Marta Pineiro et al., J Environ Anal Chem 2018, Volume: 05
DOI: 10.4172/2380-2391-C2-006

9th World Congress on
Green Chemistry and Technology
September 17-19, 2018 | Amsterdam, Netherlands

Development of a cellulose based biodegradable material for packaging

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About 38% of the 407 million tons of plastics produced worldwide is used in the packaging industry in a market dominated by the polyolefins (PP, LDPE, and HDPE). This means that, only by this activity, 154 million tons of waste is generated and a huge part of this will be lost from any recycling circuit finishing their brief lives in landfills. The introduction of biodegradable materials in packaging industry will reduce the pressure over the deposition in landfills but the decomposition must be in a way that safe products are generate during the process of environment friendly biodegradation to carbon dioxide. The non-edible nature of cellulose, its abundance as available material in the form of wood or agriculture residues and its renewable and biodegradable characteristics makes this natural polymer an interesting material to be used as environmental friendly packaging materials. However, cellulose lacks thermoplasticity which means that it must be blended with other polymeric materials in order to get possible to be workable in packaging industry. Polyesters are generally biodegradable polymers due to the reversibility of the ester bond by hydrolysis. The manipulation of the structure could turn the mechanical properties of the polyesters more similar to polyolefins and in a future replace them as a main thermoplastic source. Actually, polyesters are more expensive than polyolefins, but the introduction of low cost fillers could reduce costs and improve mechanical properties. In this work, we present the results of the combination of hydrolyzed pulp cellulose with Bioflex® which a mixture of two biodegradable polyesters, polylactic acid (PLA) and poly butylene succinate (PBS). The mechanical behavior of composite samples with different amounts of cellulose will be discussed.

Biography

Marta Pineiro has achieved her PhD in Organic Chemistry in 2003 from the University of Coimbra, Portugal, and since 2002, she has been enrolled at the University of Coimbra, as Auxiliary Professor. Her research interests are in the area of sustainable synthesis, microwave-assisted organic synthesis and synthesis and biological applications of tetrapyrrolic macrocycles. She has published so far 50 articles in international peer-reviewed journals, 17 meeting proceedings and is the co-author of six books and book chapters and four patents.

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