Herbs & Essential Oils: The Good, The Bad, and the Unknown

Tieraona Low Dog, MD
Founder: Medicine Lodge Ranch
Author: National Geographic’s Life Is Your Best Medicine, Healthy At Home, and Fortify Your Life
www.DrLowDog.com

Disclosures
- Consultant: Healthy Lifestyle Brands
- Consultant: MegaFood
- Cofounder: Rightful
- Cofounder: WildCrafter Botanicals
- President: Medicine Lodge Ranch Education
- Book royalties: National Geographic, Elsevier, Oxford University Press
- Chair: United States Pharmacopeia Dietary Supplements Admissions Joint Standard Setting Sub-Committee

A Moment to Introduce Myself
- Herbalist, midwife and massage therapist prior to graduating from University of New Mexico Medical School. Licensed MD, boarded in integrative medicine.
- Fellowship Director at the University of Arizona Center for Integrative Medicine for many years, training ~700 health professionals in 2-year integrative medicine fellowship.
- Appointed by President Bill Clinton to White House Commission on Complementary and Alternative Medicine Policy.
- Appointed by Secretary HHS to Advisory Council of NIH National Center for Complementary and Alternative Medicine (now Complementary & Integrative Health)
- Served as Chair of numerous US Pharmacopeia dietary supplement and botanical committees since 2000.
- Published >50 peer-reviewed medical journal articles, written 24 medical textbook chapters and written/edited six books, 4 with National Geographic and spoken at more than 500 medical/scientific conferences.
Herbal Medicine’s Rich History

Opium Poppy (Papaver somniferum)

- At least 3000 years ago, opium latex, which contains morphine and related alkaloids such as codeine was being used.
- Morphine “the god of dreams” in Greek mythology.
- Sertturner isolated morphine in 1806.
- Codeine and morphine still widely used today as analgesics.
Atropa belladonna
Hyoscyamus niger

• Used by Italian women to dilate pupils as making them appear more attractive.
• Source of atropine, scopolamine (anticholinergic) alkaloids: antispasmodic in GI tract, bronchodilators, anti-emetic (motion sickness,) dilate pupils, narcotic, psychotropic.
• Still widely used in medicine.

Foxglove
Digitalis purpurea

• William Withering learned about foxglove from herbwyfe in Shropshire.
• Digitoxin and digoxin derived from foxglove (and others) revolutionized our ability to treat congestive heart failure.

WHO has called stress 'the health epidemic of the 21st century'.

Herbal Medicine in Modern Times: The Potential

Rhodiola rosea L.

- Plant: perennial with thick leaves and stem; yellow, fragrant flowers. Crasulaceae
- Part Used: root and rhizomes
- Used in traditional medicine of Russia, Scandinavia, and other northern latitude countries for centuries.
- Used to increase physical endurance, work productivity, longevity, and nervous disorders.
- “Anti-fatigue agent” in Sweden, most commonly used psychostimulant in officially registered herbal medicinal products.

Mechanistic Studies

- More than 70 mechanistic studies published for R. rosea and/or its principal constituents, such as rosavin and salidroside.
- Rhodiola shown to have antioxidant, anti-stress, antimicrobial, immunomodulatory, cardio-protective, neuroprotective and anti-tumor effects.


Panossian AG. Rosenroot (Rhodiola rosea): Traditional use, chemical composition, pharmacology and clinical efficacy. Phytomedicine 2010; 17(7):481-93
Open Label Study

- Multicenter trial 118 outpatients with burnout syndrome (multiple validated scales) found 400 mg/d R. rosea extract ((1.5–5:1, WS® 1375, Rosalin) over 12 weeks had significant beneficial effect on symptoms.


27 March 2012 EMA/HMPC/232100/2011
Committee on Herbal Medicinal Products (HMPC)
Assessment report on Rhodiola rosea L. rhizoma et radix

- “The traditional use as an adaptogen ‘for temporary relief of symptoms of stress such as fatigue and sensation of weakness’ is appropriate for traditional herbal medicinal products.”
- “The long-standing use as well as the outcome of the clinical trials support the plausibility of the use of the mentioned herbal preparation in the proposed indication.”


The following are acceptable claims on Rhodiola label:

- Used in herbal medicine to help support cognitive function
- Used in herbal medicine as an adaptogen to help temporarily relieve symptoms of stress (such as mental fatigue and sensation of weakness)


R. rosea very favorable safety profile.
- In clinical studies, no serious side effects have been reported.
- Mild side effects noted: insomnia, dry mouth and mild headache.
- Animal data failed to show any significant adverse effects.
- Safety in pregnancy and breastfeeding not available.

Ashwagandha Root (and Leaf)  
(*Withania somnifera*)

- Significant stress protecting, anxiolytic, analgesic & anti-inflammatory effects.
- Most calming of "adaptogenic" herbs.
- Clinical study showed ashwagandha root extract (KSM-66, Ixoreal Biomed) 300 mg twice daily for 60 days reduced stress levels by 33-44% and cortisol levels by 22-28% compared to baseline in adults with chronic stress. Improvements significant compared to placebo.


Traditionally used in Ayurveda to relieve general debility, especially during convalescence or old age.

Traditionally used in Ayurveda as a sleep aid.

Traditionally used in Ayurveda for memory enhancement.


### Ashwagandha and Weight Management?

- RDBPCT 52 subjects chronic stress given 300 mg ashwagandha extract (KSM-66) or placebo BID for 8 weeks.
- Ashwagandha group had significant improvements in primary and secondary measures (weight loss, food cravings, stress levels), no adverse effects.
- “Ashwagandha root extract might help body weight management in adults under chronic stress.”


### Ashwagandha Joint Pain

- Animal models demonstrate ashwagandha has analgesic, anti-inflammatory and chondroprotective effects.
- 60 patients knee pain randomized to ashwagandha extract (Sensoril: 250 mg or 125 mg) or placebo twice daily x 12 weeks.
- At 12 weeks, significant reduction in WOMAC and knee swelling index in 250 mg BID group (p<0.001) and 125 mg BID group (p<0.05).
- Pain significantly reduced in both groups (p<0.01). Group taking 250 mg BID showed earliest efficacy at 4 weeks. Well tolerated.

Ashwagandha in MCI

- Prospective RDBPCT: 50 adults MCI
- 300 mg BID ashwagandha extract or placebo for 8 weeks
- Ashwagandha: significant improvement in both immediate and general memory (Wechsler Memory Scale III) and significantly greater improvement in executive function, sustained attention, and information-processing speed compared to placebo (p=0.006)
- Potential effect on thyroid hormones


Turmeric (Curcuma longa)

- Family: Zingiberaceae (ginger family)
- More than 130 species worldwide
- Part Used: Rhizome
- Perennial plant grown in tropical areas, most grown in India, they consume 80% of crop. Used in meat, fish and vegetable curries.
- Long history of medicinal use ~4,000 years.
- In ancient Ayurvedic literature, called Jayanti, meaning “one who is victorious over disease.”


Turmeric + Boswellia (Boswellia serrata)

- 12 week randomized, double-blind, placebo controlled study in 201 people with osteoarthritis (40-70 years of age) found that 350 mg curcuminoids + 150 mg boswellic acid taken three times daily led to statistically significant effect on physical performance tests and WOMAC joint pain index compared to placebo. Well tolerated, no significant adverse events.


Tuft’s Review 11 RCTs: Turmeric and Boswellia and Osteoarthritis

- Curcumin and boswellia significantly more effective than placebo for pain relief/functional improvement.
- No significant differences between curcumin, boswellia and placebo in safety outcomes.
- Curcuminoids similar efficacy to NSAIDs; significantly less likely to experience gastrointestinal adverse events.
- “Curcumin and boswellia formulations could be valuable addition to knee OA treatment regimens by relieving symptoms while reducing safety risks.”

Turmeric: Cardiovascular

- Meta-analysis 20 studies found a significant decrease in serum triglycerides and elevation of HDL-C.
- A 12 week randomized, placebo controlled trial in 118 people with type-2 diabetes found that 1000 mg curcumin + 10 mg piperine/d led to significant reduction in serum total cholesterol, non-HDL-C and lipoprotein (a).


Turmeric Mouthwash

- Clinical study 60 patients over 21 days found both 0.2% chlorhexidine and 0.1% turmeric mouthwash could be effectively used as adjunct to mechanical plaque control in prevention of plaque and gingivitis.
- Both mouthwashes had comparable anti-plaque, anti-inflammatory and anti-microbial properties.


Turmeric for Depression?

- Meta-analysis 6 studies: curcumin reduced depression symptoms, particularly in middle-aged patients when given at higher doses for longer periods of time.
- Authors concluded, “there is supporting evidence that curcumin administration reduces depressive symptoms in patients with major depression.”
- Is this an impact on microbiome? Is it due to systemic reduction in inflammation?


Absorption and Bioavailability

- <1% curcumin reaches peripheral blood after oral ingestion even at high doses (12 grams). Only organ exposed to high concentration is gastrointestinal tract.
- To enhance absorption: piperine from black pepper or use lipid bound (Meriva) product.
- Piperine, alkaloid of black pepper increases bioavailability curcumin 2000%. Do NOT exceed 20 mg/d piperine to avoid drug interactions.

Aloe Vera Gel

- **Antiseptic/anti-inflammatory gingivitis and periodontitis**
- **Mouth rinses:** reduction in gingivitis and plaque accumulation after use
- **Anti-viral:** herpes simplex
- **Reduce oral ulcer pain**
- **Inhibits oral candida**


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Elder berry
*Sambucus nigra*

- **Long history across many disparate cultures as a treatment for respiratory infections.**
- **Numerous compounds thought active for antiviral and immune priming effects.**
- **Possesses antimicrobial activity against Gram-positive bacteria *Streptococcus pyogenes* and group C and G Streptococci, and the Gram-negative bacterium *Branhamella catarrhalis.***


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Aloe vera

- **Cochrane review:** found statistically significant evidence of benefit for aloe preventing or reducing severity of mucositis in patients undergoing cancer treatment.
- **Aloe gel improved oral lichen planus in 22/27 patients compared to 1/27 in placebo group.**


• Safety good for cooked fruit and elder flowers.
• Cost good for elderberry extracts in marketplace. Given complexity of the antiviral activity, resistance is unlikely to occur.
• Take elderberry extracts as instructed on label every 4 hours at first sign of infection.


• 473 patients with flu symptoms less than 48 hours randomized to 240 mg echinacea herb/root extract + elderberry fruit (Vogel Bioforce) or tamiflu.
• No difference between recovery rates, antibiotic use, intermediate doctor visits, use of over-the-counter medications for symptoms, “ability to return to normal daily activities,” or physician- and patient-reported efficacy of the treatments.
• Safety very positive.

Challenges for Clinicians

- Concerns over **QUALITY** of supplements, particularly botanicals.
- Concerns over potential **supplement-drug interactions**.
- Unclear where to go for **unbiased and relevant** information.
- Marketplace is just so big, so **MANY products**. Labels hard to interpret.
- Not adequately trained to confidently counsel patients about their use, which increases risk for supplement drug interactions, failure to detect/anticipate adverse effects, and being unable to appropriately recommend supplements that would be beneficial.

**Quality**

- **Domestically produced products** generally better quality than those imported from China or India, though, this is improving.
- **3rd party testing** (e.g., USP, NSF, CL, NNFA) good quality indicator.
- Be cautious and skeptical for products in weight loss, sexual enhancing or bodybuilding categories. Adulteration still occurs.
- **Consumer Labs** can be a useful website for assessing quality.

https://www.quality-supplements.org/verified-products
https://www.consumerlab.com/results/brands_vitamins_supplements_list.asp#M

https://www.quality-supplements.org/verified-products

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Herb-Drug Interactions

- Safety concerns: potential for dietary supplements to interact with the absorption, transport, and/or metabolism of pharmaceutical drugs.
- While preclinical data suggests many herbs may interact with drugs, clinical studies of most botanicals predicted to interact with drugs have shown no clinically significant effects.
- More crucial drug for medical purposes and/or more narrow the therapeutic window – more closely need to watch for interactions.
- Pharmacists can be great allies for monitoring potential interactions.
- There are numerous drug-supplement checkers on the Internet.

Sprouse AA, van Breemen RB. Drug Metab Dispos 2016;44:162-171

You can go deeper into interactions


The Use of Essential Oils

Aromatherapy

- Resin and woods burned for their scent since ancient times. Fragrant herbs, gums and resins soaked in animal fat to extract scent and medicine. Incense often used in ceremony and ritual.
- The Latin *per* and *fume* means “through smoke.”
- Pleasant aromas were associated with good and holy, malodorous aromas associated with bad and evil. Stench equaled disease.

Essential Oils

- Essential oil is an aromatic substance originating from a plant: seeds, bark, stems, roots, flowers, etc. When you smell sage or lavender, you are perceiving the scent of the essential oil.
- They are highly concentrated and safety must be considered.

Smell: It’s Personal

- People perceive odors differently.
  - Study in UK in 1960s found wintergreen was least preferred aroma.
  - In US in 1970s, researchers found wintergreen most preferred aroma.
  - Participants in UK associated wintergreen with analgesics used extensively during the war.
  - Participants in US associated it with candy and freshness.

“It is clear that the sense of smell is more than a primitive phenomenon with little to tell us about higher brain function. *There is a richness of meaning in olfaction that links us to the primitive and to the complexities of human behavior.*”

_Science of Olfaction_, by Anholt
Definitions

- Essential oil: aromatic substance originating from a plant.
- Generally extracted with steam distillation, but also hexane, ether, etc.
- Soluble in alcohol, fatty oils, milk and honey (these are most common).
- Those too delicate to distill usually made into “absolute” with CO2 or solvent (e.g. rose).
- Hydrosol: liquid portion of the distillate of an herbal steam distillation. Other names include floral water, herbal water, herbal distillate. Often cloudy because it contains both water soluble compounds and a very small amount of essential oil droplets. Widely used in cosmetics, cooking, baking and medicine.

Plant Parts Commonly Used

- Leaves: sage, eucalyptus, balm, rosemary, geranium, oregano
- Flowers: rose, jasmine, chamomile, ylang ylang, lavender
- Peels: lemon, orange, grapefruit
- Berries: juniper
- Wood: sandalwood, cedar, fir
- Roots/rhizomes: valerian, ginger, vetiver
- Bark: cinnamon
- Resin: myrrh, frankincense

Some Safety Reminders

External use of properly diluted essential oils is the safest way to use essential oils. There are only a few exceptions for internal use that I will discuss in this section. Always:

- Dilute essential oils in carrier oil for topical use.
- Beware of photosensitizing effects of citrus oils (e.g., lime, lemon, and bitter orange).
- Keep out of reach of children; keep away from eyes.
Essential Oil Use

- Soluble in alcohol, fatty oils, milk and honey (these are most common).
- Face and baby products – generally 0.5%
- Body creams/lotions/oils – generally 1-2%
- Rinse off products (shower gels, soaps) – generally 2-3%

Aromatherapy Steams

- Eucalyptus: classic anti-viral that soothes the respiratory system and clears nasal passages.
- Oregano: anti-viral, antioxidant oil helps knock out low-grade sinus infections.
- Peppermint: one of the best if stuffy nose is giving you a headache.
- Rosemary: a powerful antiseptic, antiviral and decongestant.

Put 3-6 drops in pan of water for steam. Do not put face closer than 12 inches to avoid burning the skin.

Spritzer

- 2 ounces water
- 2 ounces vodka
- Add 2.5 ml (48-50 drops) essential oil

- In 4-ounce glass bottle, mix all ingredients and shake well. Attach mister top and label. Shake well before each use. Do not spray in eyes!
- Use any essential oil(s): clary sage for hot flashes, citrus for uplifting, eucalyptus cold and flu season, lavender for sleep, rosemary for clarity, etc.

Essential Oil Inhalation For Sleep

- Systematic review 11 randomized controlled trials found majority of studies showed a positive effect of essential oils on sleep.
- Lavender most frequently studied essential oil. No adverse events reported.
- Inhalation of essential oils can be used for those with mild sleep disorders.

Herbal Bath

- Balneotherapy great for relaxation, easing muscle tension, improving skin problems.
- Fill bathtub with 6-8 inches water and then add any of following:
  - 1 cup epsoms or dead sea salt
  - 10-15 drops herbal oil infused with essential oil

Essential Oil Ointments

- Vicks contains eucalyptus, cedar wood, camphor, and menthol, widely used for common cold and headache.
- Tiger-Balm contains peppermint, eucalyptus, clove and cinnamon oils, menthol and camphor, used for common cold, headache, rheumatic and muscular pains.

<table>
<thead>
<tr>
<th>Essential Oil</th>
<th>Potential Use in Dentistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lavender</td>
<td>As an anxiolytic in dental office</td>
</tr>
<tr>
<td></td>
<td>Reduces pain of needle insertion, herpes</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>Anticariogenic agent</td>
</tr>
<tr>
<td>Peppermint</td>
<td>Antimicrobial activity, halitosis</td>
</tr>
<tr>
<td>Cinnamon</td>
<td>In treating oral candidiasis</td>
</tr>
<tr>
<td>Lemon</td>
<td>In treating candidiasis</td>
</tr>
<tr>
<td>Clove</td>
<td>Antimicrobial against oral pathogens, toothache</td>
</tr>
<tr>
<td>Myrrh</td>
<td>Gingivitis, aphthous ulcers, periodontal disease</td>
</tr>
<tr>
<td>Tea Tree</td>
<td>Oral candidiasis, aphthous ulcers</td>
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<td></td>
<td>Prophylactic oral hygiene products</td>
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Inhaled Peppermint EO: Nausea

- 123 participants post cardiac surgery enrolled in study, 34 experienced nausea and received peppermint inhaler.
- On scale of 0-5, 5 greatest nausea, average nausea rating before peppermint was 3.29 and after using inhaler once, or 2 minutes later, was 1.44. 19/34 nausea free.
- 5 patients needed 2nd inhalation. 4/5 nausea free. One patient required IV antiemetic.
- Becoming system wide practice as first line intervention.
**Peppermint: Headache**

- Topical treatment with peppermint essential oil shown significantly more effective than placebo in controlled studies.
- Efficacy comparable to aspirin or acetaminophen. Peppermint oil in ethanol licensed for treatment of tension-type headache in adults and children above 6 years in Germany.

**Peppermint Leaf Essential Oil IBS**

- Meta-analysis RCTs: soluble fiber, antispasmodic drugs, peppermint oil, and gut-brain neuromodulators for IBS. Most of low risk of bias.
- Peppermint oil ranked first for efficacy when global symptoms were used as the outcome measure, and tricyclic antidepressants were ranked first for efficacy when abdominal pain was used as the outcome measure.
- Dose 0.2 ml taken 2-3 times daily.

**Oral Lavender EO (Lavendula angustifolia)**

- Meta-analysis randomized, double-blind, placebo-controlled trials show Silexan, essential oil from lavender licensed in 14 countries worldwide, has pronounced anxiolytic effect and beneficial effect on sleep. Adverse events similar to placebo.


Top Resources

• Natural Medicines Comprehensive Database. *Highly recommend.* (naturalmedicinesdatabase.com)

• American Herbal Products Association's Botanical Safety Handbook. Provides safety information >500 species of herbs, derived from data compiled from clinical trials, pharmacological and toxicological studies, medical case reports, and historical texts.


CE code for this course: T111