



HerbClip™

Mariann Garner-Wizard
Heather S Oliff, PhD

Shari Henson
Marissa Oppel-Sutter, MS

Brenda Milot, ELS
Silvia Giovannelli Ris

Executive Editor – Mark Blumenthal

Managing Editor – Lori Glenn

Consulting Editors – Dennis Awang, PhD, Francis Brinker, ND, Steven Foster

Production – Tamarind Reaves, George Solis

**File: ■ Essential Oils
■ Antimicrobial Properties
■ Medicinal Plants**

HC 070592-388

Date: November 13, 2009

RE: Review of Medicinal and Aromatic Plants with Antimicrobial Properties

Reichling J, Schnitzler P, Suschke U, Saller R. Essential oils of aromatic plants with antibacterial, antifungal, antiviral, and cytotoxic properties—an overview. *Forsch Komplementmed.* 2009;16:79-90.

Drug resistant bacteria, fungi, and viruses have evolved due to overuse of antimicrobial agents. More effective agents with novel mechanisms of action are needed. Medicinal plants and their extracts have been screened for antimicrobial activity. The results of studies published in the past 10 years are the focus of this article.

Medicinal plants with antibacterial and antifungal essential oils

Helicobacter pylori cause acute and chronic gastritis, peptic ulcer, and adenocarcinoma of the distal stomach. Twenty-four different plant extracts and isolated plant substances (e.g. alkaloids, flavonoids, and polysaccharides) have been shown to be effective against *H. pylori*. Carrot (*Daucus carota*) seed oil was the most active against *H. pylori*.

Mycoplasma pneumoniae causes atypical courses of pneumonia. In vitro studies demonstrate that *M. pneumoniae* and other *Mycoplasma* species are very susceptible to tea tree (*Melaleuca alternifolia*) oil. Tea tree oil is also effective against *Staphylococcus aureus*, which causes skin infections. *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Streptococcus pyogenes* cause the common cold and respiratory tract infections. *S. pneumoniae*, *H. influenzae*, and *M. catarrhalis* were susceptible in vitro to lemon balm (*Melissa officinalis*) oil, thyme (*Thymus vulgaris*) oil, cinnamon bark (*Cinnamomum verum*) oil, and West India lemongrass (*Cymbopogon citratus*) oil. The oils of peppermint (*Mentha x piperita*) and eucalyptus (*Eucalyptus globulus*) are frequently used for the treatment of colds but had lower activity. In the gaseous phase (as used for inhalation therapy), concentrations of the most active oils were sufficient to inhibit bacterial growth, which supports the efficacy of inhalation therapy. It is unknown how the microbes and the essential oils interact to produce antimicrobial effects.

Essential oils with antiviral properties

Thirty different essential oils have in vitro antiviral activity against enveloped DNA viruses (herpes simplex virus type 1 and type 2) and enveloped RNA viruses (dengue virus type 2, Junin virus, and influenza virus). Non-enveloped viruses (adenovirus type 3, poliovirus, and coxsackievirus B1) were not affected by the essential oils. Essential oils may interfere with the virus envelope or may mask the viral components that are necessary for absorption or entry into host cells.

Only one clinical trial was discussed in the report. A randomized, placebo-controlled, investigator-blinded study evaluated the efficacy of tea tree essential oil (6% gel) in the treatment of recurrent herpes labialis. The median time to re-epithelization after treatment with tea tree oil was 9 days compared with 12.5 days after placebo. The authors state that tea tree oil might be a potentially useful, cheaper alternative for other topical therapies and tea tree oil poses little risk of inducing antiviral resistance.

Use of essential oils to treat infections is limited by (1) the concentration that can be obtained at the site of infection, (2) resorption and transport of the active constituents, and (3) the maximum dose that can be administered without toxic side effects. Studies show that some essential oils can cause a cytotoxic effect to the tissues at concentrations that do not produce an antimicrobial effect. Adverse effects associated with essential oils include local irritation on the skin and mucous membranes and allergic reactions such as contact dermatitis. Ingestion of a few milliliters of essential oils may cause severe symptoms of intoxication such as vomiting, respiratory failure, and death. The authors state that the undiluted oils or preparations with high concentrations of essential oils should not be applied to mucous membranes or damaged skin; for inhalation, the oils should be dosed in a way that they are barely detectable by odor. It should be noted that essential oils are typically used at concentrations lower than the concentration required to kill microbes.

—*Heather S. Oliff, PhD*

The American Botanical Council has chosen not to reprint the original article.

The American Botanical Council provides this review as an educational service. By providing this service, ABC does not warrant that the data is accurate and correct, nor does distribution of the article constitute any endorsement of the information contained or of the views of the authors.

ABC does not authorize the copying or use of the original articles. Reproduction of the reviews is allowed on a limited basis for students, colleagues, employees and/or members. Other uses and distribution require prior approval from ABC.