

Poster 2

Exploring cannabinoids as a novel strategy against antimicrobial resistance: a systematic review

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Abstract

Background: Natural products have been widely researched for their potential antimicrobial properties in the fight against microorganisms' resistance to traditional drugs. Among these, cannabinoids have gained significant attention for their broad range of biological activities and their potential to enhance the effectiveness of traditional antimicrobial treatments [1]. **Objective:** This work presents a systematic review that provides a summary of research from 2020-2024 on the therapeutic potential of cannabinoids against various microorganisms, including bacteria, fungi, and viruses. **Methods:** A literature search was conducted in PubMed, Scopus and ScienceDirect databases following the PRISMA guidelines. References were screened and selected based on eligibility criteria, with full-text articles assessed for inclusion and summarized. **Results:** The final selection included 46 papers. The results demonstrated that cannabinoids have significant antibacterial activity, especially against Gram-positive bacteria including *Staphylococcus aureus*, vancomycin-resistant *Enterococcus faecium*, methicillin-resistant *Staphylococcus aureus* and vancomycin-intermediate resistant *Staphylococcus aureus*, as well as the oral cariogenic *Streptococcus mutans* [2,3]. Despite the limited antimicrobial activity against Gram-negative bacteria, due to the presence of the outer membrane, lipopolysaccharides and porins, some studies have demonstrated the antibacterial efficacy of cannabidiol (CBD) against *E. coli*, *Neisseria gonorrhoeae* and *Pseudomonas aeruginosa* [2]. Several cannabinoids have been shown to inhibit bacterial biofilm formation by reducing the expression of key biofilm-regulating genes, decreasing extracellular polysaccharide production, disrupting quorum sensing and increasing ROS production [4]. CBD exhibits strong antiviral activity against SARS-CoV-2 variants by reducing viral entry, preventing early-stage replication, and modulating the immune response in later stages [5]. Additionally, CBD impacts cellular membranes, inhibiting the replication of Zika virus and other viruses, indicating its broad-spectrum antiviral potential. CBD also inhibited the growth and formation of *Candida albicans* biofilm and induced disorganization of mature biofilm, showing an antifungal activity [6]. Cannabinoids, when combined with traditional antimicrobial agents, show potential for synergistic interactions, making them a promising strategy in combating drug resistance. **Conclusions:** Cannabinoids hold potential as a novel approach to develop treatments for drug-resistant infections, reducing the need for traditional antimicrobial agents.

Keywords: cannabinoids; antimicrobial potential; antibacterial; antiviral; antifungal

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