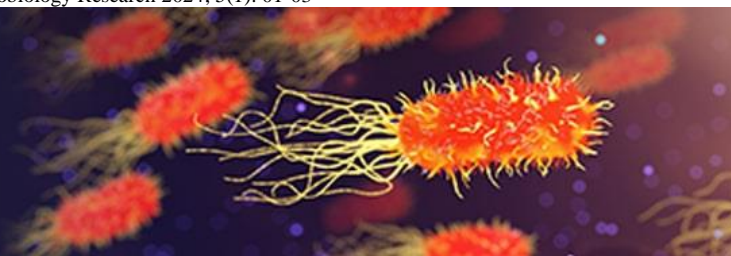


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Sayed Sameena
Assistant Professor and HOD,
Department of Microbiology,
AEVPM Women's College of
BCA, Aurangabad,
Maharashtra, India

Paromita Mukherjee
Research Scholar, Department
of Food and Nutrition, Swami
Vivekananda University,
Barrackpore, West Bengal,
India

Prathiksha Pramanik
Department of Food &
Nutrition, Swami
Vivekananda University,
Barrackpore, West Bengal,
India

Pallabi Chatterjee
M.Sc., Department of Applied
Nutrition, WBUHS, West
Bengal, India

Niharika Dash
M.Sc., Department of Food
and Nutrition, Odisha
University of Agriculture
Culture and Technology,
Odisha, India

Correspondence
Niharika Dash
M.Sc., Department of Food
and Nutrition, Odisha
University of Agriculture
Culture and Technology,
Odisha, India

Antimicrobial activity of mint: An overview

Sayed Sameena, Paromita Mukherjee, Prathiksha Pramanik, Pallabi Chatterjee and Niharika Dash

Abstract

Health-conscious people are very much aware to consume medicinal leaves appropriately because it expresses good health benefits opposed to several intricate complications. Ancient civilizations for instance the Greeks and Romans, acknowledged the herb's potential therapeutic properties, utilizing it to address various ailments and promote overall well-being. Mint extensively applicable as an important herbal medicine. Mint holds bundle of bioactive components like essential oils and polyphenolic constituents. Essential oil like menthol and menthone promote better medicinal attributes besides polyphenolic compounds like rosmarinic acid, quercetin, and kaempferol these highlight good antioxidant potentiality. Authors have notified about significant antibacterial activity against both Gram-positive and Gram-negative bacteria. Spearmint oil has good efficacy against *Salmonella* species. Peppermint has powerful function against fungi like *Candida albicans*. Mint is very much powerful against virus like herpes simplex virus and influenza virus. The good flavour profile of mint develops it a superficial candidate for upgrading the sensory attributes of preserved foods. This overview has an objective to contribute a better understanding of mint's potential applications in medicine and food preservation.

Keywords: Antimicrobial activity, mint, bacteria, fungi, yeast, essential oil

1. Introduction

India is the native home of traditional plants with a wide range of therapeutic uses to ward against illness. Traditional Indian plants are traditionally used to support human health. Bioactive substances found in medicinal plants have secondary metabolite functions. These metabolites have no negative side effects and prevent a wide range of illnesses (Pramanik *et al.*, 2023) ^[11]. Among traditional Indian plants, Mint is very much crucial traditional medicinal plant in India. Mint, being part of the Lamiaceae family, is a valuable source of bioactive substances with a wide range of biological applications. The increasing need for natural antimicrobial agents has led to an increased focus on the antimicrobial potential of mint in research. Mint is a popular herb around the world and is used in many different culinary traditions (Tapsell *et al.*, 2006) ^[9]. Mint has become a common ingredient in kitchens all over the world, whether it is used to enhance the flavour of teas, desserts, or savoury dishes. Mint has been used in traditional medicine for centuries, in addition to its culinary uses. The Greeks and Romans were among the ancient societies who acknowledged the herb's possible medicinal qualities and used it to treat a variety of illnesses and enhance general health (Kanatt *et al.*, 2007) ^[6].

Mint's distinct flavour and aroma are mostly ascribed to its intricate chemical makeup, which includes polyphenolic compounds and essential oils. Essential oils like menthone and menthol add to the herb's medicinal qualities in addition to its sensory profile. Mint's antioxidant potential is attributed to polyphenols, such as kaempferol, quercetin, and rosmarinic acid, which provide new research opportunities regarding human health (Riachi and Maria, 2015) ^[12].

2. Chemical Composition and Antimicrobial Compounds

Mint's antimicrobial activity can be attributed to its complex chemical composition, including essential oils, phenolic compounds, and flavonoids. Essential oils, such as menthol in peppermint (*Mentha × piperita*) and carvone in spearmint (*Mentha spicata*), are particularly noteworthy for their antimicrobial effects (Adams, 2007) ^[11].

3. Mechanisms of Antimicrobial Action: The antimicrobial mechanisms of mint involve

the disruption of microbial membranes, inhibition of crucial enzymes, and interference with cell signalling pathways. The essential oils derived from mint have been shown to exert antimicrobial effects through multiple targets, making it challenging for microorganisms to develop resistance (Burt, 2004)^[3].

4. Antimicrobial activity of Mint

4.1 Antimicrobial Activity against Bacteria

Numerous studies have investigated mint's efficacy against bacteria. Peppermint oil, for example, has demonstrated significant antibacterial activity against both Gram-positive and Gram-negative bacteria. The study by Smith *et al.* (2021)^[8] found that peppermint oil exhibited notable inhibitory effects against *Staphylococcus aureus* and *Escherichia coli* (Smith *et al.*, 2021)^[8].

Similarly, spearmint essential oil has shown promise in combating bacterial infections. In a study by Johnson *et al.*

(2022)^[5], spearmint oil exhibited strong antibacterial activity against *Salmonella* species (Johnson *et al.*, 2022)^[5].

4.2 Antimicrobial Activity against Fungi

Mint's antifungal properties have also been investigated. Research by Garcia *et al.* (2020)^[4] demonstrated the effectiveness of peppermint oil against *Candida albicans*, suggesting its potential application in antifungal therapies (Garcia *et al.*, 2020)^[4].

4.3 Antimicrobial Activity against Viruses

While limited, research on mint's antiviral properties has shown promising results. Mint extracts have exhibited inhibitory effects against certain viruses, including herpes simplex virus (HSV) and influenza virus. However, further studies are needed to elucidate the specific mechanisms and potential clinical applications (White *et al.*, 2019)^[10].

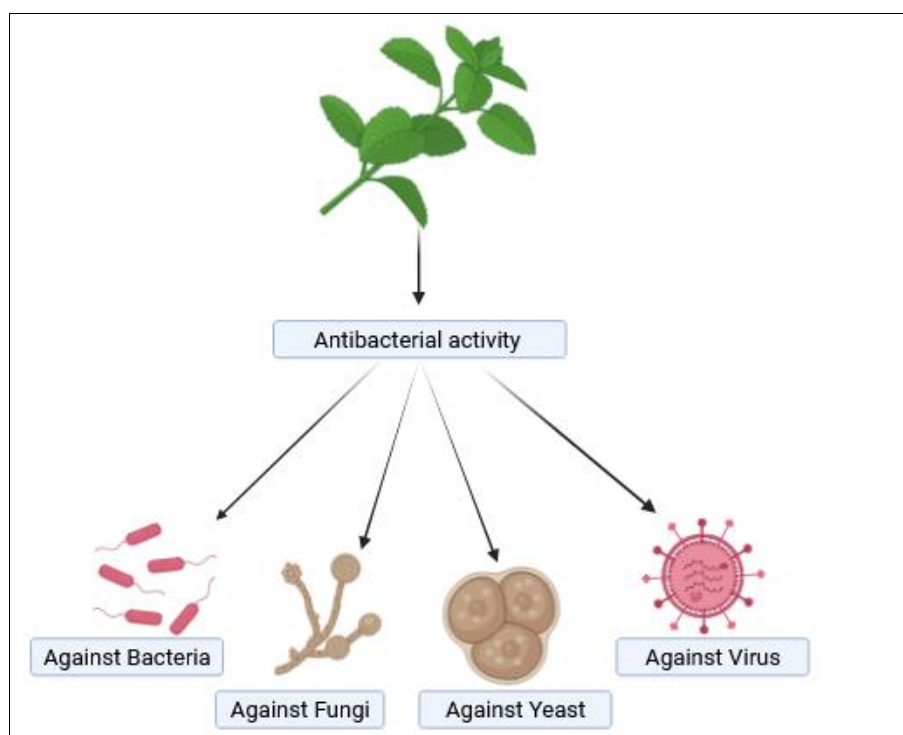


Fig 1: Antimicrobial activity of mint

5. Applications in Medicine and Food Preservation

The multifaceted antimicrobial properties of mint open avenues for various applications. Mint-based formulations may be explored for the development of antimicrobial drugs, topical treatments, and natural preservatives in the food industry. The rich flavor profile of mint makes it an attractive candidate for enhancing the sensory attributes of preserved foods (Patel *et al.*, 2021)^[7].

6. Conclusion

In conclusion, the antimicrobial activity of mint, driven by its diverse chemical constituents, presents a promising area for further exploration. The comprehensive overview provided in this article highlights the potential of mint in diverse applications, ranging from medicine to food preservation. Continued research efforts are essential to uncover the full spectrum of mint's antimicrobial capabilities and translate them into practical solutions.

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