Enzymatic modification of pullulan

K. BOUNDAOUI,[1] L. PICTON,[1] V. DULONG,[1] and D. LE CERF[1]

[1] *University of Rouen Normandy, INSA Rouen Normandy, Polymers Biopolymers Surfaces Laboratory, UMR 6270 CNRS, Mont Saint Aignan, France*

Koceila.boundaoui@univ-rouen.fr; www.pbs.cnrs.fr

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Polysaccharides are natural polymers, abundant in nature and widely used in many fields as texturizers and gelling agents for example. In order to improve their properties to better adapt them to targeted applications, they are subject to functionalization which may bring more reactivity or new properties (e.g.: amphiphilicity [1], antioxidant [2], antibacterial properties [3],...). Thanks to the presence of alcohol, carboxyl or amine functions, the reactions are carried out by using chemical activators through an ether, ester [4] or amide [5] linkage.

In the case of our project, an **enzymatic functionalization,** green chemistry respectful, is considered to bring new properties to polysaccharides (pullulan) by the addition of phenolic compounds (ferulic acid) according to a process previously described on chitosan [6]. The latter is based on the activity of a family of enzymes "laccases" able to specifically recognize and transform from molecular structure to radical structure a large number of natural phenolic compounds (e.g., ferulic acid, caffeic acid, catechin...). Through a nucleophile attack not well understood, a bond is created between polymer and phenolic compound previously activated [6, 7].

Our first results showed the possibility of this grafting pathway of ferulic acid onto pullulan by the action of a laccase (*Aspergillus sp*). These products were characterized by UV-visible spectroscopy and by steric exclusion chromatography coupled with multi-angle light scattering, a refractometric detector and a UV detector (SEC/MALS/DRI/UV). The apparition of new antioxidant character binged by the insertion of phenolic compound is demonstrated by DPPH tests [2].

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