A review of plant-derived essential oils in ruminant nutrition and production☆,☆☆

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Abstract

Public concern over use of antibiotics in livestock production has increased in recent years because of their possible contribution to emergence of antibiotic resistant bacteria, and their transmission from livestock to humans. Accordingly, ruminant microbiologists and nutritionists have been exploring alternative methods of favorably altering ruminal metabolism to improve feed efficiency and animal productivity. Plant extracts contain secondary metabolites, such as essential oils (EO), that have antimicrobial properties that make them potential alternatives to antibiotics to manipulate microbial activity in the rumen. Essential oils are naturally occurring volatile components responsible for giving plants and spices their characteristic essence and color. Over the last few years, a number of studies have examined effects of EO, and their active components, on rumen microbial fermentation. However, many of these studies are laboratory based (*i.e.*, *in vitro*) and of a short-term nature.

Abbreviations: AA, amino acid; DM, dry matter; EO, essential oil; HAP, hyper-ammonia producing bacteria; MEO, mixture of essential oil compounds; VFA, volatile fatty acid

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