

Innovative biodegradable food packaging material - use of nanotechnologies for improved barrier properties

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Abstract

The general function of packaging is the protection and preservation of the packaged products from external contamination. Nowadays packaging functions are wider and vary from case to case. A continuous innovation is going on, mostly driven by consumer needs and demands which are influenced by changing of global trends. The most challenging trend in packaging industry is increased expectations for sustainability and biodegradability of packaging material; many efforts are focused on identifying novel biodegradable packaging materials, increase of life expectancy, and stricter requirements regarding consumer health and safety. Smart packaging satisfies these requirements by providing information regarding the package history or the quality of the product. The aim of this work is to develop a new compostable packaging, based on renewable origin biodegradable plastics and nanomaterial. Improved barrier properties, heat resistance, process ability of used materials are also developed through this work. In general, the main objectives of the work are:

1. Development of a 100% biodegradable and compostable packaging by combining different materials (starches and PLA, Nano clay).
2. Improvement of barrier properties of bio plastics (e.g. by integration of Nano platelets that offer great capacity barrier Packaging, plasma surface treatment/engineering of materials, hybrids of organic/ inorganic coatings).

3. Adaptation of technologies for integrated and sustainable processes (process of injection and blow extrusion moulding And their optimization. Supercritical fluids application is also adapted to them).

4. Development of biodegradable smart Nano devices adapted to the package: (smart nanotechnology devices for the detection of low concentrations of headspace gases or Nano composites for smart release of antimicrobial and favour is developed and introduced together in multifunctional packaging. They will be attached through In Mould Labelling.

5. Finally, adaption of developed package to the major industry's needs: cosmetics, pharmaceutical and food processing.

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