3: Types of allergic reaction/hypersensitivity

	Type I	Type II	Type III	Type IV
Immune system involvement	IgE	IgG or IgM	IgG and IgM	T cells
Examples of reactions	Contact urticaria (bee sting reaction), local and systemic anaphylaxis , seasonal hay fever, food allergies and drug allergies.	Red blood cells destruction after transfusion of mismatched blood type.	Rheumatoid arthritis, systemic lupus erythematosus.	Allergic contact dermatitis , type I diabetes mellitus, multiple sclerosis.
Relevance to EOs	Rare, but can happen with essential oils.	NOT relevant to essential oils.	NOT relevant to essential oils.	Can happen with essential oils.

causes poisoning effects on cats and dogs like excessive salivation, low body temperature, weakness, muscle tremors and difficulty in walking.

Hot oils

Essential oils that contain phenolic compounds capable of cleaning our cells and are termed as hot oils. These include thyme, oregano, cassia, cinnamon, etc. It is better to use these oils with extreme caution. In case of burning or irritation, occurring to the skin

during use early application of a vegetable oil layer over the essential oil can resolve the problem. In case of inadvertent use or spillage of essential oil in eyes, skin or on swallowing, it is advisable to apply or drink vegetable oil instead of water for immediate relief.

Simultaneous use of essential oils & pharmaceuticals

A common consumer question is whether one can use essential oils

(topically, orally or by inhalation), along with a prescription drug. Incidentally, there are no specific citations or publications indicating any adverse reactions between essential oils and drugs. It is also possible that incidences of adverse interactions between drugs and essential oils exist, but not reported or categorised. In any case, it is better to be cautious and not overuse essential oils. Remember the age-old Indian saying, **॥अति सर्वत्र वर्जते॥** (Avoid everything in excess).



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- MIXTURE OF PARABENS & THEIR FORMULATIONS

MIXTURE OF PARABENS

- Gujsol-1 : Mixture of Phenoxyethanol, Methyl Paraben, Ethyl Paraben, Propyl Paraben, Butyl Paraben
- Gujsol-2 : Mixture of Phenoxyethanol, Methyl Paraben, Ethyl Paraben, Propyl Paraben, Butyl Paraben, Iso Butyl Paraben
- Gujsol-3 : Mixture of Phenoxyethanol, Methyl Paraben, Ethyl Paraben, Propyl Paraben
- Gujstat : Mixture of Methyl Paraben, Ethyl Paraben, Propyl Paraben, Iso Propyl Paraben
- Gujsept : Mixture of Methyl Paraben, Ethyl Paraben, Propyl Paraben
- Gujcombin : Mixture of Methyl Paraben Sodium, Ethyl Paraben Sodium, Propyl Paraben Sodium & Sodium Benzoate
- Gujsept-2 : Methyl Paraben, Propyl Paraben (4 : 1)

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