

## Chapter 04

# The Healing Power of Aromatherapy: Essential Oils in Medical Sciences

Rabia Yaqoob<sup>1</sup>, Anam Zohra<sup>2</sup>, Muhammad Usman<sup>3</sup>, Farhana<sup>4</sup>, Muhammad Faheem Sajjad<sup>5</sup>, Syeda Umm e Farwa Kazmi<sup>6</sup>, Faiza Sultan<sup>7</sup>, Iqra Lodhi<sup>8</sup>, Muhammad Hamza Muneer<sup>9\*</sup>, and Sidra Muhyuddin<sup>10\*</sup>

<sup>1</sup>Department of Biochemistry and Biotechnology the Women University Multan

<sup>2</sup>Government College University Lahore, Zoology department, Faculty Chemistry and life sciences

<sup>3</sup>Department of Biochemistry and Biotechnology, MNS University of Agriculture Multan

<sup>4</sup>Government College Faisalabad, Zoology department, Faculty Life Sciences

<sup>5</sup>Faculty of veterinary and Animal Sciences, Muhammad Nawaz Sharif University of Agriculture Multan

<sup>6</sup>Department of Zoology wildlife and fisheries, Muhammad Nawaz Sharif University of Agriculture Multan

<sup>7,8</sup>Department Zoology, University of Okara

<sup>9</sup>Department of Biochemistry and Biotechnology, MNS University of Agriculture Multan

<sup>10</sup>Department of Zoology, Faculty of Veterinary and Animal Sciences, Muhammad Nawaz Sharif University of Agriculture Multan, Pakistan

Corresponding Authors: [Hamza.muneer@mnsuam.edu.pk](mailto:Hamza.muneer@mnsuam.edu.pk); [Sidramirza191@gmail.com](mailto:Sidramirza191@gmail.com)

### ABSTRACT

Essential oils are known for their varied therapeutic properties and are concentrated extracts that are increasingly popular as complementary medicine. Furthermore, Egypt, China, and India which are the early civilizations utilized aromatherapy thousands of years ago, and the term itself was devised in the 20th span. The essential oils' work is observed through modern research investigation whether inhaled or applied topically and affects the nervous and immune systems by influencing mood and physiological processes. These oils are complex mixtures primarily composed of terpenes and phenolics and demonstrate antibacterial, antifungal, and antioxidant properties by addressing conditions like anxiety and pain. The increase in chronic illnesses grows their interest in further research essential to standardize quality by understanding their interactions with medications and exploring innovative delivery methods like nanotechnology. Overall, aromatherapy provides the potential to enhance human health and well-being because it emerges as a promising field blending historical wisdom with contemporary scientific exploration. The chapter showcases the wide history, diverse applications and promising future of aromatherapy through an ancient practice utilizing plant- derived essential oils for therapeutic benefits.

### KEYWORDS

Aromatherapy, Essential oils, Medicinal herbs, Complementary and Alternative treatment

Received: 28-Jun-2024

Revised: 08-Jul-2024

Accepted: 17-Aug-2024



A Publication of  
Unique Scientific  
Publishers

**Cite this Article as:** Yaqoob R, Zohra A, Usman M, Farhana, Sajjad MF, Kazmi SUEF, Sultan F, Lodhi I, Muneer MH and Muhyuddin S, 2024. The healing power of aromatherapy: essential oils in medical sciences. In: Zafar MA, Abbas RZ, Imran M, Tahir S and Qamar W (eds), *Complementary and Alternative Medicine: Essential oils*. Unique Scientific Publishers, Faisalabad, Pakistan, pp: 35-42. <https://doi.org/10.47278/book.CAM/2024.302>

### INTRODUCTION

Aromatherapy is derivative of "aroma" meaning fragrance or smell, and "therapy" meaning treatment. This practice is natural healing and focuses on the mind, body, and soul (Halder et al., 2018). Early civilizations including Egypt, China, and India used aromatherapy as a complementary and alternative treatment for over 6,000 years. Nowadays, it is modified for treating various conditions and achieved significant popularity in the late 20th century. In the 21st century, meaning recognition is an aroma science therapy. Aromatherapy contains essential oils as its central are extremely focused constituents extracted from plant parts like flowers, leaves, stalks, fruits, and roots (Pan et al., 2014). They incorporate a mix of saturated and unsaturated hydrocarbons, alcohols, aldehydes, esters, ethers, ketones, oxides, phenols, and terpenes that offer distinctive odors. Essential oils contain no color, pleasant-smelling liquids with high refractive index valued for their various uses like therapeutic, cosmetic, aromatic, and fragrant (Malabadi et al., 2021). Essential oils are applied to pressure points for rejuvenation due to their potency. Furthermore, various plant structures store these oils like pockets, reservoirs, glandular hairs, specialized cells, or intercellular spaces. These essences protect plants through evaporation from bacterial attacks and temperature fluctuations (Bayantassova et al., 2022). These are administered through inhalation, massage, or simple skin application. The primary use of aromatherapy is to restore mental and physical balance, relieve stress, and

rejuvenate individuals (Hedao and Chandurkar, 2019). A sense of well-being of the body is promoted due to the organic nature of aromatherapy and its combined effects. Many studies demonstrated that inhalation of herb essential oil is significantly used in phytotherapy to combat exhaustion and enhance the mice's locomotor activity. Recently, aromatherapy has had essential growth in holistic medicine. Many studies on the emotions and brains of humans explore its effects (Sivaphongthongchai, 2021).

Aromatherapy is mostly used other than human-made and typically contains triggers such as solvents and power sources that can irritate. A debate on the topic always remained that synthetic fragrances lack the natural vitality of essential oils among odor psychologists and biochemists. Essential oils have been important for centuries due to their fragrance (Franco et al., 2017). These potent organic plant chemicals aid in eliminating disease-causing bacteria, viruses, and fungi and purify the environment. Furthermore, their properties like antibacterial, antiviral, and anti-inflammatory effects as well as boosting the immune system and benefiting hormonal, glandular, emotional, and circulatory functions. Moreover, many scientists documented that these also enhance memory and alertness. In addition, their effects on diseases and disorders on humans have been explored by conducting many projects and studies. These oils also maintain their potency over time and age enabling them unique their stimulating properties are due to their structural resemblance to actual hormones, and their ability to penetrate subcutaneous tissues is a key feature of therapy (Ali et al., 2015).

Aromatherapy is gaining importance as a growing complementary therapy globally. The National Institutes of Health National Center for Complementary and Integrative Health suggested that the United States spend over \$30.2 billion annually on this therapy and estimated that the global market is projected to reach \$5 trillion by 2050 (Farrar, 2020). Integrative medicine is another term used for aromatherapy and is particularly important for frontline nurses to understand the complex and subtle effects of alternative and integrative therapy. Furthermore, nursing healthcare aromatherapy forces into the group of mind-body therapy. Essential oils play a role in complementing therapeutic interventions and reducing anxiety in nursing health care. In contrast, assessing anxiety levels before and after interventions can help to measure the application effects of plant-based essential oils (Bunse et al., 2022).

### **Worldwide Historical Evolution of Aromatherapy**

For thousands of years, aromatherapy has been practiced in various fields. Hippocrates who promoted aromatherapy usage, believed that aromatic baths and scented massages were essential for good health and he was known as the father of medicine (Agnihotry et al., 2024). However, in the current era, there's a growing inclination towards consuming food items as perceived as natural and minimally processed. These qualities can affect the food choice of food consumers due to their association with health. Subsequently, the World Health Organization examined approximately 600 million cases of foodborne illnesses and 420,000 related deaths occur globally each year in the 2015 report (Lee and Yoon, 2021). Moreover, food spoilage is a metabolic process that alters sensory characteristics and renders food undesirable or unacceptable for consumption despite being potentially safe. Fruits and vegetables globally post harvesting can reach losses of more than 30 to 40% which can emphasize the need to reduce such losses to ensure food security for all (Alegbeleye et al., 2022).

In modern times, the prompting efforts to secure and safeguard food through food safety is a paramount concern thereby ensuring the availability of fresh and healthy produce. Food preservatives are used by food manufacturers to extend shelf life, without concerns about the health implications of consuming food additives like synthetic preservatives. Plant extraction is used to isolate specific plant components and is gaining attention for its potential as a source of natural antimicrobials (Rudra et al., 2020). Furthermore, the basic utilization purpose of essential oils in medical science across different cultures for millennia is that are highly concentrated hydrophobic liquids containing volatile compounds from plants. The essential oils are obtained from fruit peels by various extraction methods like steam distillation and hydro distillation that can exhibit antibacterial and antiviral properties and can be explored as potential alternatives to chemical preservatives for food preservation (Bhavaniramya et al., 2019).

### **Historical Background**

In the late 20th century, the exploration of aromachology originated and was spearheaded by Japanese scientist Shizuo Torii who delved into the relationship between aroma and emotions. The research of Torri suggested the relaxation-enhancing properties of lavender and chamomile fragrances. The Institute secured the term "aromachology" in 1982 by the sense. Aromas contain a unique ability through our physical, mental, and emotional well-being are influenced by a practice dating back over 3500 years to ancient Egyptian rituals (Thangaleela et al., 2022). In our modern lifestyles, a quest for improved holistic health was reflected through the resurgence of aroma usage. Aromachology determines the internal connection between aroma and psychology and the study of how scents affect the brain. Moreover, it determines the induced subtle neurological and behavioral shifts (Bercik et al., 2021).

Aromatherapy is an ancient concept practiced by civilizations such as the Chinese, Egyptians, and Romans that gained recognition in the 1920s through incense, baths, and embalming when French chemist Rene-Maurice Gattefosse coined the term (Sowndhararajan et al., 2016). The secondary metabolites of aromatic plants are the essential oils that comprise complex mixtures of volatile organic compounds (VOCs) and plants store these oils in various structures including in reservoirs, glandular hairs, and special cells that protect against pathogens and environmental fluctuations. A range of EOs encompasses chemical groups extracted from different plant parts through methods, steam distillation, solvent extraction,

and advanced techniques (Machado et al., 2022). The therapeutic effects enable them for extensive investigation that serve as additives in the food industry and air quality enhancers. Phytoncides are volatile organic substances derived from plants that contain antimicrobial properties used to enhance immune functions. The oldest forms of natural herbal remedies are represented as Oils with roots tracing back to ancient civilizations (Franco et al., 2017).

History explores that various medicinal substances derived from herbs, animals, and minerals have been employed to address ailments. Although, the traditional medical systems predominantly emphasized medicinal herb usage. These remedies were typically administered individually or in combinations like pills, powders, or extracts (Tiwari et al., 2018). The pharmaceutical applications of medicinal oils are extensively detailed by the historical Persian medical texts prepared from various herbs for therapeutic purposes either topically or systemically. These formulations are known as "Dohn" or "Adhaan" and are meticulously described in pharmaceutical manuscripts like the "Qarabadin," which play the role of repositories of drug compounds, formulas, and indications (Sharifi-Rad et al., 2017).

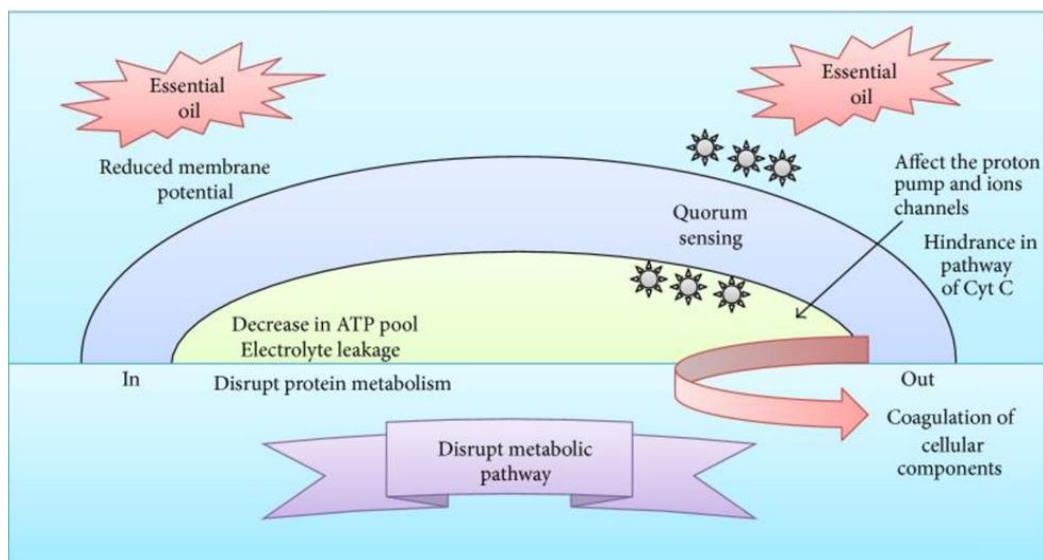
Other than their historical significance medicinal oils are often overlooked in contemporary medical research. However, their use for medicinal purposes going back to traditional Chinese and Egyptian medicine with massage therapy using herbal oils remaining prevalent in several East Asian countries. Additionally, aromatherapy help to improve immunological and physiological conditions through the usage of volatile oils (Thangaleela et al., 2022).

### Mechanism of Action of Essential Oils in Aromatherapy

The method by which essential oils work comprises of their interactions with the receptor cells in the nose when they are inhaled, triggering biological signals. The olfactory bulb plays a role in transmitting these signals to the limbic system and hypothalamus. The neurotransmitters like serotonin and endorphins are released through this process by triggering the brain by linking the nervous system with other body systems to induce a desired change and provide relief. The response to calming, euphoric, and stimulating oils and others respectively can release Serotonin, endorphins, and noradrenaline to achieve specific effects on the mind and body. Moreover, several beneficial outcomes like increased neurogenesis, regulation of hormonal levels, selective stimulation of certain brain regions, and changes in blood biochemistry that affect mood and emotions are the products of essential oils (Fung et al., 2021).

These outcomes are coming due to the inhaling of volatile elements in these oils and when these are inhaled, act through two main pathways, known as olfactory stimulation and respiratory stimulation. The olfactory nerve activation predominantly works in the inhalation aromatherapy via olfactory by extending from the nose to the brain. Their structural similarity to physiological neurotransmitters and hormones can cause the therapeutic effects and similarity enables them to stimulate olfactory chemoreceptors in the nasal passage by activating olfactory signaling. However, these signaling ends in the higher cerebral cortex where olfactory sensory neurons convey electrical impulses to the brain's limbic and hypothalamic regions via the olfactory bulb and upper olfactory cortex (Sattayakhom et al., 2023).

The olfactory signaling entirely bypass through some highly volatile molecules that directly entering the brain and regulate neuronal pathways upon inhalation. These pathways have a surge result of neurotransmitters and neuromodulators that produce a sense of calmness and alleviate anxiety and depression symptoms. Beyond olfactory stimulation, the essential oils alter the brain function through alveolar absorption and this process allows essential oil molecules to enter the blood circulation and interact with specific brain regions. In the respiratory system, the gaseous exchange controls the diffusion of essential oils to enter the systemic circulation and the brain. Lipophilic essential oil molecules activate specific central nervous system regions and can cross the BBB. These also inducing positive psychological and physiological effects that help alleviate mood disorders that is explained in figure.1.



**Fig. 1:** Mechanism of action of essential oils (Nguyen et al., 2023)

The integumentary system is influenced by the topical application of essential oils. The rapid release of endorphins and certain pain modulators due to the topical use of Essential oils can cause analgesic effects and a sense of well-being. The skin penetration by dissolving in the skin's cell membrane lipid constituent are involved in the topical use of essential oils. The chemical composition of essential oils influenced the depth of oil penetration into the skin. For example, on the upper epidermis are limited oils such as jojoba, avocado, soybean and the oxygenated terpenes can penetrate deeper layers (de Andrade et al., 2022). Some essential oils serve as penetration enhancers in internally and topically by enhancing drug partitioning, disintegrating highly ordered intercellular lipid structures, and inducing conformational changes in intercellular protein domains (Herman and Herman, 2015).

The delivery to the brain of essential oils from different routes is determined by the molecular size of these molecules. Moreover, the smaller formulations can increase the inhalation rate and delivery success. However, the proper brain penetration may also hinder by the non-uniform size of these molecules. The absorption of essential oils by utilizing the encapsulated nanoparticles in the nanotechnology presenting a promising therapeutic future (Rai et al., 2017). The impact of essential oils on the central nervous system also induced the emotional response changes and some molecules can pass through sensory neuron cells or the olfactory mucosa. The respiratory system play role in exchange of gases and to allow the essential oils to diffuse into the bloodstream and circulate in whole the body. The given medium is used for therapeutic interventions in respiratory diseases and mood disorders and to utilize olfactory interventions (Horvath and Acs, 2015). The essential oils can affect the brain by three major mechanisms, the first involves activating nasal olfactory chemoreceptors and the related impact of olfactory signals on the brain with the olfactory system directly linked to the brain's limbic regions by affecting mood. Moreover, the second mechanism involves in which the olfactory nerve influences the cellular and molecular events due to the penetration of essential oils. The third mechanism involves in essential oils absorption into the blood circulation crossing the BBB to interact with brain regions (Cui et al., 2022).

The volatile mixture of compounds is present in the majority of aromatic plants that can be extracted to form essential oils and these plants typically produce various secondary metabolites such as terpenoids, alcohols like geraniol and menthol, acids such as benzoic and cinnamic acids, aldehydes are citral and benzaldehyde, ketones are thymol and eugenol, and phenols are ascaridole and anethole. The composition of essential oils is significantly influenced by Terpenes, terpenoids, and aromatic (Koul et al., 2008). The mevalonic acid and shikimic acid pathways play a role in synthesizing the Terpenoids and aromatic polyterpenoids. Terpenoids are a vast category of secondary compounds found in aromatic and medicinal plants which play a crucial role in providing resistance against pathogens. Furthermore, monoterpenoids contain antimicrobial properties that disrupt the growth and development of microorganisms and interfere with their physiological and biochemical processes. Several botanical constituents are azadirachtin, carvone, menthol, ascaridol, methyl eugenol, toosendanin, and volkensin which have demonstrated potential in combating bacterial, fungal pathogens and insect pests (Pandey et al., 2017).

### **Chemical Composition and Properties of Essential Oils**

As discussed above Essential oils give the complex combination of volatile compounds that are plant derivatives and primarily composed of terpenoids and phenolic compounds. The specialized cells can synthesize these aromatic constituent types found throughout various plants such as leaves, flowers, and roots, and may depend on the plant species. Furthermore, these parts like glandular trichomes, adduct cavities, and osmophores can offer sites for the biosynthesis and accumulation of these compounds. Plants contain the ability to extract to produce these aromatic compounds which are obtain essential oils, and are referred to as aromatic plants. Aromatic plants are distributed widely across the plant kingdom but are not restricted to a particular group. Moreover, it's noticed that the composition of essential oils differs from one plant taxonomic group to another (Fokou et al., 2020). Additionally, essential oils' chemical composition can vary due to factors such as abiotic and biotic effects, postharvest treatments, extraction methods, and storage conditions within the same species. The synthesis of secondary metabolites in plants affected by Abiotic factors contains all nonliving components and the factors are soil characteristics like hydrology, pH, and salinity, as well as overall climatic conditions with particular emphasis on the microclimate surrounding the plant (Duarte et al., 2017).

On the other side, the biotic factors involve living organisms that influence plant metabolite production and this segment contains the soil organisms, microorganisms, and inherent plant characteristics. The secondary metabolites of essential oils play many roles like defending against plant invaders, interacting with symbiotic organisms, and attracting pollinating insects, among others. Postharvest treatments are conducted between the plant collection and essential oil extraction. However, the drying plant materials before extraction has been observed to significantly increase extraction yields and it may also trigger biochemical reactions among secondary metabolites by leading to changes in the chemical composition of the resulting essential oil compared to its original state in the plant (Taghavi et al., 2018).

Conservation method can encompass the processes from extraction to chemical analysis and can influence the nature of essential oils. Essential oils are achieving importance due to their diverse biological properties that are impacting humans, animals, plants, insects, and microorganisms. In human applications the essential oils find use in nutrition as preservatives or flavorings and in cosmetics as fragrances, and in pharmacology as active ingredients. Their pharmacological properties influenced the both transmissible and non-transmissible diseases (Roca-Saavedra et al., 2018).

## Therapeutic Properties

The World Oral Health Report suggested that although oral health has improved significantly in many countries the challenges persist especially among disadvantaged populations in developed and developing nations. The major global oral health concerns were identified as periodontal and dental caries diseases which also have adverse effects on overall health, quality of life, and work capacity (Anushri et al., 2019). However, the antibacterial agents used to treat oral health issues with various side effects like diarrhea and vomiting and there is growing concern over bacterial resistance to these drugs. Moreover, the mentioned adverse effects are increasing resistance and high costs of standard therapeutic approaches and the need to explore alternative therapeutic agents and further investigate traditional medicines derived from various plant sources (Aware et al., 2022).

**Table 1:** Historical evolution of essential oils

Country	Cultural therapy of essential oils	References
Egyptian culture	Resins, Balms and fragrant oils Papyrus Ebers wrote a famous manuscript about Aromatic Medicines around 2800 BC and proved essential oils therapeutic properties.	(Agnihotry et al., 2024)
France	Shirley price authored Aromatherapy for Health care professionals, known for clinical use of essential oils for surgery and spa treatment.	(Cartwright and Armstrong, 2020)
German	In 1919, Gattefossé, a famous chemist, was burned in an explosion in his laboratory. The wounds became infected. Wound rinsing with essential oils eradicated the infection. He coined the term, aromatherapy, and was known for the medical use of essential oils with their antibacterial and healing properties of essential oils. Jean Valnet, an army physician, wrote the first aromatherapy book by a doctor.	(Scuteri et al., 2022)

**Table 2:** Nursing theoretic frameworks for health care aromatherapy

Theorist Name	Application to Clinical Practice	References
1. Florence Nightingale Environmental	Cleanliness, rest, and relaxation properties	(Ahmad et al., 2020)
2. Myra Estrin Levine Holistic	Transformation process preventing stress	(Thakral et al., 2019)
3. Hildegard Peplau Interpersonal relations	Supports interpersonal relations; promotes personal growth	(Zhang and Shuai, 2021)
4. Martha Rogers Unitary human beings and their environment are one	Interrelationship between people and plants	(Harris, 2021)
5. Sister Callista Roy Adaptation	Assist coping and adaptation	(Gavrilescu, 2023)
6. Wanda de Aguiar Horta Basic human needs	Restore balance, thereby decreasing depression and stress	(Choudaj and Wankhade, 2023)

Many traditional remedies are analyzed for infections by conducting clinical trials to assess their efficacy and potential side effects. Among all these natural remedies, essential oils (EOs) have been a surge of interest for many years (Aljaafari et al., 2021). Approximately 3000 EOs are currently known and have been used since ancient times to treat a range of medical and dental issues. These secondary metabolites possess antibacterial, antifungal, and antioxidant properties. The systematic literature purpose is to analyze various Eos therapeutic properties (Freires et al., 2015).

## Clinical Applications

In the past, there has been a growing demand for phytotherapy with alternative medicine. Phytotherapy is a practice shown by both healthcare professionals and practitioners of traditional medicine that refers to using herbs and herbal preparations (like infusions, decoctions, and tinctures) along with phytochemicals for medicinal purposes. The scientific importance of phytotherapy evaluated through extensive clinical and experimental studies has validated the effectiveness of herbal remedies (Khan and Ahmad, 2019).

Phytotherapy contains many subsets and one of them is aromatherapy. The bindings essential oils produced by plants are secondary metabolites that work as a defense mechanism against challenges including diseases with environmental conditions such as high temperatures and droughts. Humans are using essential oils due to their advantageous biological properties in various aspects like medicine, cosmetics, and the food industry other than their botanical origin. These are also used due to their primary impact on mental and physical well-being (Lawn et al., 2020)

Inhalation aromatherapy is the most prevalent method associated with aromatherapy and offers a fast, convenient, and safe means of administering essential oils. This approach contains various methods including vapor balms, nasal inhalers, lamp diffusion, room sprays, and direct inhalation through tissues or cotton balls infused with essential oils. Despite this, aromatherapy does not cure major illnesses and promotes relaxation, stress relief, mood enhancement,

balance, well-being, and minor discomfort relief, and boosts the immune, respiratory, and circulatory systems. However, their common applications are stress management, pain relief, mood enhancement, and relaxation. Moreover, aromatherapy differs from herbal medicine in practice. The essential oils are commonly used by researchers like botanists and they prefer whole plant applications for human benefits. Traditionally, aromatherapy is used for holistic mental health and the care of mind and body (Vora et al., 2024)

### **Essential Oils for Public Health Therapy**

In developed countries, an increase in diseases occurrence by modern lifestyles that are largely attributed to poor dietary habits and inadequate physical activity. Since 2014, the USA witnessed a decline in life expectancy through prevalent measures such as hypertension, heart diseases, diabetes mellitus chronic liver diseases, and obesity (Raleigh, 2019). These increases in the disorders related to lifestyle have propelled a growing preference for natural remedies among consumers and patients and are driven by perceived lower side effects compared to synthetic alternatives. Notably, these were used historically in the middle Ages due to their diverse biological activities and are comprised of volatile mixtures primary terpenes, and aromatic structures and such oils are synthesized in different ways from plants. Moreover, Eos are extracted through steam distillation or cold pressing and were originally produced by plants for protective benefits. Well-known effects include antimicrobial, antiseptic, analgesic, anti-inflammatory, spasmolytic, and sedative impact through which EOs have garnered increasing global interest in herbal medicine (Elshafie et al., 2017).

In developing nations, almost 80% of individuals rely on traditional herbal medicine and there is a rising trend in industrialized countries as well. Many prominent health concerns like depression, obesity, diabetes, and allergic disorders are addressed by EOs reflecting their therapeutic potential against a spectrum of modern public health issues. The increasing prevalence of lifestyle illnesses underscores the Immediacy for effective therapeutic interventions. More than 264 million individuals were affected by depression globally in 2017, which poses a significant burden on public health systems (Moitra et al., 2022). Similarly, obesity affected 600 million individuals in 2015 and contributes to various secondary illnesses such as diabetes and cardiovascular diseases. Furthermore, about 20% population is affected by allergies of the global population which presents additional challenges (Yeshi and Wangchuk, 2022).

### **Future Directions and Research**

In the past, a remarkable interest was experienced in essential oils research that provided crucial results for new inventions and advancements the resurgence of interest in aromatherapy has been increased over the past few decades and can make it one of the most commonly used complementary medicines. The increase in cultivation of aromatic plants has been noted by the International Federation of Essential Oils and Aroma Trades (IFEAT) with lavender emerging as the most widely purchased raw material for essential oil (EO) extraction. EO are complex mixtures of volatile chemical components and are obtained by many extraction techniques including distillation or cold pressure that avoids the use of chemical solvents. In the early 1900s, the French chemist Gattefosse discovered the accidental discovery of lavenders by calming effects. Lavender aromatherapy has gained popularity as an alternative or complementary use from antiemetic to pain relief and more recently sedative and cognitive effects (Makeri and Salihu, 2023).

The physician Jean Valnet was inspired by the Gattefosse works and enabled to pioneer of plant-based medicine. In contrast, he initially used lavender EO to soothe the wounds of veterans in Indochina in 1948 and later to manage agitation in psychiatric patients (El-Sagheer, 2020). Recently, the globally, ethnopharmacological studies are highlighted lavender EO's efficacy in treating stress, anxiety, and depression globally. The lavender's anxiolytic effects through linked to cognitive enhancement from a cognitive perspective which is observed with certain anesthetic drugs. Many illnesses are treated and managed by aromatherapy efficacy and often when pharmacological interventions fall short. Furthermore, the discovery of the antiseptic and skin-penetrating properties of essential oils are followed by their inception that are highly concentrated plant extracted from leaves, fruit peels, and flowers. Essential oils contain therapeutic properties when inhaled or applied to the skin and are broadly classified based on aroma families such as citrus, herbaceous, floral, minty, camphoraceous, spicy, musky, and woody (Jaruzel et al., 2019).

In the available literature definition of precise mode of action is very poor. Therefore, a systematic review is needed to evaluate whether different lavender EO compositions, a systematic review is needed that can be explored to affect core cognitive functions and to consider EO phytochemical parameters and administration methods (Zhong et al., 2019).

### **Conclusion**

In conclusion, aromatherapy is a general practice that marks the mind, body, and soul through the use of essential oils. This practice has its earliest roots in civilizations like Egypt, China, and India. In the current era, aromatherapy has evolved and is gaining significant popularity. Furthermore, is recognized as a scientific therapy involving the use of highly concentrated essential oils extracted from different plant parts. Essential oils contain distinctive odors and therapeutic properties and are applied through methods including inhalation, massage, or direct skin application to restore mental and physical balance, relieve stress, and rejuvenate individuals. Moreover, essential oils encompass biological effects like antibacterial, antiviral, anti-inflammatory, and immune-boosting properties. In contrast, inhalation aromatherapy is a fast and safe method of administering essential oils to promote relaxation, stress relief, mood enhancement, and minor discomfort relief. In the mechanism of action, the essential oils affect the brain and body through olfactory and respiratory

stimulation and skin absorption. The signals are transmitted to the brain through the olfactory system and can influence neurotransmitter release and induce calming or stimulating effects. As an increasingly complementary therapy, aromatherapy is achieving importance globally furthermore, the continuous research and experimental activities underscore that use of essential oils offers numerous health benefits through making it a valuable complementary therapy in contemporary healthcare.

## REFERENCES

- Agnihotry, S., Chopra, D., Singh, J., Negi, S., Srivastav, A. K., Upadhyay, J., and Sharma, G. (2024). Aromatherapy Evolution and Blending Basics of Essential Oils. *Aromatherapy: The Science of Essential Oils*, 1.
- Alegbeleye, O., Odeyemi, O. A., Strateva, M., and Stratev, D. (2022). Microbial spoilage of vegetables, fruits and cereals. *Applied Food Research*, 2(1), 100122
- Ali, B., Al-Wabel, N. A., Shams, S., Ahamad, A., Khan, S. A., and Anwar, F. (2015). Essential oils used in aromatherapy: A systemic review. *Asian Pacific Journal of Tropical Biomedicine*, 5(8), 601-611
- Aljaafari, M. N., AlAli, A. O., Baqais, L., Alqubaisy, M., AlAli, M., Molouki, A., and Lim, S. H. E. (2021). An overview of the potential therapeutic applications of essential oils. *Molecules*, 26(3), 628.
- Anushri, M., Yashoda, R., and Puranik, M. P. (2015). Herbs: A good alternatives to current treatments for oral health problems. *Dermatitis*, 7, 9-12.
- Bayantassova, S. M., Nurgaliyev, B. E., Muhanbetkalieva, G. S., and Dzhumagulova, S. K. (2022). Veterinary-sanitary inspection of poultry, fish, beekeeping and plant products
- Bercik, J., Neomániová, K., Gálová, J., Mravcová, A., Sendra, E., López-Lluch, D., and Madzík, P. (2021). The use of aromatization and smart solutions in selected economic sectors.
- Bhavaniramy, S., Vishnupriya, S., Al-Aboody, M. S., Vijayakumar, R., and Baskaran, D. (2019). Role of essential oils in food safety: Antimicrobial and antioxidant applications. *Grain and Oil Science and Technology*, 2(2), 49-55.
- Bunse, M., Daniels, R., Gründemann, C., Heilmann, J., Kammerer, D. R., Keusgen, M., and Wink, M. (2022). Essential oils as multicomponent mixtures and their potential for human health and well-being. *Frontiers in Pharmacology*, 13, 956541
- Cui, J., Li, M., Wei, Y., Li, H., He, X., Yang, Q., and Qin, D. (2022). Inhalation aromatherapy via brain-targeted nasal delivery: Natural volatiles or essential oils on mood disorders. *Frontiers in Pharmacology*, 13, 860043
- Dagli, N., Dagli, R., Mahmoud, R. S., and Baroudi, K. (2015). Essential oils, their therapeutic properties, and implication in dentistry: A review. *Journal of International Society of Preventive and Community Dentistry*, 5(5), 335-340.
- de Andrade, M. F., Silva, M. G., de Lima Silva, I. D., Caetano, V. F., de Moraes Filho, L. E. P. T., Vinhas, G. M., and de Almeida, Y. M. B. (2022). Pepper-rosmarin essential oil (*Lippia sidoides* Cham.) as an antioxidant additive for PBAT–poly (butylene adipate co-terephthalate) films and its application for active packaging. *International Journal of Food Science and Technology*, 57(9), 5966-5972.
- Duarte, M. C. T., Duarte, R. M. T., Rodrigues, R. A. F., and Rodrigues, M. V. N. (2017). Essential oils and their characteristics. *Essential Oils in Food Processing: Chemistry, Safety and Applications*, 1-19
- Elshafie, H. S., and Camele, I. (2017). An overview of the biological effects of some mediterranean essential oils on human health. *BioMed Research International*, 2017(1), 9268468
- Farrar, A. J., and Farrar, F. C. (2020). Clinical aromatherapy. *Nursing Clinics*, 55(4), 489-504.
- Fokou, J. B. H., Dongmo, P. M. J., and Boyom, F. F. (2020). Essential oil's chemical composition and pharmacological properties. In *Essential Oils-oils of Nature*. IntechOpen
- Franco, L. S., Shanahan, D. F., and Fuller, R. A. (2017). A review of the benefits of nature experiences: More than meets the eye. *International Journal of Environmental Research and Public Health*, 14(8), 864
- Franco, L. S., Shanahan, D. F., and Fuller, R. A. (2017). A review of the benefits of nature experiences: More than meets the eye. *International Journal of Environmental Research and Public Health*, 14(8), 864.
- Freires, I. A., Denny, C., Benso, B., Alencar, S. M. D., and Rosalen, P. L. (2015). Antibacterial activity of essential oils and their isolated constituents against cariogenic bacteria: a systematic review. *Molecules*, 20(4), 7329-7358.
- Fung, T. K., Lau, B. W., Ngai, S. P., and Tsang, H. W. (2021). Therapeutic effect and mechanisms of essential oils in mood disorders: Interaction between the nervous and respiratory systems. *International Journal of Molecular Sciences*, 22(9), 4844.
- Halder, D., Barik, B. B., Dasgupta, R. K., and Saumendu, D. (2018). Aroma therapy: An art of healing. *Indian Research Journal of Pharmacy and Science*, 17, 1540-58.
- Hedaoo, S. A., and Chandurkar, P. A. (2019). A review on aromatherapy. *World Journal of Pharmaceutical Research*, 8(7), 635-651.
- Herman, A., and Herman, A. P. (2015). Essential oils and their constituents as skin penetration enhancer for transdermal drug delivery: a review. *Journal of Pharmacy and Pharmacology*, 67(4), 473-485
- Horváth, G., and Ács, K. (2015). Essential oils in the treatment of respiratory tract diseases highlighting their role in bacterial infections and their anti-inflammatory action: a review. *Flavour and Fragrance Journal*, 30(5), 331-341
- Jaruzel, C. B., Gregoski, M., Mueller, M., Faircloth, A., and Kelechi, T. (2019). Aromatherapy for preoperative anxiety: A pilot study. *Journal of Perianesthesia Nursing*, 34(2), 259-264.

- Khan, M. S. A., and Ahmad, I. (2019). Herbal medicine: current trends and future prospects. In *New look to phytomedicine* (pp. 3-13). Academic Press
- Koul, O., Walia, S., and Dhaliwal, G. S. (2008). Essential oils as green pesticides: potential and constraints. *Biopestic International*, 4(1), 63-84.
- Kuriyama, H., Watanabe, S., Nakaya, T., Shigemori, I., Kita, M., Yoshida, N., and Imanishi, J. (2005). Immunological and psychological benefits of aromatherapy massage. *Evidence-based Complementary and Alternative Medicine*, 2(2), 179-184.
- Lee, H., and Yoon, Y. (2021). Etiological agents implicated in foodborne illness worldwide. *Food science of animal resources*, 41(1), 1.
- Makeri, M., and Salihu, A. (2023). Jasmine essential oil: Production, extraction, characterization, and applications. In *Essential Oils* (pp. 147-177). Academic Press.
- Malabadi, R. B., Kolkar, K. P., Meti, N. T., and Chalannavar, R. K. (2021). Role of botanical essential oils as a therapy for controlling coronavirus (SARS-CoV-2) disease (Covid-19). *International Journal of Research and Scientific Innovations*, 8(4), 105-118.
- Nguyen, N. P. K., Tran, K. N., Nguyen, L. T. H., Shin, H. M., and Yang, I. J. (2023). Effects of Essential Oils and Fragrant Compounds on Appetite: A Systematic Review. *International Journal of Molecular Sciences*, 24(9), 7962
- Palombo, E. A. (2006). Phytochemicals from traditional medicinal plants used in the treatment of diarrhoea: modes of action and effects on intestinal function. *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives*, 20(9), 717-724.
- Pan, S. Y., Litscher, G., Gao, S. H., Zhou, S. F., Yu, Z. L., Chen, H. Q., and Ko, K. M. (2014). Historical perspective of traditional indigenous medical practices: the current renaissance and conservation of herbal resources. *Evidence-Based Complementary and Alternative Medicine*, 2014(1), 525340.
- Pan, S. Y., Litscher, G., Gao, S. H., Zhou, S. F., Yu, Z. L., Chen, H. Q., and Ko, K. M. (2014). Historical perspective of traditional indigenous medical practices: the current renaissance and conservation of herbal resources. *Evidence-Based Complementary and Alternative Medicine*, 2014(1), 525340
- Pandey, A. K., Kumar, P., Singh, P., Tripathi, N. N., and Bajpai, V. K. (2017). Essential oils: Sources of antimicrobials and food preservatives. *Frontiers in Microbiology*, 7, 228506.
- Rai, M., Paralikar, P., Jogee, P., Agarkar, G., Ingle, A. P., Derita, M., and Zacchino, S. (2017). Synergistic antimicrobial potential of essential oils in combination with nanoparticles: Emerging trends and future perspectives. *International Journal of Pharmaceutics*, 519(1-2), 67-78
- Roca-Saavedra, P., Mendez-Vilabrille, V., Miranda, J. M., Nebot, C., Cardelle-Cobas, A., Franco, C. M., and Cepeda, A. (2018). Food additives, contaminants and other minor components: Effects on human gut microbiota—A review. *Journal of Physiology and Biochemistry*, 74, 69-83
- Rudra, S. G., Gundewadi, G., and Sharma, R. R. (2020). Natural additives with antimicrobial and flavoring potential for fresh-cut produce. In *Fresh-cut fruits and Vegetables* (pp. 165-182). Academic Press.
- Sattayakhom, A., Wichit, S., and Koomhin, P. (2023). The effects of essential oils on the nervous system: a scoping review. *Molecules*, 28(9), 3771
- Sharifi-Rad, J., Sureda, A., Tenore, G. C., Daglia, M., Sharifi-Rad, M., Valussi, M., and Iriti, M. (2017). Biological activities of essential oils: From plant chemoecology to traditional healing systems. *Molecules*, 22(1), 70.
- Sivaphongthongchai, A. (2021). Effects of selected aroma compounds on physiological activities and emotions
- Sowndhararajan, K., and Kim, S. (2016). Influence of fragrances on human psychophysiological activity: With special reference to human electroencephalographic response. *Scientia Pharmaceutica*, 84(4), 724-752.
- Taghavi, T., Kim, C., and Rahemi, A. (2018). Role of natural volatiles and essential oils in extending shelf life and controlling postharvest microorganisms of small fruits. *Microorganisms*, 6(4), 104.
- Thangaleela, S., Sivamaruthi, B. S., Kesika, P., Bharathi, M., Kunaviktikul, W., Klunklin, A., and Chaiyasut, C. (2022). Essential oils, phytoncides, aromachology, and aromatherapy—a review. *Applied Sciences*, 12(9), 4495.
- Vora, L. K., Gholap, A. D., Hatvate, N. T., Naren, P., Khan, S., Chavda, V. P., and Khatri, D. K. (2024). Essential oils for clinical aromatherapy: a comprehensive review. *Journal of Ethnopharmacology*, 118180.
- Yeshi, K., and Wangchuk, P. (2022). Essential oils and their bioactive molecules in healthcare. In *Herbal biomolecules in healthcare applications* (pp. 215-237). Academic Press.
- Zhong, Y., Zheng, Q., Hu, P., Huang, X., Yang, M., Ren, G., and Liu, S. (2019). Sedative and hypnotic effects of compound Anshen essential oil inhalation for insomnia. *BMC Complementary and Alternative Medicine*, 19, 1-11.