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IMPACT OF ESSENTIAL OILS IN HUMAN HEALTH AND WELLNESS

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Abstract:
Over the last decade, essential oils (EOs) have grown in popularity. In society, these oils serve as holistic integrative modalities to traditional medicinal treatments, with many Americans substituting EOs for other prescribed medications. Food flavouring, soaps, lotions, shampoos, hair styling products, cologne, laundry detergents, and even insect repellents contain essential oils. EOs are complex substances made up of hundreds of components, the composition of which can vary greatly depending on the extraction process used by the producer or the origin of the plant. As a result, determining which pathways in the body are affected is difficult.In this section, we examine the published research that demonstrates the health benefits of EOs as well as some of their negative effects. In doing so, we demonstrate that EOs and some of their constituents have antimicrobial, antiviral, antibiotic, anti-inflammatory, and antioxidant properties, as well as purported psychogenic effects such as stress relief, depression treatment, and insomnia relief.We show not only the health benefits of using EOs, but also the risks associated with their use, such as their endocrine disrupting properties, which cause premature breast growth in young adolescents. Taken as a whole, there are numerous positive and potentially negative risks to human health associated with EOs, making it critical to raise awareness about all of their known effects on the human body.

Keywords:
Essential Oils, Antimicrobial, anti-inflammatory, Antibiotic,Human Health, Health, Wellness.

Introduction:

Over the last decade, the essential oil (EO) industry has grown into a thriving and profitable market. Many people use essential oil-containing products on a regular basis, such as food flavouring, soaps, lotions, shampoos, hair-styling products, cologne, and laundry detergents. Because essential oils are more "natural," many people believe they are safer alternatives to more invasive pharmacological forms of treatment. However, only a small amount of research on essential oils has been conducted. This leaves the potential beneficial and/or adverse effects unclear, necessitating further research into these oils in order to confirm their true effects on human health. There are numerous ways to be exposed to essential oils, including inhalation, ingestion, massage, and skin applications.Many of the health benefits of essential oils are well known, including antibacterial, antibiotic, and antiviral properties. They are also known to relieve stress and have been used in a variety of treatments including sleep disorders, Alzheimer's disease, cardiovascular issues, cancer, and pregnancy labour pain. They are also known for their insect repellent and antioxidant/anti-

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inflammatory properties. The majority of essential oils are generally safe. Although the majority of side effects are minor, there have been reports of severe toxic reactions such as abortions and pregnancy abnormalities, neurotoxicity, bronchial hyperactivity, hepatotoxicity, prepubertal gynecomastia, and premature thelarche. [1-4]

Antimicrobial, Antiviral and Antibiotic Effects:

Essential oils are common natural products that can be used for a variety of medical applications. As antimicrobial resistance has emerged, essential oils have been studied as potential antimicrobial agents. Clinical trials have linked these naturally occurring compounds to bactericidal, virucidal, and fungicidal activity. It has also been proposed that these plant extracts may not only be used to fight cutaneous infections, but may also play a role in food preservation due to their antimicrobial activity combined with antioxidant properties. Table 1 provides a brief overview of some common essential oils and the organisms they target. Bacterial infections continue to be a leading cause of death in the human population.This has prompted research into the development of alternative therapies against bacterial strains, as the threat of antibiotic resistance has grown even for the most recent antibiotic drugs. Because it is difficult to distinguish between bacteriostatic and bactericidal effects of essential oils, activity is commonly measured as the minimum bactericidal concentration (MBC) or the minimum inhibitory concentration (MIC) (MIC). A series of biochemical reactions within the bacterial cell that are dependent on the type of chemical constituents present in the essential oil facilitate the mechanism of antibacterial action.Because essential oils are lipophilic, they easily penetrate bacterial cell membranes and have been shown to disrupt critical cell membrane processes such as nutrient processing, synthesis of structural molecules, emission of growth regulators, energy generation, and influences on the cell-cell communication quorum sensing network. Listeria monocytogenes, Bacillus sphaericus, Enterobacter aerogenes, Escherichia coli O157:H7, P. aeruginosa, S. aureus, S. epidermidis, S. typhi, Shiguellaflexneri, and Yersinia enterocolitic are among the specific bacteria targeted by essential oils. Garlic, ginger, clove, black pepper, green chile, cinnamon, clove, pimento, thyme, oregano, and rosemary are some of the essential oils that are commonly used. [5-7]

Essential oils, like bacteria, have the ability to enter and disrupt the homeostasis of the fungal cell wall and cytoplasmic membranes, specifically the mitochondria. One of the proposed mechanisms involves essential oils penetrating the mitochondrial membranes and altering electron flow through the electron transport system, which disrupts the lipids, proteins, and nucleic acid contents of fungal cells. Another proposed mechanism is mitochondrial membrane depolarization, which decreases membrane potential, affecting ion channels to reduce pH, and affecting the proton pump, resulting in fungal cell apoptosis and necrosis.Plant extracts such as basil, clove, citrus, garlic, fennel, lemongrass, oregano, rosemary, and thyme have been shown to have significant antifungal activity against a wide range of fungal human pathogens. Candida acutus, Candida albicans, Candida apicola, Candida catenulata, Candida inconspicua, Candida tropicalis, Rhodotorula rubra, Sacharomyces cerevisiae, Trignopsis variabilis, Aspergillus parasiticus, and Fusarium moniliforme are among the fungal pathogens affected [8-10].

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Anti-Inflammation And Antioxidant Properties:

Inflammation is the body's reaction to noxious stimuli such as infection or tissue injury; the response is influenced by biological, chemical, and mechanical factors. EOs such as chamomile, eucalyptus, rosemary, lavender, and millefolia have been discovered to mediate the inflammatory response; they can influence antioxidant activity, signalling cascades, cytokines, and regulatory transcription. [11-12]

factors, as well as the expression of pro-inflammatory genes. The three main anti-inflammation properties of EOs are inhibition of arachidonic metabolism, production of cytokines, and expression of pro-inflammatory genes.

As part of the inflammatory response, phospholipase A2 releases arachidonic acid from the cell membrane, which is then metabolised via the cyclooxygenase (COX) or lipoxygenase (LOX) pathway [14]. Prostaglandins (PGs) and thromboxane A 2 are produced by the COX pathway, whereas leukotrienes are produced by the LOX pathway (LTs). Inhibiting either pathway reduces inflammation by lowering PGs, thromboxane A2, and LTs, which are key inflammatory mediators. [13]

Objectives:

1. To investigate the effects of antimicrobial, antiviral, and antibiotic agents.
2. The impact of essential oils on human health.
3. Human Health Impact of EO Herbicide Products.

Review of Literature:

Since ancient times, synthetic antimicrobial agents and chemical food preservatives have been used to effectively control food spoilage. Consumer concerns about chemical preservatives are driving an increased interest in natural antimicrobials such as essential oils (EOs). EOs are liquid preparations made from plant materials (flowers, buds, seeds, leaves, twigs, bark, herbs, wood, fruits, and roots) native to temperate to warm climates, such as the Mediterranean and tropical areas. Few of them are solid or resinous at room temperature; they are limpid, soluble in lipids or organic solvents, have a lower density than water, and range in colour from pale yellow to emerald green or blue to dark brownish red (Burt, 2004; Gutierrez et al., 2008). [14]

In the 16th century, Paracelsus von Hohenheim used the term "Quinta essentia" to design the active component of a drug, and from the Latin essentia comes the term "essential" (Guenther, 1948). [15]

To extend the shelf life of fresh-cut "PieldeSapo" melon, Raybaudi-Massilia et al. (2009) used malic acid and EOs extracted from cinnamon, palmarosa, and lemongrass (0.3 and 0.7%) or their major compounds (eugenol, geraniol, and citral) (Cucumis melo L.). EOs were entrapped in an alginate-based edible coating and used in a challenge test; the target microorganism was Salmonella Enteritidis (108 cfu/ml). This system was able to keep the pathogen at bay for at least 21 days (Ayala-Zavala et al., 2009). Furthermore, Rojas-Graü et al. (2007) used an apple puree-alginate edible coating to entrap lemongrass, oregano oil, and vanillin in order to extend the shelf-life of fresh-cut Fuji apples. Vanillin (0.3%w/w) maintained sensory quality at 4°C for at least 21 days. [16-17]

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Because of their low perception breakpoint, some EOs can have a negative impact on sensory attributes even at low concentrations (Lv et al., 2011); thus, the need for higher concentrations in food is unfortunate and limits their application to spicy foods.Another approach is to incorporate EOs into active packaging, either encapsulated in polymers of edible and biodegradable coatings or entrapped in sachets capable of slowly releasing active compounds on the food surface or in the headspace (Pelissari et al., 2009; Sánchez-González et al., 2011). Some passive, active, and nanocomposite multilayer films were tested; the performance of EVOH was poor because this matrix was unable to retain the active compounds. The addition of bentonite nanoparticles to EVOH active coatings, on the other hand, increased the release rate and retention ability. [18-20]

Research Methodology:

Books, educational and development journals, government papers, and print and online reference resources were among the secondary sources we used to learn about the composition, use, and effects of essential oils on human health and wellness. Taken as a whole, there are numerous positive and potentially negative risks to human health associated with EOs, making it critical to raise awareness about all of their known effects on the human body.

Result and Discussion:

Table 1 provides a brief overview of some common essential oils and the organisms they target. [21]

Table 1. Brief summary of common Essential Oils plant of origin and microorganisms affected by compound extracted

Common Name	Plant	Major Essential Oil	Inhibited Microorganisms
Thyme	*Thymus vulgaris*	Thymol	*S. aureus, V. parahaemolyticus, C. perfringens*
Oregano	*Origanum vulgare*	Carvacrol	*Polio virus, Adeno virus, L. monocytogenes*
Garlic	*Allium sativum*	Isothiocynate	*Candida spp., Enterobacteriaceae*
Lemon Balm	*Melissa officinalis*	Linalool, myrcene, camphor	*HSV-2, avian influenza virus*
Cinnamon	*Cinnamomum zelancium*	Cinnamaldehyde	*Enterobacteriaceae, P. mirabilis, S. pyogenes*
Lavender	*Lavandula angustifolia*	Linalool, Linalyl acetate	*E. coli, M. smegmatis*

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Risk for Human Health Related to the Use of EO Herbicide Products:

The risk will be determined by the physical condition of the product used. Liquid EO-based bioherbicides are possible.

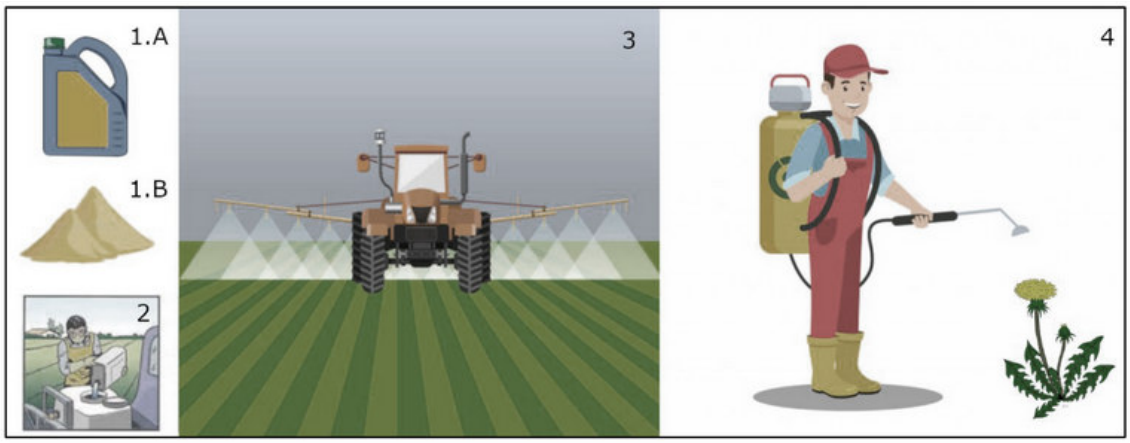

Figure 1. Illustration of risk for human health related to the use of EOs as bioherbicides. (1.A) Liquid product, (1.B) solid product, (2) filling, (3) application by tractor/cabin, (4) application by backpack sprayer with personal protective equipment.

There is a risk of the user's hands coming into contact with the product during the filling process, as well as inhaling the volatile part during the entire use (preparation, filling and application). Whereas the first case involves an acute herbicide poisoning risk, the second involves a chronic herbicide poisoning risk. [22]

Conclusion:

EOs have a variety of health effects. Many studies have shown that these oils have many psychological effects, such as reducing anxiety, treating depression, and even assisting with falling asleep. They have also been shown to have antimicrobial, antiviral, antioxidant, and anti-inflammatory properties, and they can be used as an alternative to synthetic insect repellents. Essential oils have many proven health benefits, but they also have some drawbacks. Certain essential oils and their components have been shown to contain EDCs, which appear to have increased breast growth in prepubescent children.There has been a great deal of research done in the field of essential oils, but given their multitude of components and the spectrum of possible activities, there is still a great deal unknown about their true effects on human health.

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