Chemical and enzymatical modifications of sugar derived from lignocellulose

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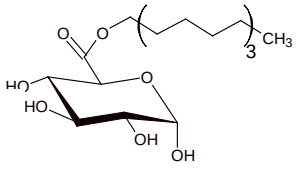
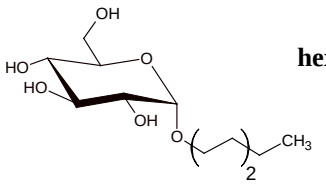
Actually, biorefinery is increasingly considered as a promising alternative to petroleum chemistry, since it aims at not only the replacement of fossil energy but also the development of chemicals from biomass, with applications such as detergents, phytopharmaceutics, solvents, plastics, etc.

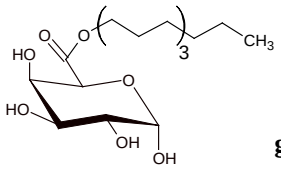
The valorisation of carbohydrates from renewable raw materials[1] is currently the subject of numerous researches[2]. In this context, the synthesis of new surfactants derived from the sugars issued from the lignocellulose hydrolysis was undertaken by chemical or enzymatic routes. In this poster, the examples of glucose, cellobiose and uronic acids[3] will be discussed.



tetradecyl glucuronate



hexyl glucoside



dodecyl galacturonate

Whatever the way used, the reaction conditions (use of a catalyst, protection/deprotection steps, type of solvent, presence of co-solvent, reactant concentrations, etc) were optimized to yield a panel of carbohydrate derivatives (some examples of the structures obtained are given above). These differ by the nature of the alkyl chain (in length and in degree of saturation), the type of chemical bond (amide, ester, thioester, acetal), and the position of substitution.

The impact of these differences on the techno-functional properties of these modified sugars will be evaluated.

[1] Lichtenthaler, F.W. *Carbohydrates as Renewable Raw Materials: a Major Challenge of Green Chemistry* IN: *Methods and Reagents for Green Chemistry: an introduction*; Tundo, P., Perosa, A., Zecchini, F. Eds.; Wiley-Interscience, John Wiley & Sons, Inc., Hoboken, New Jersey, **2007**, 23-63.

[2] Queneau, Y., Chambert, S., Besset, C., Cheaib, R., *Carbohydr. Res*., **2008**, *343* (12), 1999 – 2009.

[3] Blecker, C., Danthine, S., Pétré, M., Lognay, G., Moreau, B., Vander Elst, L., Paquot, M., Deroanne, C., *J. Coll. Interf. Sci*., **2008**, *321* (1), 154 – 158.