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Antibacterial Effects of Flavonoids and Their Structure-Activity Relationship Study: A Comparative Interpretation
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Abstract

According to the latest report released by the World Health Organization, bacterial resistance to well-known and widely available antibacterial drugs has become a significant and severe global health concern and a grim challenge to tackle in order to cure infections associated with multidrug-resistant pathogenic microorganisms efficiently. Consequently, various strategies have been orchestrated to cure the severe complications related to multidrug-resistant bacteria effectively. Some approaches involved the retardation of biofilm formation and multidrug-resistance pumps in bacteria as well as the discovery of new antimicrobial agents demonstrating different mechanisms of action. In this regard, natural products namely alkaloids, terpenoids, steroids, anthraquinone, flavonoids, saponins, tannins, etc., have been suggested to tackle the multidrug-resistant bacterial strains owing to their versatile pharmacological effects. Amongst these, flavonoids, also known as polyphenolic compounds, have been widely evaluated for their antibacterial property due to their tendency to retard the growth of a wide range of pathogenic microorganisms, including multidrug-resistant bacteria. The hydroxylation of C5, C7, C3', and C4'; and geranylation or prenylation at C6 have been extensively studied to increase bacterial inhibition of flavonoids. On the other hand, methoxylation at C3' and C5 has been reported to decrease flavonoids' antibacterial action. Hence, the latest information on the antibacterial activity of flavonoids is summarized in this review, with particular attention to the structure-activity relationship of this broad class of natural compounds to discover safe and potent antibacterial agents as natural products. © 2022 by the authors. Licensee MDPI, Basel, Switzerland.

Author Keywords

Antibacterial effects; Flavonoids; Natural products; Pharmacophores; Structure activity relationship studies

Index Keywords

antiinfective agent, flavonoid; bacterial infection, bacterium, chemistry, drug effect, growth, development and aging, multidrug resistance, structure activity relation; Anti-Bacterial Agents, Bacteria, Bacterial Infections, Drug Resistance, Multiple, Bacterial, Flavonoids, Structure-Activity Relationship

Chemicals/CAS

Anti-Bacterial Agents; Flavonoids

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