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Nanoparticles in plastic materials for food contact applications

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Nanoparticles can be used in food contact materials to improve barrier, mechanical and thermal properties of biodegradable materials. The use of nanoparticles also allows the development of lightweight non-renewable polymers, maintaining their barrier, mechanical and thermal properties with less thickness. The use of nanoparticles is also possible for the development of active and intelligent materials with improved properties. Focusing on the improvement of biodegradable polymers properties, the formulation of organoclays and their incorporation into a PLA matrix allowed an increase of its barrier properties (↓ 25% OTR, ↓ 21% WVTR), mechanical properties (↑ 40-45% compression resistance) and an improvement of thermal properties. The reinforcement of barrier and mechanical properties of a PLA matrix was also using nanocelluloses extracted from different plants by-products (flax, hemp, oat, etc.). According to the plastic European Regulation for food contact materials (EU) N° 10/2011, chemical and physical properties of nanoparticles could differ from those at large scale, leading to different toxicological properties. Therefore, case-by-case, risk assessment should be performed, and they can only be used if explicitly authorized and mentioned in Annex 1 of the plastic regulation. In the recent years, a notable increase in the number of authorized nanoparticles for food contact applications has been noticed in Europe, but harmonized measurement methods must be still developed to obtain consistent results over time and between laboratories. For the authorization of nanoparticles in US, a safety assessment should be also performed through a Food Contact Notification Program or alternative programs such as Threshold of Regulation (TOR) exemptions. The authorization procedures should be considered for the commercialization of these materials for food contact applications.

Biography

Marta Lara-Lledó is an Agricultural Engineer specialized in Food Industries from Polytechnic University of Valencia (UPV). She has a Master's and a PhD in Food Science and Engineering (UPV) and a Diploma in Packaging from Instituto Tecnológico del Embalaje, Transporte y Logística (ITENE). Since 2007, she is Technical and Project Manager of New Materials and Packaging Systems department at ITENE. Nowadays, She is responsible for the Food Safety Area. She is working on several R&D projects specifically related to food packaging. She is specialized in the development, characterization and authorization of new packaging materials, including the implementation of food contact materials legislation and verification processes for the proper performance and good manufacturing practices of the packaging materials.

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