

Effect on Medicinal Properties through Climate Change in Basil Oil

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Abstract

In ancient India, essential oils and natural remedies played a significant role in traditional medicine, particularly within the Ayurvedic system. Basil oil is one of them. Basil oil is a multifaceted essential oil with many health, wellness, and cuisine applications. Climate change is one of humanity's greatest challenges today, with wide-ranging impacts on ecosystems, human health, and economies. Basil oil is widely used in traditional medicine, and its medicinal properties are affected by climate change.

Keywords: Basil oil, Climate change, medicine, skin, anti-inflammatory and antimicrobial.

Introduction

Climate change presents a complex and evolving challenge for global agriculture. Increasing temperature in some regions may benefit from longer growing seasons, but the overall impact is largely negative, with decreased yields, altered growing conditions, increased pest and disease pressure, and declining crop quality. Plants are challenged by hostile environments of temperature, drought, salinity, and heavy metals which disrupt cellular and developmental processes. High temperature and water stress are common climate factors that can significantly affect and diminish crop yields.

Plants have developed complex, well-organized mechanisms to adapt and tolerate biotic and abiotic stress conditions. Without effective adaptation, climate change could severely threaten food security and agricultural sustainability in many parts of the world. Abiotic stresses such as water stress, salinity, cold temperature, anoxia, high light intensity, and nutrient imbalances usually and highly significantly affect plant growth, development, and productivity.

Basil, an herb native to tropical regions of central Africa and Southeast Asia, has been cultivated and used for thousands of years, particularly in traditional medicine and cultural practices. The knowledge of using basil and its oil has been passed down through generations, continuing to be an integral part of traditional Indian medicine and culture. Basil leaves are a rich source of nutrients. Basil oil, derived from the leaves and flowers of the basil plant (*Ocimum basilicum*), is a versatile essential oil known for its aromatic, medicinal, and culinary properties. Basil has a rich history has been valued across various cultures for its numerous benefits. Basil oil's role in Ancient India was for religious and spiritual significance. The leaves and oil were used in religious rituals and ceremonies, believed to purify and protect against negative energies.

Basil oil, extracted from the basil plant leaves, was used for its anti-inflammatory, antimicrobial, and antioxidant properties. It was often applied to treat respiratory conditions, skin infections, and digestive issues. Basil oil's aromatic properties were used to calm the mind and enhance mental clarity. It was often used in meditation practices to alleviate stress and anxiety. While basil oil was used mainly for its medicinal properties, the basil plant leaves were also used in cooking to add flavor and aroma to various dishes.

Health Benefits of Basil Essential Oil- Basil oil, derived from the basil plant (*Ocimum basilicum*), is widely used in traditional medicine and aromatherapy for its therapeutic properties. Stress relief and mental clarity

through aromatherapy are important for mental health. Inhalation of basil oil can help reduce stress, anxiety, and mental fatigue. It is known to promote mental clarity and focus, making it useful during periods of mental exertion or stress. Calming Effects is another property where Basil oil calming effect on the nervous system and is often used to alleviate symptoms of depression and anxiety. Add a few drops of basil oil to your bathwater to relax muscles and calm the mind.

Pain Relief in Anti-inflammatory Properties by Basil oil can help reduce pain and swelling associated with arthritis, muscle aches, and joint pain. Muscular Relaxation can be used in massage therapy to relieve muscle tension, cramps, and spasms. Basil oil helps in Respiratory Health as a natural remedy for respiratory conditions such as colds, bronchitis, and asthma.

The antibacterial properties of basil oil can help in fighting respiratory infections. Basil oil aids digestion by reducing bloating, gas, and discomfort. It can stimulate appetite and promote the efficient breakdown of food. It can relieve stomach cramps and other gastrointestinal spasms. Basil oil's antimicrobial properties effectively treat minor skin infections, cuts, and wounds. It can be used to treat acne and other skin blemishes due to its ability to inhibit the growth of bacteria on the skin.

The antioxidant properties of basil oil can help reduce signs of aging, such as wrinkles and fine lines. Basil oil can promote a healthy scalp by reducing dandruff and itchiness. Regular use of basil oil can help in boosting the immune system, making the body more resistant to infections and diseases.



Fig no 1: Health benefits of Basil Oil

Effect of climate change on chemical composition of Basil oil- Climate change characterized by rising global temperatures, altered precipitation patterns, and extreme weather events directly affects agriculture, including the cultivation of medicinal and aromatic plants like basil (*Ocimum basilicum*).

Basil oil, extracted from basil leaves, is valued for its therapeutic, culinary, and cosmetic uses. However, climate change impacts the quantity and quality of basil oil production. Climate change can affect the chemical composition of basil oil. Excess heat and drought stress might alter the proportions of linalool, eugenol, and methyl chavicol in basil oil, reducing its medicinal efficacy and altering its fragrance.

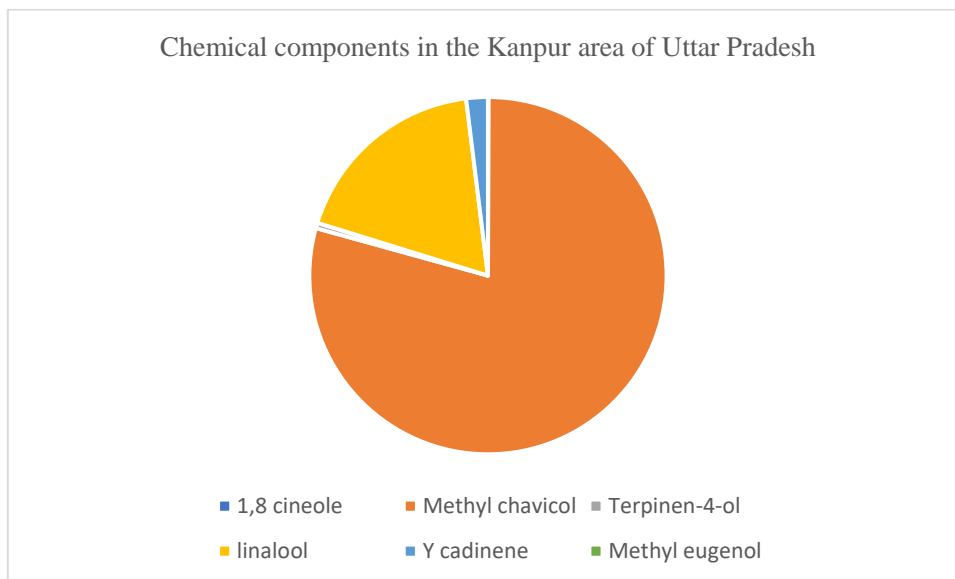


Fig no 2: Chemical components in the Kanpur area of Uttar Pradesh

Basil growth affected between 25°C and 30°C continuous increases in temperature decrease the growth of the basil plant. Climate change-induced temperature fluctuations can lead to heat stress, affecting plant growth, oil yield, and composition. Altered rainfall patterns and droughts may result in insufficient water availability, hindering basil cultivation. Basil is sensitive to water scarcity, which can reduce essential oil concentration and affect the balance of its active components (e.g., linalool, eugenol). Intense rainfall or droughts caused by climate change can affect soil health, reducing nutrient availability, and impacting basil plants' ability to produce oil.

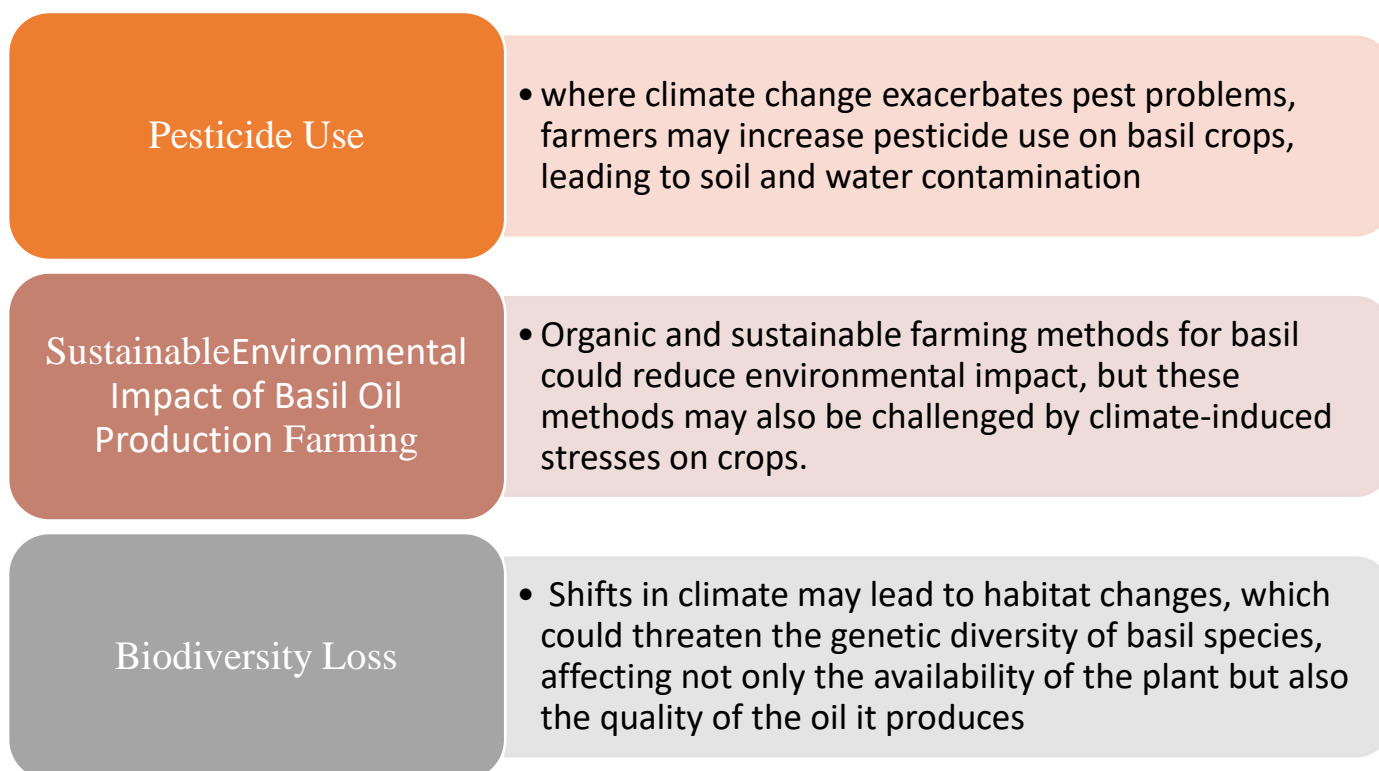


Fig no 3: Environmental Impact of Basil Oil Production

Conclusion: - Climate change presents a complex and evolving challenge for global agriculture. Increasing temperatures, the overall impact is largely negative, with decreased yields, altered growing conditions, increased pest and disease pressure, and declining crop quality. Basil oil offers numerous health benefits, but the effects of climate change pose challenges to its production and quality. Ensuring sustainable farming practices and adapting to changing climate conditions will be crucial for maintaining both human and environmental health in the context of basil oil.

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