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Exopolysaccharides in food preservation

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Exopolysaccharides or extracellular polymeric substances are macromolecules with a high molecular weight that are secreted by microorganisms. They are usually composed of polysaccharides having repeating sugar units, such as glucose and galactose and non-carbohydrate components, such as acetate and pyruvate. Exopolysaccharides are also rich in sulphur and uronic acid. Bacteria, such as lactic acid bacteria, produce exopolysaccharides through either of the four mechanisms, namely Wzx/Wzy-dependent pathway, ATP-binding cassette transporter-dependent pathway, extracellular synthesis using single sucrase protein and synthase-dependent pathway. The exopolysaccharides generally protect pathogenic bacteria from harsh environmental conditions. However, owing to their health benefits, they are widely used in the food and pharmaceutical industries. Further, the exopolysaccharides exhibit both antitumour and antioxidant properties by restoring redox regulations in cells. Hence, they prevent the harmful effects of free radicals and other unstable molecules present in food. They can be used to prevent the deterioration of stored food products. Leveraging their antioxidant properties, exopolysaccharides can be used as additives to preserve food from chemical changes. Some exopolysaccharides show antimicrobial properties and can be used in food preservation to prevent bacterial growth. Therefore, the combined use of both antioxidative and antimicrobial exopolysaccharides can preserve food from chemical and biological deterioration. These exopolysaccharides not only preserve food but also have many health benefits, such as reducing cholesterol levels. It also has anticancer, antihypertensive, immunomodulatory, and antidiabetic properties. Thus, by using a mixture of these exopolysaccharides in adequate proportions, maximum health benefits can be extracted. Unlike chemical food preservatives, the use of these natural food preservatives has no health hazards linked to them.

Keywords: exopolysaccharides, antioxidant, antimicrobial, preservative, health benefits

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