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ELLIPSE: EFFICIENT AND NOVEL WASTE STREAMS CO-PROCESSING TO OBTAIN BIO-BASED SOLUTIONS FOR PERSONAL CARE AND AGRICULTURAL SECTORS

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Abstract

Sustainability is a pillar to develop and maintain global strategies such as the EU Bioeconomy Strategy, the EU Green Deal and the SDGs. The transition from a linear to a circular economy including resource recovery, reuse and recycling is essential. However, meeting the requirements for converting bio-based waste streams into renewable raw materials, like bioplastics, with strict purity and high performance to ensure both proper processing and meet product request, demand inter-disciplinary cooperation among high skilled experts from EU. ELLIPSE project will address the valorisation of two heterogeneous waste streams: slaughterhouse waste and paper & pulp sludge, to produce cost-efficient polyhydroxyalkanoates for agricultural and personal care applications, by the coprocessing with other organic waste such as sludge from the dairy industry and glycerol from the biodiesel industry, as well as recovering nutrients to produce bio-based fertilizers. This will be achieved by applying the cascade biorefinery approach using acidogenic fermentation where, by one hand a VFA enrich stream will be generated from the selected feedstocks and coupled to PHB fermentation production system, and by other hand, the solid fraction produced after the acidogenic fermentation will be used to recover nutrients such as N and P. The integration of these waste streams as biorefinery feedstocks will allow reducing the volumes of landfilled waste, opening new avenues for platform chemicals and bioplastics production while creating additional revenue for the related industries generating them, with added advantages of water recycling, decreased soil degradation, groundwater pollution and methane emissions. ELLIPSE approach will be based on lab-scale optimization of organic waste mixtures and operation conditions, then these conditions will be up-scaling to treat at least 100 tonnes of slaughterhouse waste and 20 tons of wastewater sludge derived from pulp and paper industry.

Key words: bioeconomy, waste management, bioplastic, bio-based fertilizers

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