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Recent developments in the pilot scale process of PLLA production from food waste

[1]N. G. Malliaros, [2]A. E. Maragkaki, [3]T. Lazou, [1]C. Tsompanidis, [3]K. Velonia and [2]T. Manios

[1]*ENVIROPLAN SA, 23 Perikleous & Iras Str, 15344 Gerakas Athens, Greece*
[2]*Laboratory of Solid Waste & Wastewater Management, School of Agricultural Science, Hellenic Mediterranean University - Educational and Research Committee, Heraklion, 71401, Crete, Greece*
[3]*Department of Materials Science and Technology, University of Crete, Heraklion, 71003 Greece*

Abstract

The global production capacities of innovative biopolymers such as polylactic acid (PLA) and polyhydroxyalkanoates (PHAs) are set to quadruple in the next five years. These polyesters are bio-based, biodegradable, and feature a wide array of physical and mechanical properties. PLA is a very versatile material that displays excellent barrier properties. Thus, high-performance PLA grades constitute an ideal replacement for several conventional fossil-based plastics such as PS (polystyrene) and PP (polypropylene). The main research core of the Biowaste to Bioplastics (B2B) project is the optimization of the total stages that constitute the production process of Poly L-Lactic Acid (PLLA) using food waste as starting material, which has been previously researched in laboratory scale, by University of Crete. Following the experimental data reported in previous phases of the PLLA production process, the topic of the current presentation is the recent advances made regarding the set goals of this project, particularly in the ever-recurring challenges concerning the smooth transitioning from lab scale to industrial scale reactions. As reported previously, significant progress has been made in the 1st stage of the production process, particularly the pilot scale fermentation reaction. Herein, the developments that will be presented regard the treatment and purification of the large scale fermentation broth containing L-lactic acid, as well as the 2nd and 3rd stage of the PLLA production process, namely the retrieval of L-lactic acid via esterification and the final polymerization reaction, respectively.

Keywords: food waste, plla

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