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Chapter 15

Microbial β -Glucans as Potential Resources in Food Packaging



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Abstract Microbial β -glucans are renewable polysaccharides with potential for use in sustainable food packaging. Their structural properties, including (1 $\rightarrow$ 3) and (1 $\rightarrow$ 6) linkages, enable these molecules to form films with desirable mechanical strength, oxygen and moisture barrier properties, and intrinsic bioactivities, such as antimicrobial and antioxidant properties. Being synthesized by yeasts, fungi, bacteria, and agro-industrial byproducts, β -glucans provide environmental and nutritional benefits. They have been utilized in edible coatings and composite films, as well as in intelligent and active packaging systems that can extend shelf life and improve food safety. Despite the challenges posed by production costs, up-scalability, and functional consistency, microbial β -glucans present a promising system for eco-designed packaging materials.

Keywords β -glucans · Food packaging · Biodegradability · Antimicrobial activity · Circular economy

Abbreviation

EPS Exopolysaccharides

1 Introduction

β -Glucans (Fig. 15.1) are a class of complex polysaccharides consisting of D-glucose units linked together by β -glycosidic bonds in a linear or branched manner. Different linkages are mainly (1 $\rightarrow$ 3)- and (1 $\rightarrow$ 6)- β -D-glucan bonds, which confer each

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