



AROMA THERAPY: ROLE OF ESSENTIAL OILS IN RESPIRATORY DISEASES: A REVIEW

[Kanchan B Jangid¹](#), [G Parthasarathy²](#), [Saji Jose³](#), [Jayasekhar P⁴](#)

¹Pharm D (Doctor of Pharmacy), Innovator and Pharmacology Specialist at BIBO (Hilt Brands India Pvt Ltd)

²HOD of Pharmacy Practice, The Oxford College of Pharmacy, Bangalore, Karnataka, India

³Proprietor at Advanced Herbal Remedies Research Laboratories, Director at Eubelle Global Ltd UK

⁴Former Professor & Chair of Pharmacy, National University of Science and Technology, Muscat, Sultanate of Oman

Corresponding Author: kanchan@bibo.health

<https://doi.org/10.46607/iamj16p6052022>

(Published Online: July 2022)

Open Access

© International Ayurvedic Medical Journal, India 2022

Article Received: 16/07/2022 - Peer Reviewed: 23/07/2022 - Accepted for Publication: 05/08/2022



ABSTRACT

Using petroleum jelly-based ointments for nasal congestion may lead to lipid pneumonia. Also, antibiotics and multidrug resistance have led to the continuous need to discover new drug moieties and alternative treatments against infection-causing bacteria. Essential oils (EOs) are being used in various health care fields for their known antimicrobial, anti-inflammatory, analgesic, and other uses. Due to the growing population and pollution, respiratory tract infections are increasing tremendously. Essential oils due to their volatile nature can easily reach the upper and lower respiratory tract by inhalation. Due to their antimicrobial and anti-inflammatory actions, they may provide relief from the common cold, cough, and inflammatory conditions like sinusitis, asthma, bronchitis, COPD, pneumonia, and others.

Key words: Respiratory health, Essential oils, Aromatherapy, Eucalyptus oil, Eucalyptus globulus, Cinnamomum camphora, Camphor, Thymus vulgaris, Thymol, Pinus sylvestris, Pine oil, Mentha piperita, Menthol.

INTRODUCTION

Upper respiratory tract infections (URTIs) are common these days. Among all the URTIs, the common cold and cough are the most common. People use ointments and inhalers to relieve the common cold symptoms, especially nasal congestion. Some petroleum jelly-based ointments are very famous to manage nasal and chest congestion. But there are numerous cases of lipoid pneumonia associated with the use of petroleum jelly-based ointments [1-5]. Kilaru et al. reported a case of a young woman 21 years old with exogenous lipoid pneumonia from chronic, extra nasal use of petroleum-based jelly (Vicks VapoRub in this case report) for nasal decongestion [1]. Ojeda et al. presented a case of exogenous lipoid pneumonia in an 85-year-old woman due to the continuous use of ointment containing petroleum jelly such as Vicks VapoRub for alleviating the symptoms of chronic rhinitis [2]. Due to increasing antibiotic resistance and growing multidrug resistance bacteria, there comes a need for discovering other drug moieties or plant extracts that show antimicrobial action. Various studies show the antimicrobial effects of essential oils derived from different plant species. Essential oils contain a mixture of volatile compounds that may have various pharmacological properties. The essential oils of some plant extracts are suitable for inhalation and help to relieve symptoms associated with the upper and lower respiratory tract. The upper respiratory tract consists of the nose, the nasal cavity, mouth, sinuses, pharynx, and larynx, while the lower respiratory tract comprises of trachea, bronchi, bronchioles, and lungs. Essential oils may show antimicrobial, anti-inflammatory, and analgesic activities [6-7]. Aromatherapy (where aroma means fragrance) is well-known therapy for hundreds of decades. It is known as a treatment itself in various disease conditions and complications [7-9].

1. Essential Oils for Respiratory Health

1.1. Eucalyptus oil

Eucalyptus globulus belongs to the *Myrtaceae* family. It originated from two words "Eu" meaning "true" and "calyptus" meaning "to cover" [10]. It is extracted by steam distillation and rectification from fresh

leaves of various species of Eucalyptus. This oil is colorless or pale-yellow liquid with an aromatic odour. Eucalyptus oil is primarily used in the treatment of upper respiratory tract infections such as cold, cough, bronchitis, and symptomatic relief from catarrh [6]. Different parts of the plant contain Eucalyptus oil, such as the leaves, fruits, buds, and bark of the plant. It shows analgesic, antiseptic, antibacterial, antiviral, antioxidant, nasal decongestant, anti-inflammatory, and anticancer properties. For this reason, it is used in the treatment of respiratory diseases such as common colds, nasal and sinus



congestion, influenza, bronchitis, asthma, COPD, and other inflammatory conditions. It helps reduce sinus pain and pressure due to its pain-reducing properties [10-12]. The medicinal importance of Eucalyptus largely depends on eucalyptol (1,8-cineole or cineole). It constitutes more than 70% of the total oil. Other major constituents include limonene and α -terpineol. Other phytochemicals present in Eucalyptus are macrocarpals, eucalyptin, flavonoids, alkaloids, tannins, oleanolic acid, etc [10-11]. Due to its antiseptic and antibacterial properties, it has been used traditionally for the treatment of respiratory tract infections including cold, flu, sore throat, bronchitis, and pneumonia. Various studies show the moderate antibacterial activity of Eucalyptus oil against gram-positive and gram-negative bacteria. It is believed that the antimicrobial activity is due to the presence of eucalyptol. Various studies support the antimicrobial activity of Eucalyptus making it a natural preservative. It can be used as an alternative antibacterial agent in Ayurveda for the treatment of various infections [12]. Various preclinical and clinical studies have revealed the potential use of Eucalypts in the treatment and management of respiratory diseases, pain, oral health,

infectious diseases, cancers, etc [11-12]. Juergens et al. suggested that eucalyptol is a strong inhibitor of inflammatory mediators such as cytokines. This may indicate the use of eucalyptol for long-term treatment of the inflammation of airways in asthma, bronchitis, and other steroid-sensitive disorders [13]. Another double-blind, placebo-controlled study revealed the anti-inflammatory activity and efficacy of eucalyptol in patients with severe asthma and suggestive use of it as a mucolytic agent in both upper and lower respiratory tract diseases [14].

1.2. Thymol

Thymus vulgaris or thyme is known as “garden thyme” and belongs to the family *Lamiaceae*. In



Greek, the word thyme means “to fumigate” [15]. Thyme oil is obtained from the fresh flowering aerial parts of *Thymus vulgaris* or other species of *Thy-*

mus. It is extracted by steam distillation. The major phytochemicals present in thyme oil are phenols, mainly thymol & carvacrol, and terpenoids. It is a clear, yellow, or dark reddish-brown liquid with a characteristic aroma [16]. Thyme has been used for centuries due to its various pharmacological properties. It shows antioxidant, anti-inflammatory, analgesic, expectorant, free radical scavenging, antibacterial, antiviral, antifungal, antiseptic, antitumor, antispasmodic, and carminative properties, along with a few more important activities. The significant phytochemicals present are terpenoids, flavonoids, phenolic acids, and glycosides [15]. Due to its anti-inflammatory properties, Thymol is used for managing respiratory conditions such as whooping cough, bronchitis, asthma, sinusitis, and catarrh. It is recommended for bacterial and fungal infections. In the ancient Roman era, Thyme was consumed before and after meals due to its properties as an antidote (treatment for poisoning). It was a pre-

ferred herb for bathing due to its antidote property. Various studies show that the antidote property of this herb is due to the presence of the phytochemicals such as thymol and carvacrol [16]. Various phytochemical analysis studies reveal the presence of carvacrol and γ -terpinene which shows anti-inflammatory and antiviral properties. These properties make it an important herb in managing conditions like cold, sore throat, bronchitis, asthma, whooping cough, pharyngitis, and other respiratory tract infections [15-16].

1.3. Pine oil

Pinus sylvestris (Pine) belongs to the family *Lamiaceae*. The essential oils are derived from the needles of the pine tree. The medicinal properties of pine oil

include analgesic, anti-allergic, antibacterial, anti-inflammatory, anti-fungal,



and antimicrobial. They help in opening the airways and also show expectorant actions. The major constituents present in pine oil are α -pinene, β -pinene, and camphene. Various studies confirm the presence of more than 40 constituents in pine oil, of which more than 8 have clinical importance. Other constituents present in pine oil include α and β -pinene, camphene, sabinene, α -terpineol, limonene, and a few more [17-19].

1.4. Camphor

Cinnamomum camphora, also known as camphor tree,

belongs to the family *Lauraceae*.

Due to its various me-



dicinal properties, camphor is one of the ingredients in many formulations such as creams, balms, and oils. Camphor has medicinal benefits. It shows analgesic, anti-inflammatory, anti-infective, antiseptic, antispasmodic, expectorant, and nasal decongestant properties. These properties make it ideal for use in conditions like cold and fever and reduce inflammation in conditions like asthma, bronchitis, sinusitis, infectious diseases, etc. The topical application of camphor can be used as a counterirritant and antiseptic. There are several chemical varieties of camphor, each with different essential oil composition. *Cinnamomum camphora* contains camphor as the main component. Other components of camphor include cineol, linalool, eugenol, limonene, camphene, safrole, and a few more [20-22].

1.5. Menthol

Mentha piperita (peppermint or mint) belongs to the



family *Lamiaceae*, which is one of the most aromatic plant species. Phytochemicals derived from the mint family show anticancer properties against differ-

ent cancers such as cervix, lung, breast, and much more in humans. The species of *Mentha* are rich in polyphenols and contain caffeic acid and its derivatives like caftaric acid, cinnamic acid, ferulic acid, and oleanolic acid. Flavonoids like luteolin and its derivatives apigenin, acacetin, thymonin, diosmin, and salvigenin are present in these plants. Of all the phytochemicals present, the essential oils of these species play an important role [23]. Several studies have shown the cooling effect of menthol, which can alleviate dyspnea. It also reduces physical and mental breathing effort, breathing discomfort, anxiety, and fear during inspiratory resistive loaded breathing [24-25]. A study on *M. piperita L.* leaf extracts revealed

strong antibacterial action against Gram-positive bacteria like *Staphylococcus aureus* and *Bacillus subtilis* than Gram-negative *Escherichia coli* [26]. *M. piperita* shows other pharmacologically essential activities such as antifungal, antiviral, anticancer, anti-inflammatory, and anti-allergic. Peppermint leaves act as a remedy for the common cold and inflammation of the mouth and respiratory tract [23]. Various in vitro studies show smooth muscle relaxant properties of peppermint oil. These species contain high levels of antioxidants, including phenolic compounds, ascorbic acid, and carotenoids. The phenolic compounds show free radical scavenging properties [23,26].

CONCLUSION

The essential oils mentioned in this article are clinically proven to have antibacterial, antiviral, antifungal, anti-inflammatory, analgesic, nasal decongestant, and anti-allergic properties. Using these essential oils can be used as an alternative or supportive therapy to manage both upper and lower respiratory tract diseases. Essential oils can also be an alternate to antibiotics and petroleum jelly-based ointments, as they are comparatively safer. Using a blend of essential oils may provide a synergistic effect to manage respiratory conditions. These essential oils are also ideal to use in steam inhalers, diffusers, handkerchiefs, and as a booster dose for vapor patches for inhalation.

REFERENCES

1. Kilaru H, Prasad S, Radha S, Nallagonda R, Kilaru SC, Nandury EC. Nasal application of petrolatum ointment - A silent cause of exogenous lipoid pneumonia: Successfully treated with prednisolone. *Respir Med Case Rep* 2017;22:98-100.
2. Cherrez Ojeda I, Calderon JC, Guevara J, Cabrera D, Calero E, Cherrez A. Exogenous lipid pneumonia related to long-term use of Vicks VapoRub® by an adult patient: a case report. *BMC Ear Nose Throat Disord* 2016;16:11.
3. Onyenekwu CP, Sheinin Y. Exogenous Lipoid Pneumonia Presenting as an Enlarging Lung Nodule in a Patient with a Long-standing Usage of Petroleum Jelly. *Am J Clin Pathol* 2020;154(1):39.
4. Hadda V, Khilnani GC, Bhalla AS, Mathur S. Lipoid pneumonia presenting as non-resolving community-acquired pneumonia: a case report. *Cases J* 2009; 2:9332.

5. Bell MM. Lipoid pneumonia: An unusual and preventable illness in elderly patients. *Can Fam Physician* 2015;61(9):775-7.
6. Horváth G, Ács K. Essential oils in the treatment of respiratory tract diseases highlighting their role in bacterial infections and their anti-inflammatory action: a review. *Flavour Fragr J* 2015;30(5):331-341.
7. Ali B, Al-Wabel A, Shams S, Ahamad A, Khan AS, Anwar F. Essential oils used in aromatherapy: A systematic review. *Asian Pac J Trop Biomed* 2015;5(8):601-11.
8. Farrar AJ, Farrar FC. Clinical Aromatherapy. *Nurs Clin North Am* 2020;55(4):489-504.
9. Ben-Arye E, Dudai N, Eini A, Torem M, Schiff E, Rakover Y. Treatment of upper respiratory tract infections in primary care: a randomized study using aromatic herbs. *Evid Based Complement Alternat Med* 2011; 2011:690346.
10. Silva J, Abebe W, Sousa SM, Duarte VG, Machado MI, Matos FJ. Analgesic and anti-inflammatory effects of essential oils of Eucalyptus. *J Ethnopharmacol* 2003;89(2-3):277-83.
11. Qabaha K, Ras SA, Abbadi J, Al-Rimawi F. Anti-Inflammatory Activity of Eucalyptus Spp. And Pistacia Lentiscus Leaf Extracts. *Afr J Tradit Complement Altern Med* 2016;13(5):1-6.
12. Bachir RG, Benali M. Antibacterial activity of the essential oils from the leaves of Eucalyptus globulus against Escherichia coli and Staphylococcus aureus. *Asian Pac J Trop Biomed* 2012;2(9):739-42.
13. Juergens UR, Engelen T, Racké K, Stöber M, Gillissen A, Vetter H. Inhibitory activity of 1,8-cineol (eucalyptol) on cytokine production in cultured human lymphocytes and monocytes. *Pulm Pharmacol Ther* 2004;17(5):281-7.
14. Fischer J, Dethlefsen U. Efficacy of cineole in patients suffering from acute bronchitis: a placebo-controlled double-blind trial. *Cough* 2013;9(1):25.
15. Patil SM, Ramu R, Shirahatti PS, Shivamallu C, Amachawadi RG. A systematic review on ethnopharmacology, phytochemistry, and pharmacological aspects of Thymus vulgaris Linn. *Heliyon* 2021;7(5): e07054.
16. Nagoor Meeran MF, Javed H, Al Tae H, Azimullah S, Ojha SK. Pharmacological Properties and Molecular Mechanisms of Thymol: Prospects for Its Therapeutic Potential and Pharmaceutical Development. *Front Pharmacol* 2017; 8:380.
17. Salehi B, Upadhyay S, Erdogan Orhan I, Kumar Jugran A, L D Jayaweera S, A Dias D, et al. Therapeutic Potential of α - and β -Pinene: A Miracle Gift of Nature. *Biomolecules* 2019;9(11):738.
18. Kim DS, Lee HJ, Jeon YD, Han YH, Kee JY, Kim HJ, et al. Alpha-Pinene Exhibits Anti-Inflammatory Activity Through the Suppression of MAPKs and the NF- κ B Pathway in Mouse Peritoneal Macrophages. *Am J Chin Med* 2015;43(4):731-42.
19. Nam SY, Chung CK, Seo JH, Rah SY, Kim HM, Jeong HJ. The therapeutic efficacy of α -pinene in an experimental mouse model of allergic rhinitis. *Int Immunopharmacol* 2014;23(1):273-82.
20. Hamidpour R, Hamidpour S, Hamidpour M, Shahlari M. Camphor (Cinnamomum camphora), a traditional remedy with a history of treating several diseases. *Int J Case Rep Imag* 2013;4(2):86-9.
21. Alam K, Nawab M, Kazmi HM. Pharmacological and Therapeutic profile of Kafur (Cinnamomum camphora (L.) J. Presl)- A Review. *Hippocratic J Unani Med* 2019;14(3):1-16.
22. Lee SH, Kim DS, Park SH, Park H. Phytochemistry and Applications of Cinnamomum camphora Essential Oils. *Molecules* 2022;27(9):2695.
23. Tafrihi M, Imran M, Tufail T, Gondal TA, Caruso G, Sharma S, et al. The Wonderful Activities of the Genus Mentha: Not Only Antioxidant Properties. *Molecules* 2021;26(4):1118.
24. Prieur G, Beaumont M, Delorme M, Combret Y, Medrinal C, Hilfiker R, et al. Short-term effects of menthol on walking dyspnoea in patients with COPD: a randomised, single-blinded, cross-over study. *ERJ Open Res* 2021;7(4):00450-2021.
25. Kanezaki M, Terada K, Ebihara S. Effect of Olfactory Stimulation by L-Menthol on Laboratory-Induced Dyspnea in COPD. *Chest* 2020;157(6):1455-65.
26. Singh R, Shushni MA, Belkheir A. Antibacterial and antioxidant activities of Mentha piperita L. *Arab J Chem* 2015;8(3):322-8.

Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Kanchan B Jangid et al: *Aroma Therapy: Role of Essential Oils in Respiratory Diseases: A Review.. International Ayurvedic Medical Journal* {online} 2022 {cited July 2022} Available from: http://www.iamj.in/posts/images/upload/3627_3631.pdf