



# Physical properties and food packaging application from chitosan-gelatin Edible films (review)

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**Abstract**— Environmental pollution problems caused by synthetic plastic packaging are prompting researchers to look for alternative methods. Chitosan and gelatin are considered for food packaging applications and due to their excellent intrinsic properties, including degradability, edibility, film-forming properties and compatible nature, they are suitable biomaterials for the production of food packaging films. Chitosan and gelatin can be used to make film and edible film-forming solutions by methods such as casting, electrospinning and thermoplastic methods. Chitosan-gelatin composite layers with excellent physical properties such as mechanical properties, hydrophobic surface properties, paint properties, barrier properties and thermal properties have made great progress. This study comprehensively examines recent advances in raw materials, manufacturing strategies, and physical properties of chitosan-gelatin-based oral films.

**Keywords:** Chitosan, Gelatin, Edible films

## Introduction

Natural biopolymer materials in food packaging applications are increasing to meet consumer demands and address environmental concerns arising from petroleum-based plastic packaging in recent years. Chitosan and gelatin are popular oral biopolymers for making high-performance edible films. The mechanical properties and water permeability of chitosan films reduce its application to food packaging (1). To prevent these problems, gelatin is often used as a composite with chitosan. Gelatin is usually a by-product of fish and animal processing. In addition, due to its high content of proline, glycine and hydroxyproline, it is a bio-based material that is often used to develop food packaging,

which gives gelatin the ability to help form an excellent flexible film (2). Other characteristics such as edibility, biodegradability, abundance, good barrier capacity and transparency, indicate that gelatin is a suitable biopolymer for the production of biodegradable packaging films. The final chitosan-gelatin-based composite films have excellent physical properties, thus protecting food, distribution and transportation, ensuring hygiene and increasing the shelf life of perishable items, especially products that are prone to stress, air, light or even temperature (3). Current studies on chitosan films and gelatin films focus mainly on chitosan composite films alone, gelatin composite films alone, and their bioactive properties. There is no specific study on the physical properties of chitosan-gelatin composite films. Therefore, this study discusses the laws of chitosan and oral gelatin, the manufacturing methods and the physical properties of chitosan-gelatin composite films. Also, future views and trends on chitosan-gelatin composite films are presented.

## Film formation Methods

Chitosan-gelatin composites, with or without additives, are used by various technologies to obtain edible films in the filmmaking process. Different filmmaking technologies can not only change the properties of the final film, but also design special properties for the films, such as physical properties. Common methods for making chitosan-gelatin films include casting, electrospinning, thermoplastic methods, and more.

Casting is a production process in which a liquid material is poured into a mold and then allowed to solidify.