Prevention of Bacterial Infections Using Encapsulated Phytophenolic Actives

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Résumé en anglais	The recent overuse of antibiotics has led to the emergence of multidrug-resistant bacteria (MRB) responsible for severe infections, which are often difficult or impossible to treat. In the world of infectious diseases, the lack of development ofnew antibacterial molecules by the pharmaceutical industry is a major problem. Today, the number of new drugs able totreat Gram-negative MRB infections is significantly limited. It is therefore important to find new therapeutic approaches that are effective but limit the emergence of bacterial resistance. Medicinal plants containing essential oils constitute a potentially large source of antibacterial molecules that can be used to treat MRB infections. Essential oils, which primarily consist of phenolic compounds, have been demonstrated to have antibacterial effects against a wide variety of microorganisms. However, these molecules exhibit poor solubility in water and are biologically unstable. In addition, these molecules tend to bind to food constituents, resulting in decreased bioavailability and antimicrobial activity. To overcome these challenges, essential oils can be encapsulated within nanoparticles to enhance their solubility in aqueous media and to increase their antibacterial activity by facilitating contact with bacterial cells. The high antibacterial effectiveness of several delivery systems, including emulsions, liposomes and nanoparticles, indicates the potential of encapsulated phenols. The anti-infective potential of essential oils, combined with various technologies from nanomedicine, provides a new hope in the fight against infectious diseases.
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