

Synthesis and applicative study of innovative materials obtained from natural and renewable sources for the conservation of cellulosic artefacts

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In recent times, the use of biopolymers for the production of green formulations has considerably increased in many different fields, because they easily degrade to products that are not harmful for the environment and because they are obtained from natural renewable sources.

On this basis, several new biopolymers and nanocomposites were synthesized from “green monomers”, obtained using saccharides as renewable feedstocks (α,α' -trehalose and D-glucose). Properly designed synthetic procedures were used to obtain copolymers with high purity and without protection/deprotection steps in agreement with the principles of green chemistry and industrial sustainability. The choice of renewable starting materials was made in accordance to the growing interest for the exploitation of lignocellulosic biomasses and the valorization of wastes recovered from food processing and agro-industries. Moreover, saccharides were chosen as starting materials for the synthesis of bio-based monomers, in order to introduce units with a structure similar to that of the cellulosic materials in the final products. This allowed to obtain new biopolymers that showed high affinity and compatibility for the cellulosic substrates, like paper or wood, and which are suitable for applications like adhesion or consolidation in the field of cultural heritage.