



Is Essential Oils Considers New Paradigm's Shift as Treatment Goal for Covid-19: Review Based Approach Study

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Abstract

The Essential oils considered as promising veridical activity against various pathogenic viruses. By analyses we found out that essential oil constituent having any counter effect or interact with specific proteins present in COVID-19. The method to determine give in literature view by using databases resources such as, Semantic scholar, Google scholar, Science direct and PubMed. Result: In literature survey it is found out that aromatic plants containing essential oils having veridical activity against various viruses which include Herpes virus-2, Enterovirus 71, HIV, Adeno virus. From literature reviews its reveal that aromatic plant and essential oil having high antiviral activity for many viruses. It is found that some essential oils having some isolated compound which have inhibitory effect on COVID 19. According to analysis done by, its found out that 171 constituent of essential oil influencing SARS-COV-2 proteins and found potential inhibitor of viruses.

Key Words: Essential Oil Constituents, SARS-CoV-2, Aromatic Plants, Essential Oil, Veridical Activity

Introduction

COVID-19, was a virus which outbreak in Wuhan, a china city. A pandemic, which is declared by WHO on January 11, 2020. This virus had a great impact on whole world, due to which whole world are in deadly condition. (Yue, et al. 2020)

It's rapidly spread and now become pandemic that result into deadly condition. From then to now world is now busy in to find effective remedy against this virus, but up to till now no effective medicine are available. Everyone in race to make effective medicine. In literature survey, traditional medicine considered as useful in treatment of COVID-19. Medicinal plants have isolated compounds which

have antiviral activity and having potential pharmacological component against which are useful in treatment against virus. According to WHO survey, most Asian and African population using medicinal plants as traditional medicine for treatment of primary health related issue problems. Because of it having low side effects, less expensive, being safe and having effective therapy as it compared to modern medicine.

Corona viruses named as corona because they have spiked surface protein, which makes viruses appearance like crown. Corona virus is single stranded RNA, and they are enveloped viruses. Bats are major cases of corona viruses, act as primary

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mediator then pass through intermediate before entering human body.

The analysis of coronavirus done which shows that, they complete their cycle in cytoplasm. This virus is quite different in reference to SARS and MERS.

Symptoms of Covid-19 affects different people in different ways. Most infected people mild to moderate symptoms. Common symptoms are fever, dry cough, Tiredness, Aches and pains, runny nose, Worst conditions include breathing difficulties, pneumonia, chest pain and kidney failure.

Normally on 5-6 days its show symptoms but sometimes its show symptoms upto 14 days. (Jung, et al. 2020)

Effective Essential oil Constituent and their Antiviral Activity

As we already know that corona viruses are emerging disease and not any promising medication found out yet to cure this disease. as nowadays about 171 licensed antiviral medication are available but lack of their competency because of viral resistance, latency and frequent other serious concerns and problems. (Davies & Macnaughton 1979)

EOs used in aromatherapy and phyto-medicine can be preferable because of their evident and promising role as antiviral, antifungal and antioxidant effects (Masters, 2006). Aromatic plants are boiled to inhaled and used in treatment of cough, flu and to cold. Aroma therapy provides decongestant, psychological benefits and disinfectant. Research and investigation are done on leads and bioactive molecules to found out that their antiviral which shows promising effects on recent viruses. In literature, it was found out that about 70% medications are plants, and their origin are from natural products. 30% to 40% medicine acts as antiviral, antifungal and antibacterial (Chang 2005). Nowadays, pharmaceutical industries show major concern on targeting natural herbs and medicinal plants to found out leads compounds and bioactive molecules. Aromatic herbs and medicinal plants have secondary metabolites and chemical compounds EOs which have effective role in inhibition of viral replication and various infectious and non-infectious illness (Shanmugaraj 2020).

Bioactive molecules such as flavonoids, terpenes, polysaccharides, alkaloids, amino acid,

phenols, and essential oils: playing promising and effective role as antiviral molecules and prevent replication of viruses for example hepatitis B, HSV or SARS (Boldog, et al. 2020). EOs composed of complex secondary metabolites which are extracted by different techniques such as steam distillation, solvent extraction, ultrasound or microwave extraction. oxygenated bioactive molecules such as sesqui-terpenes, monoterpenes and phenyl propanoids, plays effective role in pharmacological activities. Research and exploration of various bioactive molecules are done by their analyzed of their properties by in vitro and in vivo studies were reported. In vitro and in vivo studies are done by using enveloped viruses such as influenza or herpes simplex viruses (Pang, et al. 2020) EOs from *Origanum acutidentis*, *Artemisia glabella*, *Houttuynia cordata*, *salvia sclera*, *Cynachum stauntonii*, *Thymus vulgaris*, and *Salvia limbata*, constituent *Cinnamaldehyde* has been evaluated against influenza. (de Clercq, E. (2004)) Essential oil constituent anise (*Illicium verum*), sandalwood and tea tree, chamomile, hyssop, ginger and eucalyptus, thyme (*thymus vulgaris*) *salvia fruticosa*, *Melissa officinalis* are described against Herpes viruses (Gómez-Cansino, et al. 2017). Tested oils resulted *juniperus communis*, *eucalyptus globulus*, *cupressus sempervirens*, *ocimum basilicum album*, *m. piperita*. *Ranversa aromatic*, *lavandula latifolia* (lavender) evaluated against HSV-1. (Harvey, A. L. 2007) Apart from most studies done on influenza viruses and HSV, adenoviruses and mumps viruses, dengue virus type 2 and junin viruses, yellow fever, HIV, and the viral agent SARS, and now novel corona viruses evaluated against a range of essential constituent and chemical components.

Mechanisms of Action of Essential Oil

Eos shows their direct effect when they are in direct contact on free viruses as compared to their intracellular virucidal activity (Brand, et al. 2015) As more viruses are enveloped viruses, which means they en-coated by membrane from the host cells and having phospholipid bilayer structures. Antiviral effect of EOs, as they are lipophilic in nature, so they are more likely to disturb or interfering with viral membrane protein involved in host cell attachments. In reference to in vitro studies, in vivo studies are also done against murine cytomegalovirus, *heracleum species*, *C stauntonii*, by using *nigella sativa*, *Es and cinnamaldehyde*, influenza virus were tested by mouse model (Bouazzi, et al 2018) Its reported in literature that inhibition of herpes virus's replication,

prevention to prevent cell by cell transformation with using by the *santolina insularis*. In literature found out that not as such intracellular replication step activity reported with reference to EOs. In addition it was found out no antiviral activity of eucalyptus oil reported on adenoviruse as they are non envelope (Iampol'skaia et al. 1979) As veridical activity of EOs are lipophilic in nature, however some resistant mutant strain of viruses exist which shows no promising result by their use.

Methodology

This literature review done by using the COVID-19 information center resources which t are easily available to all scientific community, by help of open research base data based. And from the other resources too such as Google Scholar and Pub Med.

Antiviral activity, aromatic plants, essential oils are using as key words. And bibliographical references are given using reference sources 'end note.

Analysis of Phyto-Chemistry

Antiviral activities of EO based on the composition of natural products or extract These are the complex mixture compounds and their main constituent act as bioactives. Tea tree oil, terpinen-4-ol, thymol, 1,8 - cineole and fennel was examined having virucidal activity against HSV-1. Essential oil containing yield ranging from 1.5 to 3.5%. L berry oil characterized by having beta-ocimene (21.83%), alpha-pinene (3.67%) as major components and constituent of sesquiterpenes. Thuja orientalis characterized and identified by having 48 compounds. List of compound constituents mentioned in Table 1

Table 1. Chemical Constituents of Essential Oil

| Plants (Family) compounds EO | Virus | Types | Major constituents | References |
|---|-------------|---------------------------|--|--|
| <i>Tetracera alinifolia</i> Wild (Dilleniaceae) | E7, E19 | RNA non enveloped viruses | cedrol, terpinolene | (Salem & Hossain 2000) , Tkachenko 2007) |
| <i>Mentha piperita</i> L(Lamiaceae) | HSV-2 | RNA enveloped | menthol, de menthyle | Saddi et al. 2007 |
| <i>Artemisia arborescens</i> (Vaill.) L | HSV-1 | DNA enveloped virus | alpha-pinene, beta-cinene, camphre | Loizzo et al. 2008 |
| <i>Origanum majorana</i> L(Limiaceae) HSV-1 | HSV1/HSV-2 | RNA enveloped virus | Terpinen-4-ol, gama-terpinene | Mpiana et al. 2020 |
| <i>Hyssopus officinalis</i> L | HSV-1 | RNA enveloped virus | alpha-pinene, beta-cinene, camphre | Mbadiko et al. 2020 |
| <i>Pinus mugo Turra</i> (Pinaceae) | HSV-1/HSV-2 | RNA enveloped virus | bornyl acetate, alpha-cadinol | Mpiana et al. 2020 |
| <i>Lippia junelliana</i> | Junin virus | RNA enveloped virus | piperitenone oxide, myrcenone | Mpiana et al. 2020 |
| <i>Larus nobilis</i> L(Lauraceae) SARS-CoV | SARS-CoV | RNA enveloped viruse | Caryophyllene, germacrene-D | Marshall E. (2011) |
| <i>Spondias mombin</i> L | HSV | RNA non enveloped viruse | ethyl acetate, ethyl hexanoate, linalool | Alamgeer, et al 2018 |

Essential Oil Virucidal Activity against Corona Viruses

In vivo and in vitro anti-coronavirus activity in a mixture of essential oil and botanical oleoresin, designated QR448(a), has been determined or examined. Avian infectious bronchitis viruses were treated with the aid of constituent QR448(a) that reduces the virus titer analyzed in the two laboratories in host systems, that is, embryonic eggs

and Vero E6 cells. The effects of the portion on infectious chickens were also tested or examined by means of the 1:20 spray dilution on chicken, 2 hours before the dealing with IBV were assessed to be the most successful effective treat. Care due to reduced incidence of or complications with clinical signs and lesions of bird disease, resulting in lower levels of viral RNA (Öğütçü, et al. 2008)

Nigella sativa (N. Sativa) (Ranunculaceae family) is commonly used worldwide as a medicinal plant.

There is one natural material that science has shown to have the potential to combat coronaviruses. (Hayashi, et al. 2007) "Black Seed Oil" is the name of this amazing substance. This oil has many names, including kalonji, *Nigella Sativa*, Habbatul Barakah, the seed of black cumin, and many others. The scientific community has also labeled it as a 'Miracle Herb'. Efficacy of NS oil on the basis of its quinone constituent, in particular thymoquinone (TQ), an essential bioactive constituent that makes up 30-48% of the total compound. Components of other functions. *Nigella sativa* is well-known as an antiviral, antibacterial herb that playing a very important role of decreasing the viral load in the body. It increases immunity and serves as a probable antiviral agent (Sivropoulou, et al. 1997)

Generic name for eucalyptus oil is *eucalyptus* Eucalyptus leaf having distill oil, a genus family the Myrtaceae plant family belong to Australia or also belong to cultivated globally. The leaves of selected species of Eucalyptus are distilled by steam for eucalyptus oil extraction. A-terpineol, thymol, 1,8-cineole (eucalyptol), a-pinene, a-cinemone, b-pinene, sabinene, camphor, globulol, citronellal, aromadendrene are the main constituents of eucalyptus oil (Allahverdiyev, et al. 2004) Eucalyptus oil having various and a wide history of use as a medicinal, antiseptic, repellent, flavoring, fragrance and industrial uses. The leaves of the selected species of Eucalyptus is distilled with steam to extract oil from eucalyptus. A possible inhibiting of COVID 19 infection having corona virus by analyzing determining studies is eucalyptol containing 1.8 cineole from Eucalptus essential oils (Harvey, A. L. 2007b)

Peppermint extract is a peppermint (*Mentha piperita*) herbal extract that is produced from the essential oils of peppermint leaves. Peppermint is a water mint and spearmint hybrid and was native to Europe and the Middle East before becoming widespread in other areas, such as North America and Asia.

As an antiseptic, anti-viral, stimulant, and a flavoring agent, peppermint extract is widely used. Moderate amounts may be safely mixed into food products or topically applied, sprayed as a household cleaner on surfaces, or inhaled using aromatherapy. (Wang & Chang 2009) The virucidal activity of the *Mentha piperita* essential oils, peppermint oil, against the herpes simplex virus has been investigated. Having Inhibitory activity for herpes simplex virus type 1 (HSV-1) or herpes simplex virus type 2 (HSV-2) was tested on RC-37 cells using the in vitro method of plaque reduction assay. (Ross, et al. 1997)

Avain coronavirus in vitro analysis research resulted or discovered material for ethanol extraction plants such as *Desmodium canadense*, *Thymus vulgaris* and a *Mentha piperita* plant that interferes with corona. (Schnitzler, et al. 2007)

Family Lauraceae are belong to flowering plants, *Laurus nobilis* is an aromatic evergreen tree or big shrub with green, glabrous smooth leaves. It is belong to the Mediterranean era region and is used for cooking the l as bay leafs to season. *Nobilis* berries were extracted from an area in Lebanon, with 1,8 cineole, b-ocimene, a-pinene and b-pinene are main constituents of essential oils. An successful veridical against SARS-COV from *Laurus nobilis* berries extracted distill oil from berries (Loizzo et al, 2008). Essential oils are evaluated for having inhibitory activity against in-vitro replication of COVID-19, herpes simplex virus-1 by visual scoring of the virus-induction post-infection cyto-pathogenic activity. *L. Nobilis* oil excretion has a potent COVID-19 operation having a IC value (50) of 120 microg/ml or a selectivity index (SI) having 4.16. The key components are oil characterization, 1,8-cineole, alpha-pinene, beta-cinemon and beta-pinene. *J. Ssp. oxycedrus*. *oxycedrus* oil, major constituents are alpha-pinene and beta-myrcene, shows virucidal activity treating HSV-1 of value IC, 200 microg and having similarity index of 5 (Siddiqui, et, al 1996). Mechanism of essential oil in Table 2.

Table 2. Essential oils mode of action

| Eos Constituents | Mode of Action | Viruses Forms | References |
|--|---|------------------------|-------------------------|
| Isoborneol, Oxygenated monoterpentene | Inhibited glycolysation of viral protein | HSV-1 Viral protein | Ogunwande, I. A. (2019) |
| Eugenol (clove constituent) | Delayed growth, induce keratitis in mouse model | Herpesvirus HSV | Minami et al 2003 |

| | | | |
|--|---|-------------------------------------|-----------------------------|
| Terpinolene | Inhibits un-coating in endosomes by interfering with acidification | H1N1 | Ramling et al 2012 |
| Trans-cinnamaldehyde | Target mid-stage of virus growth, specifically the synthesis of virus protein | H1N1 H3N2 Influenza B viruses | Kizil, et al. 2010 |
| Isopinocampone, pinocarvone, carvacrol | RNA enveloped virus | HSV-1 / HSV-2 | Adeyinka Aboaba et al. 2016 |
| Terpinen-4-ol, gama-terpinene | RNA enveloped virus | HSV1 / HSV-2 | Reichling, et al. 2005 |
| alpha-pinene, beta-cinene, camphre | DNA enveloped virus | HSV-1 | Oladimeji, (2018) |
| alpha-pinene, beta-cinene, camphre | RNA enveloped virus | HSV-1 | Duschatzky, et al. 2005 |
| ethyl acetate, ethyl hexanoate, linalool | DNA enveloped virus | HSV | Kasende, et al. 2016 |

Final Remarks

As COVID-19 is highly infectious and emerging disease as similar as respiratory illness or Common respiratory disease (Adeyinka Aboaba et al. 2016). A condition in which COVID-19 is now become a deadly virus and is progressing in whole world taking a lot of lifes. Alternative therapy now considers providing an effective action against COVID-19 (Lin et al. 2014) Medicinal and aromatic plant consider as effective medicine therapy to treat infection against corona virus. In literature review and in scientific evidence that's show effect on essential oils and medicinal plants and their effect on RNA AND DNA are well documented. As in symptoms or in documentation the most serious cause of death is because of respiratory failure, which result due to pneumonia, which result to morbidity (Weizmann & Rosenfeld 1937).

Essentials oil reported as having some interaction with life cycle of virus, as viral entry, attachment on virus, on replication, assembly ,on release and targeting virus host through specific

interaction or bonding with bond such van der wall interaction. In aromatic plant ecalpyptus and atremisia, lippie have antiviral activities (Lien, et al 2005) The study reveals that naturally existing essential oil chemo-types having beta-pinene as main constituent and therapeutic agent against SARS-CoV-2S main protease, COVID-19 causative agent (Anderson & West1998).

Conclusion

The present study based on determining or mentioning, identifying the antiviral properties of aromatic plant species which are used against SARS-CoV-2. Essential oils have veridical activity against DNA and RNA viruses.This review based on propose development of COVID-19,by using alternative approach by using reverse pharmacology approach. Analyze by literature reviews and literature survey of some naturally essentials oil, having chemo-types against SARS-CoV protease are progressing to identify potential inhibitor(Duschatzky, et al. 2005)

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