The missing piece: recent approaches investigating the antimicrobial mode of action of essential oils

ABSTRACT

Antibiotic resistance is a major global health issue that has seen alarming rates of increase in all parts of the world over the past two decades. The surge in antibiotic resistance has resulted in longer hospital stays, higher medical costs, and elevated mortality rates. Constant attempts have been made to discover newer and more effective antimicrobials to reduce the severity of antibiotic resistance. Plant secondary metabolites, such as essential oils, have been the major focus due to their complexity and bioactive nature. However, the underlying mechanism of their antimicrobial effect remains largely unknown. Understanding the antimicrobial mode of action of essential oils is crucial in developing potential strategies for the use of essential oils in a clinical setting. Recent advances in genomics and proteomics have enhanced our understanding of the antimicrobial mode of action of essential oils. We might well be at the dawn of completing a mystery on how essential oils carry out their antimicrobial activities. Therefore, an overview of essential oils with regard to their antimicrobial activities and mode of action is discussed in this review. Recent approaches used in identifying the antimicrobial mode of action of essential oils, specifically from the perspective of genomics and proteomics, are also synthesized. Based on the information gathered from this review, we offer recommendations for future strategies and prospects for the study of essential oils and their function as antimicrobials.

Keyword: Essential oil; Genomic analysis; Mode of action; Proteomic analysis