

Advancements in fruit preservation technologies: Harnessing chitosan, aloe vera gel, and plant-based essential oils for coating applications

ABSTRACT

This work is centred on an eco-friendly method of preserving fruits via chitosan and aloe vera gel coating reinforced with plant-based essential oils. It analyzes the correlation of physicochemical properties, structure, composition and biological activity of chitosan, aloe vera gel and plant-based essential oil. Extensive understanding on this particular topic shows that edible coatings, specifically their physicochemical properties, structure, composition, play an important role in postharvest quality maintenance of fruits. The research looks into the binding mechanisms and interaction modes of such coatings and this gives evidence about their effectiveness in preserving fresh produce, slowing down food spoilage and implying the overall nutritional value of fresh produce. The article deals with the development of sustainable coatings in the process of which fruit shelflife and quality are improved, and resources are made more efficient while generating as little waste as possible. It highlights the value of putting the wastes to work in bioactive chitosan and essential oil production, promoting an environmentally conscious as well as less costly approach in food processing. The findings of this study therefore represent a very timely contribution to existing practices and future directions in environmentally friendly processes of fruit preservation, which may eventually usher in an innovative and sustainable alternative to the conventional thinking about food packaging and preservation.