



Abstract

Biopolymers have emerged as sustainable alternatives to conventional plastics in food packaging, addressing environmental concerns while maintaining functional integrity. This study focuses on advancements in gas and vapor barrier properties of biopolymers, essential for preserving food quality and extending shelf life. Strategies such as blending, coating, and incorporating nanofillers are explored to enhance oxygen and moisture barrier performance. The role of processing techniques and compatibilizers in optimizing these properties is also discussed. Recent innovations in biopolymer-based films for food packaging applications are highlighted, emphasizing their potential to meet industry standards while reducing environmental impact. This work provides a comprehensive overview of gas and vapor barrier improvements in biopolymers, paving the way for more sustainable and effective food packaging solutions.

Keywords:

biopolymers, food packaging, gas barrier, vapor barrier, nanofillers, processing techniques, compatibilizers, sustainable alternatives, environmental concerns, functional integrity, shelf life, oxygen barrier, moisture barrier, industry standards, environmental impact, effective food packaging solutions.

Introduction

The global demand for sustainable and eco-friendly packaging solutions has driven significant research into biopolymers as alternatives to conventional plastics. Biopolymers, derived from renewable resources, offer a promising pathway to reduce the environmental footprint of food packaging. This study explores the advancements in biopolymer-based films, focusing on their gas and vapor barrier properties, which are crucial for maintaining food quality and extending shelf life. The research investigates various strategies, including blending, coating, and the incorporation of nanofillers, to enhance the barrier performance of biopolymers. Additionally, the role of processing techniques and compatibilizers in optimizing these properties is discussed. Recent innovations in biopolymer-based films for food packaging applications are highlighted, emphasizing their potential to meet industry standards while reducing environmental impact. This work provides a comprehensive overview of gas and vapor barrier improvements in biopolymers, paving the way for more sustainable and effective food packaging solutions.

