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Preparation of Network Polysaccharides Using Carboxy-terminated Maltooligosaccharide Cross-linker

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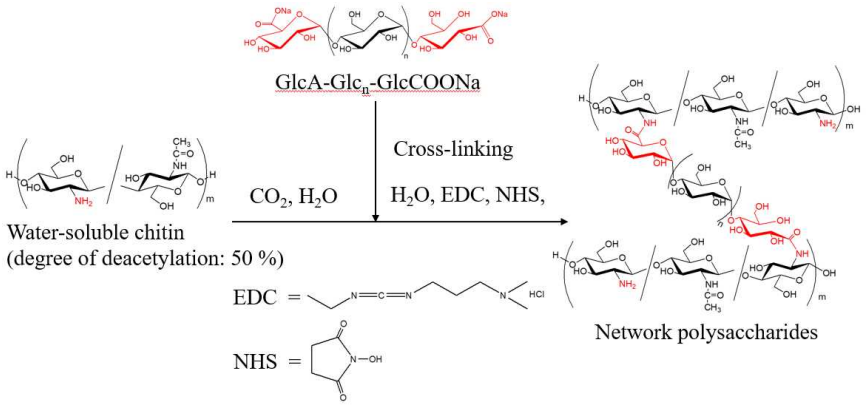
Abstract

Network polysaccharides are expected as 3D bio-based materials, which have a potential to be applied in biomedical and tissue engineering fields. In this study, carboxy-terminated maltooligosaccharides (GlcA-Glc$_n$-GlcCOONa) were enzymatically synthesized by phosphorylase catalysis and used as cross-linkers to produce network polysaccharides. Phosphorylase catalyzes glucosylation using α-D-glucose 1-phosphate and maltooligosaccharide as glycosyl donor and acceptor, respectively. As this enzyme shows weak specificity for the recognition of the substrate structures, we have already reported that thermostable phosphorylase (from *Aquifex aeolicus* VF5)-catalyzed glucuronylation using α-D-glucuronic acid 1-phosphate as glycosyl donor [1]. In this study, we synthesized GlcA-Glc$_n$-GlcCOONa by the glucuronylation using a maltoheptaose accepter having a carboxylate group at reducing end. Dehydrative condensation between water-soluble chitin (degree of deacetylation: 50 %) and GlcA-Glc$_n$-GlcCOONa was then performed to prepare network polysaccharides, which formed hydrogel in the reaction media **(Scheme 1)**.



Scheme 1. Dehydrative condensation between water soluble chitin and GlcA-Glc$_n$-GlcCOONa.

References

[1] Y. Umegatani, H. Izawa, M. Nawaji, K. Yamamoto, A. Kubo, M. Yanase, T. Takaha, J. Kadokawa, *Carbohydr. Res.*, **350**, 81 (2012).

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