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Enzymatic Synthesis and Characterization of 2-Deoxyamyloses

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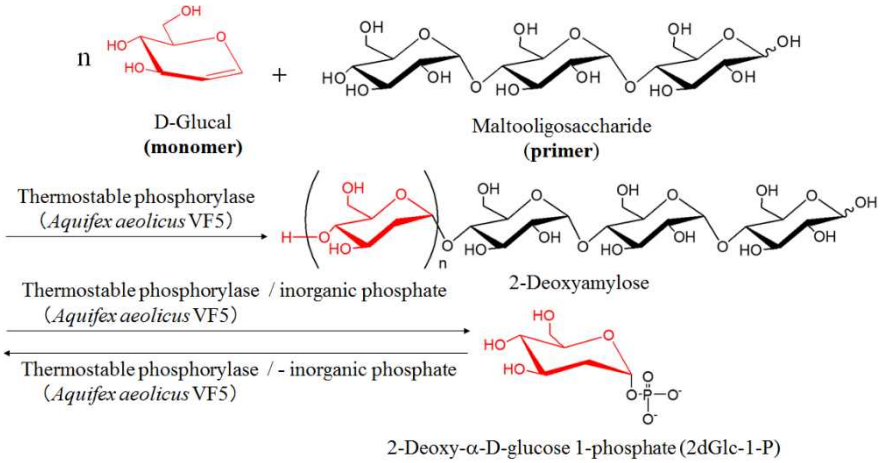
Abstract

Phosphorylase catalyzes enzymatic polymerization of α-D-glucose 1-phosphate (Glc-1-P) as a monomer using a maltooligosaccharide primer to produce α(1→4)-glucan (amylose) [1]. Because of weak specificity for the recognition of substrates, phosphorylase recognizes several analogue substrates of Glc-1-P to give non-natural polysaccharides [2]. Recently, we found that different from potato phosphorylase, thermostable phosphorylase (from *Aquifex aeolicus* VF 5) has ability to recognize D-glucal as a monomer for polymerization. In this study, the synthesis of 2-deoxyamylose was investigated by thermostable phosphorylase-catalyzed enzymatic polymerization of D-glucal via the in-situ production of α-2-deoxy-D-glucose 1-phosphate (2dGlc-1-P) (Scheme 1). The enzymatic copolymerization of D-glucal with Glc-1-P was also carried out. The produced heteropolysaccharide formed a flexible film.



Scheme 1. Thermostable phosphorylase-catalyzed enzymatic polymerization of D-Glucal via in-situ production of 2dGlc-1-P.

References

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