CENTRE OF BIOLOGICAL ENGINEERING
UNIVERSIDADE DO MINHO

INSTITUTE FOR BIOTECHNOLOGY AND BIOENGINEERING

Bio-based nanofilms/coatings for food applications

M.A. Cerqueira, A.A. Vicente, J.A. Teixeira.

IBB-Institute for Biotechnology and Bioengineering, Centre for Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

Edible packaging for food is one of the areas where developments are being made based on nanotechnological solutions, e.g. through the development of edible nanofilms and nanocoatings, in particular under the form of edible nanolaminates. Polysaccharides, proteins and/or lipids are used due their GRAS statute. Polysaccharide- and protein-based films/coatings provide good barriers to O2 and CO2, but are very permeable to water vapor; in turn, lipid-based films/coatings provide excellent barriers to water vapor but have a limited resistance to other gases and have low mechanical resistance. The use of successive nano-layers will provide better physical stability in aggressive environments, better chemical stability to active compounds which may be incorporated into these structures; and improved control of the release rates of such compounds.

The application of this technology can be used for the enhancement of food safety, for the encapsulation of functional food ingredients, and in systems providing the integration of sensing, localization, reporting and remote control of food products.

At the current state of knowledge, many of these applications may be difficult to adopt commercially due the difficult to be implement at an industrial scale. Moreover, the effects of nanotechnological systems in the human body are still unclear.

This means that using nanotechnological applications in foods must be justified essentially by their advantages, which must be clearly perceived by the consumer. Not doing so will undermine consumers' trust on this emerging technology, eventually hindering its success in future applications.