THE SCIENCE BEHIND ESSENTIAL OILS

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I have no personal or professional affiliation with any of the resources listed in this presentation, and will receive no monetary gain or professional advancement from this lecture.

I am a Wellness Advocate for an Essential Oil Company.
TALK OBJECTIVES

- **Describe**
  - Describe how essential oils have been used for centuries as pharmacological agents

- **Increase**
  - Increase your understanding of the chemical composition of essential oils and how they are extracted for pharmacologic use

- **Discuss**
  - Discuss how oils can be used internally, aromatically, and topically.

- **Illustrate**
  - Illustrate the chemical make-up, medicinal uses, and potential clinical application of TEA TREE, CLARY SAGE, COPAIBA, VETIVER, OREGANO, LEMON, MELISSA, AND LAVENDER.
Plants love us. They help us reclaim our health and our whole selves. Plants are healers.

Robin Rose Bennett
WHAT ARE ESSENTIAL OILS?

• Plants are able to synthesize two kinds of oils: fixed oils and essential oils
  • Fixed oils are esters of glycerol and fatty acids
  • Essential oils are mixtures of volatile, organic compounds that originate from a single botanical source. These oils create the flavor and fragrance of the plant

• Called “essential” because they are the essence of the plant

• It is also believed that in the Middle Ages essential oils were “essential” to life

• In Modern times essential oils are defined as the essence, or extract, of the plant’s aroma or flavor.
  • Ex. Lavender smells like Lavender because of the oil contained within the plant
WHY DO PLANTS PRODUCE ESSENTIAL OILS?

- Essential oils are produced as a part of the plants immune system, playing a critical role in protection against environmental threats.
  - Attract Insects
  - Repel Competition
  - Protect
  - Defend & Protect: Provide Immunity

- Those parts of the plants with the greatest amounts of essential oils are generally the areas that are at the highest risk for an invasion by microorganisms. This may be the bark, sap, leaves, seeds, or fruit rinds.
PRODUCTION METHODS

- Distillation: Scent & Steam
- Distillation vs. Extraction
- Steam Distilled
- Water Distilled
- Cold Pressing
- Extraction
STEAM DISTILLED

- Distillation: method of evaporating leading to the condensing of liquids
  - Can be performed through very simple means in the fields where the plant is harvested
  - Ability to process large amounts of plant material in a short period of time
  - Highly flammable solvents are not required

- Steam Distilled:
  - Principle of a two-phase distillation as opposed to a regular one-phase distillation
  - Steam is injected into the dry plant material. Due to the very high temperatures those constituents of the plant that have a very high boiling point are extracted
  - This method is almost exclusively used for the industrial production of essential oils.
STEPS OF STEAM DISTILLATION

1) Steam is created from the boiling point
2) The steam passes through the plants biomass, breaking up the plant micro-particles
3) This process separates the volatile from the non-volatile organic compounds, both rise with the steam
4) A condenser is used to cool the steam, thus transforming it back into water
5) The volatile principles (i.e. essential oils) rise to the top through the use of a separator and are then extracted
6) The residual water contains the non-volatile principles, or floral waters (i.e. hydrosols) which can be used for body care products and also contain medicinal properties
7) The essential oils are then tested for purity
Plant material is placed in a still and is completely covered in water.

The entire still is brought to a boil.

Continues to be a method used for very high quality oils as it is performed at reduced pressure and temperature as compared to steam distillation.
COLD PRESSING

- The most gentle form of extraction
- Used exclusively to prepare citrus oils
- Peels are separated from the fruits and then cold pressed
- The essential oil is collected with small amounts of juice and then separated
• Used on raw materials that have a low concentration of essential oils
• Best method for isolating fragrant constituents
• Solvent Extraction
• Enfleurage
PURITY

• Essential oils may be adulterated by extending it with another essential oil that has similar composition
• It is difficult to detect
• 3 simple tests:
  a) Additional of vegetable oil is the most common way to extend an essential oil creating a greasy feel when applied. PURE essential oils do not feel greasy. Apply a small amount to your thumb and rub together with your index finger, it should feel smooth not greasy.
  b) Place a drop of essential oil on a sheet of plain, white paper. A pure oil will completely evaporate and leave no residue, an extended will leave a lasting, oily stain on the paper.
  c) Essential oils used for cosmetic purposes sometimes use surfactants and/or emulsifiers, although they claim to be 100% pure. Place 1 drop into water, pure essential oils do not dissolve in water, they float to the top as they are lighter than water. Emulsified dissolve in the water producing a milky white or opaque solution.
QUALITY

• Pure, natural, and complete
• Genuine and authentic
• Natural vs. Synthetic

“A truly genuine and authentic essential oil should always be guaranteed in three respects: the plant, the distillation process, and the essential oil itself.”

-Kurt Schnaubelt, Ph. D.
LABELING

100% Natural
100% Pure
100% Complete
USAGE OF ESSENTIAL OILS

Aromatically

Internally

Topically
Strong connection between scent and psychological response

Research demonstrates that basil, lemon, and peppermint are stimulating while bergamot and sandalwood are relaxing.

More than 1000 genes code the types of olfactory receptors in our nose.

Receptors are located on the tips of the olfactory receptor cells.

These receptors are positioned on the upper part of the nasal lining.

The body can smell and remember approximately 10,000 smells.

An odor molecule stimulates an odor receptor, which in turn activates the olfactory receptor cell. An electronic impulse is created, then relayed to the glomeruli, then transmitted to the higher regions of the brain, this signals a response.
AROMATICALLY

Direct inhalation

Diffusion

Steam Inhalation
In as little as 5-20 minutes the essential oil is carried into the bloodstream, carried to the lungs, and exhaled through the breath. Essential oils are also eliminated through the skin and urine.

The term “neat”: can be applied without any dilution

Dilute: Essential oils which should be diluted with a carrier oil every time

Sensitive: Require dilution before applying to more sensitive skin such as young children and the elderly.

Carrier Oil: an oil that literally acts as a carrier to the essential oil to the desired area, ex. Fractionated coconut oil, avocado oil, jojoba oil
In their 1930 publication *Useful Drugs* the American Medical Association listed certain oils for oral use. Pure oils were used for decades in the food and drink industry for flavorings. FDA has created a Generally Recognized As Safe (GRAS) list that provides the names of essential oils that are deemed as safe for internal use.
CONSTITUENTS:

HYDROCARBONS & OXYGENATED COMPOUNDS

Terpenes Hydrocarbons
- Monoterpene
- Sesquiterpene

Oxygenated Compounds
- Phenols
- Alcohols
  - Monoterpene alcohols
  - Sesquiterpene alcohols

Aldehydes

Ketones

Esters

Ethers

Oxides
MONOTERPENE

- Found in nearly all essential oils
- Structure of 10 carbon atoms and at least 1 double bond
- The carbon atoms are derived from two isoprene units
- React readily to air and heat sources
- Example: LEMON
MAIN CHEMICAL COMPONENTS: LIMONENE, S pinenes, Γ-TERPIMENE:

LEMON ESSENTIAL OIL IS EXTRACTED FROM THE LEMON RINDS, OR PEEL OF THE LEMON. THE LEMON RINDS ARE COLD PRESSED TO PRODUCE LEMON ESSENTIAL OIL. AN EXPRESSION DISTILLATION PROCESS, COLD PRESSING IS TYPICALLY USED FOR CITRUS OILS WHEN PRODUCING ESSENTIAL OILS, AND USES HIGH MECHANICAL PRESSURE TO PRODUCE OIL FROM THE LEMON RIND.
LEMON

History

• Lemon trees are native to Asia, they may have arrived in Europe in the Middle Ages around 200 A.D. English sailors in the Royal Navy used them to protect against vitamin deficiencies given their known benefits as an antiseptic and anti-bacterial agent
• Used for thousands of years in Ayurvedic Medicine.

Botanical Name: *Citrus x limon* L.

Botanical synonym: *Citrus limonum* Risso

Family: Rutaceae

Source: Fruit peel, by expression

Key Constituents:

(+) - Limonene

β-pinene
MEDICINAL USE & CLINICAL APPLICATION

- Antiseptic-like properties
- Contains compounds studied for their effect on immune function
- Limonene slightly inhibits Phase 1 liver detoxification enzymes, thus induces Phase 2 enzymes.
- Selectively inhibits reproduction of tumor cells through the inhibition of HMG CoA reductase
  
  *** this same process occurs when we eat citrus fruits or use Lemon Essential Oil***

- May serve as insect repellent
- May be beneficial to the skin
- May reduce nausea and vomiting in pregnancy (inhalation)

***CITRUS OILS SHOULD NOT BE APPLIED TO SKIN THAT WILL BE EXPOSED TO DIRECT SUNLIGHT OR ULTRAVIOLET LIGHT WITHIN 72 HOURS***
The effect of lemon inhalation aromatherapy on nausea and vomiting of pregnancy: a double-blinded, randomized, controlled clinical trial.

https://www.ncbi.nlm.nih.gov/pubmed/?term=lemon+essential+oil+nausea+and+vomiting

The effect of lemon, orange and bergamot essential oils and their components on the survival of Campylobacter jejuni, Escherichia coli O157, Listeria monocytogenes, Bacillus cereus and Staphylococcus aureus in vitro and in food systems.


Effects of sub-minimum inhibitory concentrations of lemon essential oil on the acid tolerance and biofilm formation of Streptococcus mutans.


Induction of apoptosis in human cervical carcinoma HeLa cells by polymethoxylated flavone-rich Citrus grandis Osbeck (Dangyuja) leaf extract.

SESQUITERPENE

• Work as a liver and gland stimulant
• Contain caryophyllene and valencene
• Composed of 15 carbon atoms derived from 3 isoprene unit
• Less volatile than Monoterpenes
• Example: Copaiba
MAIN CHEMICAL COMPONENTS: CARYOPHYLLENE, A BICYCLIC SESQUITERPENE

COPAIBA ESSENTIAL OIL IS OBTAINED BY STEAM DISTILLATION OF THE RESIN COLLECTED FROM COPAIFERA OFFICINALIS, A TREE NATIVE TO CENTRAL AND SOUTH AMERICA.
COPAIBA

History
• Used since the 16th century by native and traditional medical practitioners in its native Brazil and throughout South America
• Harvested from the trunk of the Copaifera tree. The essential oil is the distilled resin of the tree

Botanical Name: Copaifera langsdorffii, Copaifera officinalis
Family: Fabaceae
Source: Balsam from wood
Key Constituents:
  - β-Caryophyllene
  - Germacrene B

Has no known hazards or contraindications
MEDICINAL USE & CLINICAL APPLICATION

- Bicyclic sesquiterpene beta-caryophyllene has the ability to bind to CB2 receptors
- beta-caryophyllene has been known to be a cannabinoid
- Activation of CB2 receptors
- Thus supports healthy nervous and immune function
- Copaiba essential oil is composed of more than 50% beta-caryophyllene
- As an anti-oxidant
- To support the nervous system
- For the treatment of acne
- Wound and scar healing
Application of the essential oil from copaiba (Copaifera langsdorfi Desf.) for acne vulgaris: a double-blind, placebo-controlled clinical trial.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Application+of+the+essential+oil+from+copaiba+(Copaifera+langsdorfi+Desf.)+for+acne+vulgaris%3A+a+double-blind%2C+placebo-controlled+clinical+trial%2C

Antibacterial Combination of Oleoresin from Copaifera multijuga Hayne and Biogenic Silver Nanoparticles Towards Streptococcus agalactiae.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Antibacterial+combination+of+oleoresin+from+Copaifera+multijuga+Hayne+and+biogenic+silver+nanoparticles+towards+Streptococcus+agalactiae

Antimicrobial Activity of Copaiba (Copaifera officinalis) and Pracaxi (Pentaclethra macroloba) Oils against Staphylococcus Aureus: Importance in Compounding for Wound Care.

PHENOLS

• Subtype of alcohols
• An alcohol group (an oxygen and a hydrogen) attached to a benzene ring
• Benzene ring= has six carbon atoms arranged in a hexagon pattern with 3 double bonds inside the ring
• Hepato-toxicity
• Example: Oregano
MAIN CHEMICAL COMPONENTS: CARVACROL, THYMOL, PARA-CYME, \(\Gamma\)-TERPINENE

ORIGANUM VULGARE, IS A BUSHY PERENNIAL THAT IS PART OF THE LAMIACEAE FAMILY. THE LEAVES OF THE PLANT ARE FRAGRANT AND ARE CHARACTERIZED BY THEIR ROUNDED TO OVATE SHAPE. IT THRIVES IN FULL SUN. THE OIL IS EXTRACTED FROM THE LEAVES OF THE PLANT.
OREGANO

History

• Used since the 16th century by native and traditional medical practitioners in its native Brazil and throughout South America
• Harvested from the trunk of the Copaifera tree. The essential oil is the distilled resin of the tree

Botanical Name: *Origanum onites* L.; *Origanum vulgare* L. subsp. *hirtum*; *Thymbra capitatus*

Family: Lamaceae

Source: Dried aerial parts of the flowering plant

Key Constituents:
- Carvacrol
- *p*-Cymene
- *γ*-Terpinene

Contraindicated in pregnancy and breastfeeding, caution with topical use if hypertensive, sensitive skin, and children under the age of 2.
Main chemical component is carvacrol which contains warming properties
- Antiseptic properties due to carvacrol
- As a phenol oregano also has beneficial antioxidant effects
- Antiseptic
- Anti-bacterial
- Contain high levels of oxygenating molecules and have antioxidant properties
- Carvacrol may help support the body’s normal immune response to inflammatory stressor
- May promote gastrointestinal health


Antioxidant and Antimicrobial Activities of Essential Oils Obtained from Oregano (Origanum vulgare ssp. hirtum) by Using Different Extraction Methods

http://online.liebertpub.com/doi/abs/10.1089/jmf.2010.0098

Chemical composition and bioactivity of different oregano (Origanum vulgare) extracts and essential oil.


Antioxidant, Antibacterial, and Cytotoxic Activities of the Ethanolic Origanum vulgare Extract and Its Major Constituents

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4804097/
MONOTERPENE ALCOHOLS

• Any molecule with an alcohol functional group

• An oxygen atom bound to both the carbon backbone on one end and a hydrogen atom on the other end

• Example: Tea Tree and Lavender
MAIN CHEMICAL COMPONENTS: LINALOOL, LINALYL ACETATE

A SHORT SHRUB THAT GROWS TO BE ROUGHLY 2 FEET TALL, LAVENDER IS NATIVE TO THE MEDITERRANEAN. THE DISTINCT, FRESH SCENT OF LAVENDER COMES FROM THE PLANT’S FLOWERS, WHICH IS WHERE THE ESSENTIAL OIL IS EXTRACTED FROM. AFTER EXTRACTION, LAVENDER ESSENTIAL OIL IS PRODUCED THROUGH THE PROCESS OF STEAM DISTILLATION.
LAVENDER

History

- The name lavender comes from the Latin root *lavare*, which means "to wash."
- There is documented use of Lavender for more than 2500 years.
- Used in cosmetics in Egypt, in Greece and Rome as an antiseptic, and ingested internally during the Middle Ages.
- Prior to World War 1 Lavender essential oil was only produced from wild plants grown in the French and Italian Alps

Botanical Name: *Lavandula angustifolia*

Family: Lamiaceae

Source: Flowering Tops

Key Constituents:

- Linalyl acetate
- *Linalool*

Non-toxic, low risk of skin sensitivity
No known contraindications
MEDICINAL USE & CLINICAL APPLICATION

- Linool inhibits HMG CoA reductase (antitumor, antifungal), reduces spasms, is anticonvulsant, and modifies autonomic nervous system activity
- Linalool may activate biochemical pathways in the endothelial lining of the blood vessels, thus relaxing the underlying vascular smooth muscle.
- Lavender’s nerve-calming effects may be due to its ability to modulate NMDA receptors
- May alleviate premenstrual emotional symptoms Anti-bacterial
- May decrease stress and enhance immune function in pregnant women
- Useful in managing insomnia
- Active against Staphylococcus aureas, Klebsiella, and Candida albicans making it a beneficial essential oil for a variety of skin conditions
Does lavender aromatherapy alleviate premenstrual emotional symptoms?: a randomized crossover trial.


Effects of Aromatherapy Massage on Pregnant Women’s Stress and Immune Function: A Longitudinal, Prospective, Randomized Controlled Trial.


Inhaled lavender effect on anxiety and pain caused from intrauterine device insertion.


Antinociceptive and gastroprotective effects of inhaled and orally administered Lavandula hybrida Reverchon “Grosso” essential oil.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Antinociceptive+and+gastroprotective+effects+of+inhaled+and+orally+administered+Lavandula+hybrida+Reverchon+Grosso+essential+oil

Linalool Affects the Antimicrobial Efficacy of Essential Oils.


Effect of Inhaled Lavender and Sleep Hygiene on Self-Reported Sleep Issues: A Randomized Controlled Trial.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Effect+of+lavender+and+sleep+hygiene+on+self-reported+sleep+issues%3A+A+randomized+controlled+trial

Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office.


Effect of lavender aroma on salivary endocrinological stress markers.

MAIN CHEMICAL COMPONENTS: TERPINEN-4-OL, Y-TERPINENE

MELALEUCA OIL, OR TEA TREE OIL, IS EXTRACTED FROM THE LEAVES OF MELALEUCA SHRUBS OR TREES, WHICH HAVE A STRONG AROMA WHEN RUBBED. MELALEUCA ESSENTIAL OIL IS PRODUCED THROUGH THE PROCESS OF STEAM DISTILLATION.
**TEA TREE**

**History**
- Used by the Aboriginal people of Australia for centuries
- “Discovered” by British explorer Captain James Cook (1728-1779) on his travels around the world
- Used in military first aid kits during World War II
- Classed as a necessary commodity in Australia

**Botanical Name:** *Melaleuca alternifolia*

**Family:** Myrtaceae

**Source:** Leaves

**Key Constituents:**
- Terpinen-4-ol
- γ-Terpinene

Non-toxic, low risk of skin sensitivity.
• Terpinen-4-ol has a strong 5 carbon bond which is chemically resilient against bacteria, it prevents bacteria from reproducing.
• The water-soluble components of tea tree oil can suppress pro-inflammatory mediator production by activated human monocytes.
• Terpinen-4-ol and alpha-terpineol can suppress the production of inflammatory mediators in LPS-stimulated human macrophage.
• Potent topical antiseptic, known as a anti-fungal, antiviral and antibacterial aid.
• May be effective at reducing the appearance of skin concerns.
• Likely has a place in oral hygiene to keep teeth, gums, and mouth clean and free of disease.
Influence of melaleuca and copaiba oils on Candida albicans adhesion.


Melaleuca alternifolia (Tea Tree) Oil: a Review of Antimicrobial and Other Medicinal Properties

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1360273/

Plants of the Melaleuca Genus as Antimicrobial Agents: From Farm to Pharmacy.


Efficacy of Specific Plant Products on Microorganisms Causing Dental Caries.

ALDEHYDES

• Highly reactive
• Characterized by the group C-H-O (Carbon, Hydrogen, Oxygen)
• Anti-infectious with a sedative effect on the central nervous system
• Quite irritating when applied topically, calming effect when inhaled
• Example: cinnamon
MAIN CHEMICAL COMPONENTS: EUGENOL, EUGENOL ACETATE, CINNAMIC ALDEHYDE AND BENZYL BENZOATE

A native to Indonesia, but cultivated in Sri Lanka and India, the tree is rust-colored and can grow up to 15 meters (45 feet). Extraction: the leaves and twigs or inner dried bark are subjected to steam distillation.
CINNAMON

History

• One of the oldest known aromatics
• Longest existing spices in the world
• Used for embalming purposes, medicine and incense throughout Egypt and for flavoring and as an aromatic in religious rites in Europe.

Botanical Name: Cinnamomum verum J. Presl.

Family: Lauraceae

Source: Leaves or Bark

Key Constituents:

- Eugenol (leaf)
- (E)-Cinnamaldehyde (bark)
- Eugenyl acetate

High risk of skin sensitization, contraindicated in pregnancy and breastfeeding. Medication interaction must be considered.
MEDICINAL USE & CLINICAL APPLICATION

• Cinnamaldehyde, which is the main chemical constituent of Cinnamon Bark, may support healthy molecular function in the kidneys by inactivating the JAK2-STAT1/STAT3 biochemical pathway in the kidney cells.

• Sirtuin-1 (Sirt-1), a deacetylase in the insulin signaling pathway is a possible target for cinnamon extract and may be why it has an antidiabetic effect.

• Anti-inflammatory properties of cinnamaldehyde have been shown to be caused by its ability to block nuclear factor-kB activation in immune cells.

• Anti-diabetic properties

• Patients may be using cinnamon as a dietary supplement for gastrointestinal issues or weight loss.

• Frequently used as a spice.
Cinnamon research

Cinnamaldehyde and Nitric Oxide Attenuate Advanced Glycation End Products-Induced the JAK/STAT Signaling in Human Renal Tubular Cells

https://onlinelibrary.wiley.com/doi/abs/10.1002/jcb.25058

Cooperative binding of cinnamon polyphenols as activators of Sirtuin-1 protein in the insulin signaling pathway

http://www.fasebj.org/doi/abs/10.1096/fasebj.31.1_supplement.761.25

Immune Suppressive Effect of Cinnamaldehyde Due to Inhibition of Proliferation and Induction of Apoptosis in Immune Cells: Implications in Cancer

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4182734/
ESTERS

• Formed by the reaction of alcohols with acids

• Central carbon atom double bonded to an oxygen atom, single bonded to the backbone, and single bonded to a second oxygen atom

• Used extensively in flavorings and edible fruit aromas

• Activity against fungal overgrowth

• Example: Clary sage
MAIN CHEMICAL COMPONENTS: LINALYL ACETATE, LINALOOL

CLARY SAGE IS A BIENNIAL OR PERENNIAL HERB THAT IS FAST GROWING. CLARY SAGE ESSENTIAL OIL IS EXTRACTED FROM THE FLOWER.
CLARY SAGE

History

• In the Middle Ages Clary Sage was used to relieve a wide range of gynecological conditions including menstrual cramps, painful menstruation, and hot flashes

• Mentioned in herbalist Culpeper’s ‘Complete Herbal & English Physician’ (1653), clary sage was referred to as ‘clear eye’ as after soaking the seeds form a thick mucilage that were used to remove foreign objects from the eye, draw out splinters and thorns from the skin, and reduce inflammation.

• Native to Southern Europe

Botanical Name: Muscatel sage

Family: Lamiaceae

Source: Leaves and flowering tops

Key Constituents:

- Linalyl acetate
- Linalool
- Germacrene D

Non-toxic, Moderate risk of skin sensitization, No known contraindications.
MEDICINAL USE & CLINICAL APPLICATION

• Active against Staphylococcus aureus, S. epidermidis and S. xylosus
• Massage with Clary Sage provided relief for primary dysmenorrhea and reduced the duration of menstrual pain

• May be of benefit to women in menopause
• May be effective adjunct in the treatment of depression
• Shows promise as an antimicrobial agent
Randomized controlled trial for Salvia sclarea or Lavandula angustifolia: differential effects on blood pressure in female patients with urinary incontinence undergoing urodynamic examination.


Changes in 5-hydroxytryptamine and cortisol plasma levels in menopausal women after inhalation of clary sage oil.


Antidepressant-like effect of Salvia sclarea is explained by modulation of dopamine activities in rats.


The effect of clary sage oil on staphylococci responsible for wound infections.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4100007/
ETHERS

- A molecule with an oxygen atom bonded between two carbons.
- The two flanking carbons MUST only have bonds with other carbons
- Ether eucalyptol or 1, 8-cineole is the most common ether found in essential oils
- Eucalyptole (usually redistilled or isolated) is widely used as an expectorant in many over-the-counter pharmaceuticals
- Example: eucalyptus
MAIN CHEMICAL COMPONENTS: EUCALYPTOL, ALPHA-TERPINEOL

THE EUCALYPTUS PLANT IS AN EVERGREEN TREE THAT CAN GROW UP TO 50 FEET IN HEIGHT. EUCALYPTUS LEAVES ARE THIN, LONG, AND GREEN IN COLOR. EUCALYPTUS ESSENTIAL OIL IS EXTRACTED FROM THE LEAVES.
EUCALYPTUS

History

- Originally grown in Australia and known by the native population of Australia as ‘kino’, used to cover wounds and assist in healing
- Introduced in Europe in 1788
- The first major use of Eucalyptus in the Industrialized world was as an antiseptic agent

Botanical Name: Eucalyptus camaldulensis; Eucalyptus globulus; Eucalyptus maidenii; Eucalyptus plenissima; Eucalyptus polybractea; Eucalyptus radiata; Eucalyptus smithii

Family: Myrtaceae

Source: Leaves

Key Constituents:
- 1, 8-Cineole
- α-Pinene
- A-Terpineol

May cause breathing and CNS problems in young children. DO not apply near the face of an infant or children under the age of 10.
MEDICINAL USE & CLINICAL APPLICATION

- Eucalyptus is a mucolytic, and as such has bronchodilating and anti-inflammatory effects.
- Broad-spectrum antimicrobial.
- Application by inhalation or oral route provides benefit for purulent and non-purulent respiratory problems.
- Eucalyptus oil has been shown in studies to significantly induced macrophage activation and reduce the release of inflammatory cytokines.
- Used as an anti-inflammatory, anti-fungal, and antimicrobial agent.
- Studies to demonstrate the efficacy of the use in Eucalyptus in the treatment of asthma and COPD are ongoing.
Concomitant therapy with Cineole (Eucalyptole) reduces exacerbations in COPD: a placebo-controlled double-blind trial.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Concomitant+therapy+with+Cineole+(Eucalyptole)+reduces+exacerbations+in+COPD%3A+a+placebo-controlled+double-blind+trial

Patients with asthma benefit from concomitant therapy with cineole: a placebo-controlled, double-blind trial.

https://www.ncbi.nlm.nih.gov/pubmed/?term=Patients+with+asthma+benefit+from+concomitant+therapy+with+cineole%3A+a+placebo-controlled+double-blind+trial
KETONES

• All ketones share the same functional group: the ketone or carboxyl group
• Most prominent feature is their mucolytic effect
• Ability to induce the formation of new cells and tissue
• Possibly neurotoxic when isolated from constituents
• Example: Spikenard
Essential Oils Might Be the New Antibiotics

Faced with increasingly drug-resistant bacteria, scientists and farmers are now looking to plant extracts to keep people and animals healthy.

TORI RODRIGUEZ
JAN 16, 2015 | HEALTH

ESSENTIAL OILS MIGHT BE THE NEW ANTIBIOTICS

MAIN CHEMICAL COMPONENTS: CARVONE, ISOVALENCENOL, KHUSIMOL

Vetiver Essential Oil in Cosmetics: What Is New?

RESOURCES

• Essential Oil Safety by Robert Tisserand & Rodney Young
• The Healing Intelligence of Essential Oils by Kurt Schaubelt
• Emotions & Essential Oils
• Aromatica by Peter Holmes
• Medical Aromatherapy by Kurt Schaubelt