



## **INNOCARTOPACK- Innovative nano-structured treatments for biodegradable cardboard packaging**

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Treatments on the cardboard that can make it anti-mildew or anti-bacterial, at least at the level of the exposed surface towards the packaged product, in order to prolong its shelf life and ensure its good preservation, are in many cases based on the use of metals or oxides. Nevertheless, the use of natural substances is better for obvious reasons related to the better compatibility with human organism and for the lower impact onto environment. In nature, chitin is in the form of crystalline structures with a high structural order called "nanofibrils". These crystallites have an average size equal to about 240x7x5 nm, while the term fibril indicates a thin and needle-like structure.

The solubility, biodegradability and antimicrobial properties of chitin, as for chitosan, depend on the extraction source of the polysaccharide and on the degree of acetylation of the glucosamine units, as well as on their arrangement along the polymeric chain.

In the present paper, presenting the results about a project funded by Bank Foundation Cassa di Risparmio di Lucca and developed in collaboration with Lucense research center about cellulosic products, slightly acidic aqueous solutions containing chitin and chitosan were prepared to obtain films by means of solvent casting to simulate the thin layer to be deposited on the cardboard. Mechanical properties of the films have been studied. The best formulations were then used to treat virgin and recycled paper with different devices. Several series of samples have been characterized by evaluating the anti-microbial properties with the use of different types of tests.

### **Biography**

Maria-Beatrice Coltelli has 15 years of experience on materials characterization and study of the correlations between molecular structure, morphology and properties of polymers, biopolymers, blends and composites, especially related to their relation with environment. She is author and co-author of 50 publications in international journals and two patents. She followed the scientific activity of European projects on materials science and nano-technology. Currently she supports the didactical activity of courses for Chemical Engineers and Materials and Nanotechnology Engineers