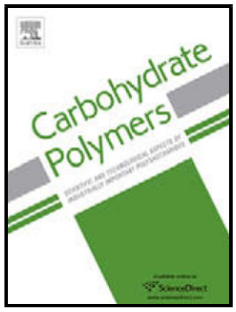

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Synthesis of full interpenetrating hemicellulose hydrogel networks

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Highlights

- The hemicellulose AcGGM was converted to full interpenetrating networks by sequential syntheses.
- Maleate-functionalized softwood O-acetyl-galactoglucomannan (AcGGM) was used as a hydrogel precursor
- IPN formation led to an increase in the shear storage modulus (G′) of hemicellulose hydrogels.

Abstract

Two methods with different cross-linking mechanisms for designing hemicellulose-based full interpenetrating polymer networks (IPNs) was developed through the sequential synthesis of full IPNs from *O*-acetyl-galactoglucomannan (AcGGM) utilizing free-radical polymerization and a thiol-ene click reaction. A faster swelling rate was observed for all IPN formulations compared with the single-network gels. The highly porous structure of the IPNs with small interconnected pores was verified using scanning electron microscopy. A rheological analysis revealed that the AcGGM IPNs fabricated by the free-radical polymerization of acrylamide and N-N'-methylenebisacrylamide (cross-linker) had shear storage modulus (G′) values approximately 5 and 2.5 times higher than that of the corresponding precursor single networks of AcGGM. IPNs