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Antibacterial Mechanisms of Cinnamon and its Constituents: a Review

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Abstract:

BACKGROUND: In the current healthcare environment, an alarming rise in multi-drug resistant bacterial infections has led to a global health threat. The lack of new antibiotics has created a need for developing alternative strategies. **OBJECTIVE:** Understanding the antibacterial mechanisms of Cinnamon and its constituents is crucial to enhance it as a potential new source of antibiotic. The objective of this review is to provide a compilation of all described mechanisms of antibacterial action of Cinnamon and its constituents and synergism with commercial antibiotics in order to better understand how Cinnamon and its constituents can collaborate as alternative treatment to multi-drug resistant bacterial infections. **METHODS:** The relevant references on antibacterial activities of cinnamon and its constituents were searched. Meanwhile, the references were classified according to the type of mechanism of action against bacteria. Relationships of cinnamon or its constituents and antibiotics were also analyzed and summarized. **RESULTS:** Cinnamon extracts, essential oils, and their compounds have been reported to inhibit bacteria by damaging cell membrane; altering the lipid profile; inhibiting ATPases, cell division, membrane porins, motility, and biofilm formation; and via anti-quorum sensing effects. **CONCLUSION:** This review describes the antibacterial effects of cinnamon and its constituents, such as cinnamaldehyde and cinnamic acid, against pathogenic Gram-positive and Gram-negative bacteria. The review also provides an overview of the current knowledge of the primary modes of action of these compounds as well as the synergistic interactions between cinnamon or its constituents with known antibacterial agents. This information will be useful in improving the effectiveness of therapeutics based on these compounds.

Running Title: Antibacterial Mechanism of Cinnamon

Keywords: antimicrobial activity, cinnamon, mechanisms of action, multi-drug resistance, synergism, trans-cinnamaldehyde.

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