

# Chapter 9


## Antimicrobial Properties of Secondary Metabolites

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### ABSTRACT

*Secondary metabolites are highly potent organic compounds that are synthesised by plants, fungi, and bacteria as a defence mechanism against predators. Plants have been employed as traditional remedies for centuries due to their production of a diverse array of secondary metabolites. Many individuals are intrigued by the potential of food and other plant materials to serve as alternative medications due to their bioactive components, which have the ability to suppress microbial proliferation and treat it with minimal adverse effects. The critical function of these components in enhancing the therapeutic efficacy of traditional medications against a diverse array of pathogenic germs was demonstrated by their addition. Additionally, researchers have investigated the use of specific metabolites in conjunction with antimicrobial pharmacological medications to address the issues resulting from drug resistance. Therefore, this chapter examines the antimicrobial properties of secondary metabolites and their role in enhancing drug sensitivity in the presence of pathogenic organisms.*

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## INTRODUCTION

Medicinal plants are chiefly regarded for the diverse plant constituents utilised in the treatment of chronic and infectious disorders within the pharmaceutical sector. Prior to humanity's understanding of bacteria, it was already established that such organisms had antibacterial properties that we now recognise. Traditional herbal treatments are rooted in historical and cultural ideas, contributing to their global prevalence (Ogidi & Emaikwu, 2023a, b). In contemporary usage, “herb” denotes both the woody and non-woody components of a plant (Bourinbaïar & Lec-Huang, 1996). The rich origins of antibacterial drugs are derived from medicinal plants. According to the WHO, medicinal plants are the primary source of many pharmacological molecules, with 80 percent of the global population relying on herbal medicine and the use of plant extracts or active ingredients for a significant share of conventional therapies (Ogidi, 2023). Nonetheless, a relatively recent area of study is the research analysis aimed at identifying their antibacterial active components (Anand et al., 2019).

Infectious diseases are common, especially those affecting the skin and mucous membranes. Fungi and bacteria constitute a significant category of skin infections. The most severe inoculation problems encompass dermal irritation, folliculitis, skin degradation, acne, dermatitis, and rosacea, among others. Multi-drug-resistant bacteria have been a major contributor to premium skincare products. A new kind of infectious disease, known as multidrug resistance, has emerged as a result of the widespread and unregulated use of synthetic antimicrobial drugs (Ogidi et al., 2023). It is also known that people with weakened immune systems are more likely to get infections that are difficult to cure. A promising solution to multi-drug resistance bacteria is a new chemical exhibiting diverse mechanisms of antibiotic action against microorganisms. Current medications utilised for the protection of infectious disorders sometimes provoke substantial enquiries concerning their safety. Numerous synthetic pharmaceuticals induce unpleasant responses. Antimicrobial agents derived from potential plants should be investigated to address this issue (Ogidi et al., 2022). These herbal drugs exhibit reduced toxicity; they possess no adverse effects and are cost-effective. They treat infectious illnesses effectively, nearly equivalent to synthetic antimicrobials (Kubo et al., 1994; Ahmed et al., 1993). Plant-dependent antimicrobials provide a significant, underutilised reservoir of pharmaceuticals, necessitating urgent exploration of their potential. Plant-derived antimicrobials possess considerable therapeutic potential. The present study highlights the significant potential of plants as sources of antimicrobial agents (Hunter & Hull, 1993).

The ongoing proliferation of multidrug resistance in various microorganisms has established a formidable obstacle in the fight against infectious diseases (Ferri et al., 2017; Prestinaci et al., 2015). The overuse of antibiotics by humans is one of

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