

Recent Advancements and Future Trends in the Development of Antimicrobial Edible Films for Food Preservation

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Abstract : Food packaging plays a crucial role in protecting food from unwanted external factors. Antibacterial edible films are a promising option for food packaging due to their biodegradability, environmental friendliness, and safety. This paper reviews recent research progress on antimicrobial edible films, focusing on those made from polysaccharides, proteins, and lipids. Polysaccharides and proteins are the primary components of antimicrobial edible films, while lipids primarily serve as plasticizers and carriers for active substances in composite films. For instance, second-generation liposomes have shown great potential as carriers for antimicrobial substances and other bioactive compounds due to their exceptional stability. Furthermore, this paper analyzes recent advancements and future trends in antimicrobial edible films. One promising direction is the integration of antimicrobial edible film materials with delivery systems, such as nanoemulsion and microencapsulation technologies, to ensure stable loading of bioactive substances. Another emerging area of interest is the development of smart and active packaging that allows consumers to assess the freshness of food products without opening the package. pH-sensitive films and smart fluorescent "on-off" sensors for humidity are currently being explored as materials for smart and active packaging to monitor food product freshness, with further exploration anticipated in the future.

Keywords : antimicrobial edible film, biopolymer, antimicrobial agent, encapsulation, antimicrobial assay

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