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Abstract

Bio-waste to Bio-plastic (B2B): Production of Compostable Bio-Plastics from Food Waste †

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Abstract: The degree of purity of materials recovered from municipal solid waste (MSW) depends mainly on the objective: the intended use of the recovered material and the cost to recover this material in its pure form, determined by the intensity of the effort and the technology involved. The Bio-waste to Bio-plastic (B2B) Project aims to develop an integrated separation process at the bio-waste source, focusing on Hospitality Units. The quality of the collected bio-waste will be upgraded by removing foreign bodies or even specific categories of food waste, or by adding bio-waste from other, more specialized, sources (e.g. bakery residues) to produce compostable bio-plastics through an optimal synthesis process. Compostable bio-plastics are high added value products, which justify an increase in the cost of the preceding processes. After examining the possibility of further source separation and its results, B2B will study the optimal collection and transport system which decisively affects many qualitative elements, testing and evaluating a relatively high-cost but highly effective solution, that of hand-sorting in order to optimize materials recovery. B2B will identify all the parameters of the production process of PLA monomers and (poly) lactic acid in relation to the quality characteristics of the raw material (bio-waste) collected from Hospitality Units. Quantitative and qualitative analysis of food waste (bio-waste) produced in Hospitality Units will then take place. All the above will be tested on a bench-scale unit that will allow their further study and their substantial improvement, as well as the extraction of realistic results. Finally, the effect of the end-product bio-plastic on the composting and anaerobic digestion of bio-waste will be examined. The expected results from the B2B implementation are an optimized source separation scheme for Hospitality Units, the identification of the appropriate method of upgrading the quality of residues collected for the purpose of bio-plastic production, and eventually an integrated process of converting bio-waste into a high added value product.

Keywords: food waste; bio-plastic; source separation; anaerobic digestion; composting

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