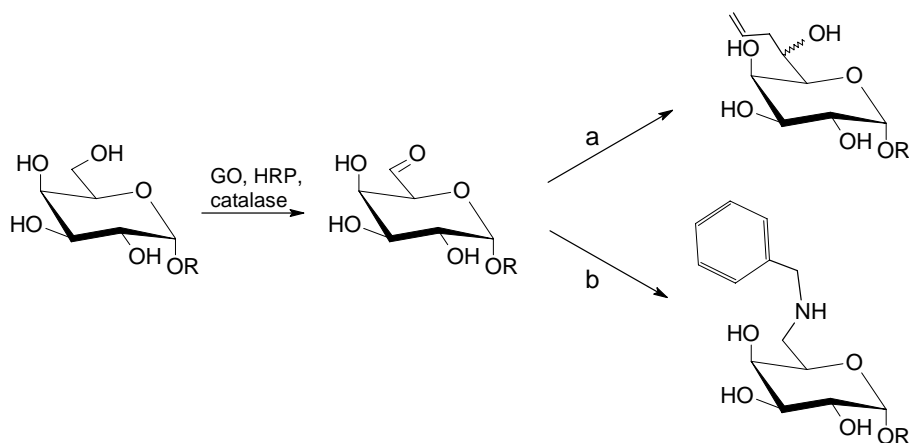


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CHEMICAL MODIFICATION OF WATER-SOLUBLE SPRUCE *O*-ACETYL-GALACTOGLUCOMANNAN

The utilization of biomass as raw material and aqueous systems as solvents are steps towards more environmentally friendly synthetic procedures. Water is safe and cheap compared to many organic solvents, and when performing reactions in aqueous systems, water-soluble hydroxyl-containing compounds, such as polysaccharides, can be modified without the need of time-consuming protection-deprotection steps. *O*-acetyl-galactoglucomannans (GGM) is a potential raw material for natural biochemicals and biomaterials. GGM sorbes well to chemical pulps. By derivatizing only the galactose side groups the high affinity to cellulose is preserved and modified GGM can be used for the functionalization of cellulose. The objective of this project is to develop modification procedures that are done in aqueous solutions, even with water as only solvent. Such procedures will lead to economically and environmentally more benign synthetic methods. The affinity of the modified GGM's to cellulose surfaces is also investigated.

One way of doing selective modification of galactose units in GGM is to combine enzymatic oxidation with chemical reactions. Examples on reactions where aldehyde groups formed during enzymatic oxidation are further chemically functionalized, are indium mediated allylation, and reductive amination. Besides enzymatic oxidation also chemical oxidation has been used for the activation of specific hydroxyls for further modification. The affinity of the modified polysaccharides to cellulose is also investigated.



Selective chemical modifications of GGM in water: Enzymatic oxidation followed by a) Indium mediated allylation and b) reductive amination. R = GGM backbone.