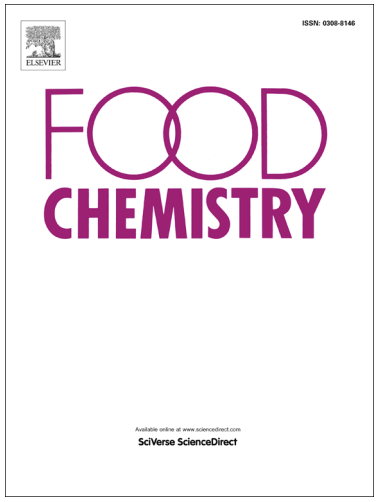

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What is new in lysozyme research and its application in food industry? -A review

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Abstract: Lysozyme, an important bacteriostatic protein, is widely distributed in nature. It is generally believed that the high efficiency of lysozyme in inhibiting gram-positive bacteria is caused by its ability to cleave the β-(1,4)-glycosidic bond between N-acetylmuramic acid and N-acetylglucosamine. In recent years, there has been growing interest in modifying lysozyme via physical or chemical interactions in order to improve its sensitivity against gram-negative bacterial strains. This review addresses some significant techniques, including sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), infrared (IR) spectra, fluorescence spectroscopy, nuclear magnetic resonance (NMR), UV-vis spectroscopy, circular dichroism (CD) spectra and differential scanning calorimetry (DSC), which can be used to characterize lysozymes and methods that modify lysozymes with carbohydrates to enhance their various physicochemical characteristics. The applications of biomaterials based on lysozymes in different food matrices are also discussed.

Keywords: lysozyme; characterization; modification; Maillard reaction; food application

1. Introduction

Lysozyme, also referred to muramidase or N-acetylmuramic hydrolase, is a small, monomeric protein stabilized by four disulfide linkages among the eight cysteine residues of its polypeptide chain (Fig. 1). The discovery of lysozyme is attributable to Alexander Fleming, who accidentally discovered that a drop of his nasal mucus could cause the lysis of bacteria present on the plate, which enabled him to detect a ‘remarkable bacteriolytic element’ that he later called lysozyme (Fleming 1922). Later, lysozymes were found in large quantities in human organs, tissues, and secretions (spleen, placenta, skin milk, tear, saliva, serum, etc.), and similar lytic enzymes were isolated from organs and secretions of various vertebrates, invertebrates, bacteria, and