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Study of the degree and speed of disintegration of PLA commercial grades as a function of material shape and thickness

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Biodegradable polymers are being increasingly used in several applications, such as packaging, disposable non-wovens and hygiene products, consumer goods and agricultural products. A wide variety of biodegradable polymers have been developed, both from petrochemical and renewable sources. Polylactic acid (PLA) is the most demanded biodegradable polymer in the market, which is mainly used for the manufacture of compostable packaging. ISO 13432 establishes the requirements for packaging to be considered as recoverable through composting and biodegradation, including the test scheme and evaluation criteria for the final acceptance of packaging. The test scheme typically involves the following analysis and testing: chemical characterization (heavy metals and volatile organic compounds), biodegradation, disintegration and eco-toxicity (of the composted product). Test on disintegration is usually the most limiting factor for plastic products to be accepted as compostable. This paper will present the main findings of a study on the degree of disintegration of different PLA commercial grades. Samples of pellets and sheets with various thicknesses were tested under simulated composting conditions in a lab-scale test. The degree and speed of disintegration of these samples were measured and compared with each other. Hence, the effect of the shape and thickness of the product on the disintegration was evaluated. Based on these findings, recommendations for product design and waste conditioning prior to composting were provided to ensure the compostability of PLA products.

Biography

Mrs. Elena Dominguez Solera, holds a Bachelor Degree in Chemical Engineer from the Universidad Politécnica of Valencia (Spain) with a Master in Technology of Polymeric Materials and Composites. Researcher at the Department of Sustainability and Industrial Recovery of AIMPLAS since 2015. Among the activities which carry on, are included: research in the fields of new material developments, manufacturing processes, recycling/recovery of materials and eco-design. She also has experience in the field of bioplastics/biocomposites and implements laboratory tests (according to established standards and relevant legislation) for determination of biodegradability (in different environments) and compostability of these materials.

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