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

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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 nanomaterials. Improved barrier properties, heat resistance, processability of used materials is 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, nanoclay).
2. Improvement of barrier properties of bioplastics (e.g. by integration of nanoplatelets 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 nanodevices adapted to the package: (smart nanotechnologic devices for the detection of low concentrations of headspace gases or nanocomposites for smart release of antimicrobial and favour is developed and introduced together in multifunctional packaging. They will be attached through In Mould Labeling.
5. Finally, adaption of developed package to the major industries needs: cosmetics, pharmaceutical and food processing.

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Biography

Anka Trajkovska Petkoska, PhD, is an Associate Professor at Faculty of Technology and Technical Sciences, Veles at University St. Kliment Ohridski, Bitola, R. Macedonia. She graduated at Chemical Engineering Department, University of Rochester, Rochester, NY (USA) in 2007. Her work was dedicated on polymer cholesteric liquid crystalline materials made into particulate forms and their use for particle display technologies. During her PhD graduate work she was granted with two US Patents related to: i) polymer cholesteric liquid crsytals shaped in tailored micro-particles by use of soft lithography technique, and ii) composites based on polymer cholesteric liquid crystals and different types of conductive and non-conductive dopants with micro- and nano-structures to improve dielectric properties of the base material. In 2008 she published the book entitled as: *Polymer Cholesteric Liquid Crystal Flakes – Their Electro Optic Behaviour for Potential E-Paper Application* (Verlag Dr. Muller, Germany). In 2015 she edited a book New Developments in Liquid Crystals Research. Trajkovska Petkoska obtained her MSc at Faculty of Technology and Metallurgy, University St. Cyril and Methodius in Skopje, R. Macedonia where she got her BSc, as well. Her work was on polymers, polymer blends and composites. Nowadays, Trajkovska Petkoska is active participants in the field of materials science particularly in novel advanced materials based on polymers, surface engineering of polymers, nanocomposites and thin film applications. She participates in several EU projects (Framework Programme FP7 projects, Eureka project as well as bilateral projects)..

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