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CAPSAICIN AS FUNCTIONAL INGREDIENT IN FOOD INDUSTRY

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Abstract: Chili peppers, prized for their intense and spicy flavor, are a culinary ingredient with many beneficial properties. Capsaicin, the compound responsible for spiciness, has been shown to possess potent biological activities, including antimicrobial, anti-inflammatory, and antioxidant properties. These characteristics make chili peppers a functional ingredient of great interest to the food industry. This review explores the different mechanisms of action of capsaicin and its applications in the food industry. The antimicrobial properties of capsaicin and its role in food preservation, as well as its effects on sensory perception and consumer health, will be discussed. In addition, emerging trends in the use of capsaicin in food product innovation, such as functional foods will be illustrated.

• Introduction



Capsaicin¹

The food industry is constantly seeking natural and functional ingredients to meet the needs of increasingly health- and wellness-conscious consumers. The genus *Capsicum*, rich in bioactive compounds including capsaicin, is a growing source of interest in the food industry. Capsaicin, in addition to imparting the characteristic spicy flavor, stimulates taste receptors, enhancing other flavors and aromas in foods or to mask unwanted flavors and to stabilize emulsions. Due to its antimicrobial properties, chili peppers help to extend the shelf-life of many food products without resorting to synthetic preservatives². In addition, its thermogenic properties promote metabolism and body weight control and its anti-inflammatory properties open new perspectives for the development of functional foods and wellness products^{3,4}.

• Methods

The academic search engines Google Scholar, Pubmed and Scopus were used for this search. The keywords "capsaicin," "capsicum," "chilli pepper," "food industry," and "functional food" were searched in the databases. Studies focusing on potential food use as an additive in enriched and functional foods were included in the search.

• Industrial applications in food processing

Scientific studies suggest that regular consumption of chili peppers may contribute to the reduction of appetite and blood fat levels, promoting body weight control. Askin and coworkers evaluated fermentation of chili pepper juice with *Bacillus licheniformis* SK1230 reduced spiciness while maintaining its antioxidant properties⁵.

Adding the fermented juice to yogurt resulted in a decrease in pH and an increase in titratable acidity, improving product preservation. In addition, the polyphenol content and antioxidant activity of the yogurt increased. Another study, however, evaluates the use of these bioactive compounds in the enrichment of dairy products. Using encapsulation techniques, bioactives extracted from chili waste can be protected and incorporated within yogurt, significantly improving its nutritional profile⁶. Another work by Bázan-Lugo et al. evaluated that the addition of paprika powder to meat batters inhibits lipid peroxidation, as shown by the reduction in malondialdehyde levels due to the antioxidant action of the carotenoids and polyphenols it contains⁷. Results of another study showed that supplementing 25% yellow bell pepper flour, properly hydrated, resulted in a product with significantly higher carotenoid content than traditional bread, without compromising sensory characteristics⁸. Scientific research has highlighted the potential of chili extracts as natural preservatives because they can inhibit the growth of a wide range of pathogenic bacteria such as *Salmonella* and *Pseudomonas aeruginosa*, reducing the risk of contamination². In addition, extracts of chili peppers were tested on bacterial biofilm formation by Akyuz and colleagues. The data obtained indicate that certain compounds in chili peppers are able to interfere with the mechanisms of adhesion and biofilm formation, thereby reducing the ability of pathogenic bacteria to colonize food-contact surfaces⁹.

• Conclusions

In conclusion, chili is a valuable natural resource for the food industry, offering a wide range of benefits both nutritionally and technologically. However, further research is needed to fully understand the potential of chili and to develop new applications in food.

• References:

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