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Preparation of hydrogels using various starch Aldehydes

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Hydrogels are hydrophilic, three-dimensional, and expandable matrices that are produced through chemical and/or physical crosslinking of certain polymers. In some cases, polysaccharide-based hydrogels have been prepared from a single polysaccharide such as Carboxy Methyl Cellulose (CMC) and starch. CMC is an anionic water-soluble natural polymer derivative, which is widely used in detergents, oil exploration, and in the food, paper, and textile industries because of its viscosity-increasing properties. Starch is widely used in different fields such as food, environmental-friendly plastics, and medicine due to its low cost, biodegradability, and renewability. In this study, the polysaccharide hydrogels were prepared by esterification between hydroxyl groups of CMC and aldehyde group of modified starch. Epichlorohydrin and citric acid were used for crosslinker. The starches used in the experiments were corn starch, potato starch, and soluble starch. Sodium periodate was used as the oxidizing agent. The degree of aldehydes substitution (DS) of hydroxyl groups was varied with the amount of oxidizing agent, and the DS showed a minimum of 0.87 to a maximum of 2.79. As a result of analysis of the hydrogels, epichlorohydrin crosslinker showed a high swelling ratio when reacted with native starch. On the other hand, citric acid crosslinker showed good results when reacted with starch aldehydes. The maximum swelling ratio of hydrogel was about 50.

Biography

Jungmin Lee graduated from Seoul National University in 2008. He received a master's degree from Seoul National University in 2013. He is a PhD student of Department of Biosystems and Biomaterials Science and Engineering, Seoul National University. He has published more than 5 papers in reputed journals.

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