




# Cold plasma technology: Applications in improving edible films and food packaging

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## Highlights

- Cold plasma (CP) is an emerging technology in the food science applications.
- CP significantly affects the structural and functional properties of packaging film.
- Cold plasma showed the considerable antimicrobial activity.
- This paper reviews the application of plasma treatment in food packaging.

## Abstract

Applications of biopolymer/polymer-based packaging films have been typically limited on an industrial scale owing to their poor technological, and functional characteristics, as well as poor physical, thermal, barrier, mechanical, and structural properties. Therefore, various techniques such as UV radiation, ozonation, gamma ray, laser treatment, rebound responses, and plasma-based methods are utilized to modify biopolymers/polymers for the intended applications. Compared to other methods, cold plasma (CP), as a versatile emerging non-thermal technique for surface modification, has found prominence in modifying packaging films. CP is an ionized gas composed of neutral molecules, electrons, and positive and negative ions that can actively induce physical and chemical changes on the surface of the biopolymer/polymer. CP technology has been revealed which can improve the chemical, physicommechanical, structural, and functional properties of edible films including surface roughness, contact angle, stiffness/flexibility, thermal stability, barrier properties, antimicrobial activity and biodegradability in most cases. Additionally, due to CP's unique features such as applicability for heat-sensitive materials, great antimicrobial activity, and increase in shelf-life of foods, it has become an appealing and promising method for research in the food industry. Therefore, the aim of the current study is to investigate the influence of cold plasma technology in improving the quality and attributes of edible films and its application as an antimicrobial agent in food packaging.