Novel Methods to Introduce Functionality to Cellulose

GripX™

GripX™ is a recent invention developed at SweTree Technologies®. The novel comb-co-polymer presents a unique ability to adsorb to cellulose. GripX™ consists of a primary amine functionalized polymer and a hemicellulose. A structural example of the GripX™ macromolecule family is a backbone of chitosan with xylolucan (XG) as side chains.

The primary amines along the chitosan backbone enables the introduction of beneficial groups to the polymer. The xylolucan side chains contributes with its high solubility in water and the intrinsic high affinity to cellulose. GripX™ is readily adsorbed to cellulose e.g. wood or cotton fibers in the form of pulp, paper or textile.

Benefits
• Comb-co-polymer of two naturally derived polymers
• Excellent adsorption to cellulose materials
• Multivalency
• Tunable solubility in water over a wide pH range
• Versatile functionalization

Results show that when GripX™ is used as a wet end additive to pulp the toughness of the paper increases dramatically (Fig. 1). GripX™ has also been used to introduce a vast number of different functionalities to cellulose (example in Fig. 2).

Applications
• Pulp and paper
• Packaging, specialty paper
• Textile
• Hygiene and clinical applications
• Medical devices and biotechnology products

Non-aggregated Nanomagnetic Cellulose

An innovation in SweTree Technologies’ portfolio is Magnetic Cellulose® based on research by Berglund et al.² (Royal Institute of Technology, Stockholm, Sweden). Magnetic cellulose is obtained by precipitation of metal salts onto a cellulose template. The cellulose source can be originated from bacterial cellulose, in the form of a hydrogel or aerogel, or microfibrillated cellulose.

Nanocellulose Films with High Toughness

The innovation is based on work by Berglund et al. (Royal Institute of Technology, Stockholm, Sweden), in which cellulose nanofibers is used to produce cellulose nanofilms with high toughness.¹-³ The cellulose nanofibers can either be microfibrillated cellulose disintegrated from wood fibers or bacterial cellulose (BC) nanofibers.

SweTree Technologies is a plant and forest biotechnology company. We are a technology provider offering products or technology alliances turning innovation and know-how into high value products.

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References