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Mini Review

Marine polysaccharides and potential enzymes for its degradation

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Marine polysaccharide degrading enzymes are pivotal for catalyzing glycosidic linkages' breakdown in polysaccharides, yielding low-degree oligosaccharides and monosaccharides. These enzymes show substantial potential in diverse biotechnological applications. Marine polysaccharides and their derivatives exhibit anti-inflammatory, antiviral, anticoagulant, and anticancer properties, and are used in food additives with potential health benefits such as prebiotic oligosaccharides. Research explores pharmaceutical applications of marine polysaccharide degrading enzymes, including novel drug delivery and therapeutic bioactive oligosaccharide production. These enzymes are crucial for depolymerizing marine polysaccharides, providing energy and nutrients to microorganisms, and contributing to nutrient cycling and ecological balance. The breakdown of marine polysaccharides is vital for the global carbon cycle and helps regulate atmospheric carbon dioxide levels, impacting environmental sustainability. This comprehensive review delves into marine polysaccharide degrading enzymes, emphasizing carrageenase, agarase, chitinase, chitosanase and alginate lyase. Challenges such as low yields, poor stability, and high costs prompt solutions through metabolic engineering, enzyme immobilization, and engineering, enhancing resistance and efficiency. These advancements amplify the value of marine polysaccharide-degrading enzymes in biotechnological and environmental contexts.

Keywords: Agarase, Alginate lyase, Carrageenase, Chitinase, Chitosanase, Fucoidan, Macroalgae, Ulvan