

## Spices as Potent Antimicrobial Agents

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### Editorial

Spices are used traditionally from ancient days as flavoring agents, food additives, food preservatives and in folk medicines. Spices are obtained from different plant parts such as fruits, leaves, buds, seeds, bark and rhizomes. It is noted that India is called “Land of Spices” as about sixty-three different varieties of spices are grown here [1,2].

The plant-derived oils are a rich source of bioactive compounds such as carvacrol, eugenol, cineole, cinnamaldehyde, limonene, geraniols, limonene, cuminaldehyde, menthol, thymol, citral, terpineol, vanillin, perillyl alcohol, vanillin and others with a strong medicinal value. Major issues, such as poor aqueous solubility and volatility due to the lipophilic nature of these essential oils, still remain a major concern with respect to the usage of these bioactive components. To overcome these disadvantages, nanocarriers are exploited in recent times and studied in depth.

Nanoemulsions are demonstrated to have a strong impact on antimicrobial activity due to their wide spectrum action against bacteria, fungi and viruses. Moreover, nanoemulsions are known to have important and unique properties such as nano-sized droplets, homogeneity, transparency, high stability, improved bioavailability and easier permeation through blood capillaries without elimination from natural host defense mechanism [3-6].

There are published reports on spice-based nanoemulsions as potent antimicrobial agents. A study on various essential oils demonstrated that clove and lemongrass emulsions prepared by a microfluidization technique were superior in bactericidal activity against *Escherichia coli* and showed higher inactivation kinetics [7]. A carvacrol- incorporated nanoemulsion system produced by spontaneous emulsification technique demonstrated potent antimicrobial activity [8]. Also, infusion of carvacrol into food matrices showed higher antimicrobial activity due to particle size reduction to nanometer range [9]. Turmeric nanoemulsions prepared by high-energy methods demonstrated antibacterial activity against *Staphylococcus aureus* [10]. Another study has documented a good antimicrobial action by the combined effects of carvacrol, limonene and cinnamaldehyde infused into a sunflower oil nanoemulsion system [11]. Spices are one of the most abundant

natural sources available. But, research on spice-based nanoemulsions is very limited, and importance should be given to this field owing to its beneficial effects in the field of medicine.

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