

Antibacterial Activity of *Mentha piperita* (Pudina) Ethanolic Extract Against Oral Pathogenic Bacteria

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Structured Abstract

Background: The emergence of bacterial antimicrobial resistance (AMR) is a major public health concern. To combat AMR, there is a need to search for other alternatives. A study stated that distilled quantities of *Mentha piperita* essential oils can have effects similar to those of the antibiotic gentamycin in preventing the growth of bacteria. The plant extract has demonstrated antimicrobial activity against prevalent human pathogenic bacterial and fungal strains. This study aims to evaluate the effectiveness of *M. piperita* ethanolic extract against oral pathogenic bacteria (*Streptococcus mutans*, *Streptococcus sanguinis* & *Enterococcus faecalis*).

Methods: The leaves of *M. piperita* were ground into a powder and soaked in ethanol for a full day to extract their essence. To evaluate the antibacterial properties of the extract, the Kirby-Bauer disc diffusion assay, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) were used. 6mm discs were soaked in various concentrations of the extract (ranging from 50 to 400 mg/mL) and then placed on Mueller-Hinton Agar streaked with the bacteria inoculum. Different dilutions of the extract were dispensed into microtiter plates containing a standardized amount of bacteria. The MIC and MBC were then determined with the help of a resazurin-based method.

Results: Disc diffusion assay showed that the extract of *M. piperita* showed higher antimicrobial activity against the *S. mutans* strain specifically ATCC 25175 and DSM 20523 than other clinical strains. The minimum bactericidal concentration (MBC) to minimum inhibition concentration (MIC) ratio for the *S. mutans* ATCC 25175, *S. mutans* DSM 20523, and *S. sanguinis* was 4, and for *S. mutans* Z and *E. faecalis*, the ratio was 2, classifying it as bactericidal.

Conclusion: This study revealed that the ethanolic extract of *M. piperita* demonstrates a broad-spectrum antibacterial activity, effectively killing a wide range of oral pathogenic bacteria. The observed MIC and MBC values indicate that the ethanolic extract of *M. piperita* displays bactericidal properties, with an MBC/MIC ratio of less than or equal to 4. This study has confirmed that the ethanolic extract of *M. piperita* contains an antibacterial compound. This compound has the potential to serve as an antibacterial agent and is effective in inhibiting the growth of oral pathogenic bacteria.

Keywords: *Mentha piperita*, antimicrobial resistance, ethanolic extract, oral pathogenic bacteria, bactericidal

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