

Environmental assessment of home composting for food waste valorization: the case study of the A2UFood project

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Abstract

Resource recovery, reuse, and recycling action are imperative, to achieve the transition to a circular economy. Despite transition efforts, landfilling and incineration are still the most common approaches to waste management. Home composting is easily applicable, as it is carried out on site, i.e. next to the point of production of organic waste. Additionally, due to the low environmental risks, it is suitable for the treatment of small quantities - volumes of organic household waste. Separating and processing household biodegradable waste helps to avoid the conventional final disposal of this stream (sanitary landfill). A small composting unit at the household level requires minimal resources and emits minimal emissions. The A2UFood project is a holistic approach to tackling food waste, with innovative actions to prevent and manage both avoidable and unavoidable food waste, with the main of using food waste and reducing the quantities produced. To achieve the above objective, a home composting action was implemented on a pilot scale and 100 home compost bins were distributed to a corresponding number of households. At the same time, with the distribution of the bins, the necessary information/instructions for better use were given through leaflets and short-time videos. The main objective of this study is to quantify the connection between household food waste with the environmental burden via means of Life Cycle Assessment. The chosen impact assessment method was ILCD 2011 Midpoint+ V1.11 / EC-JRC Global, equal weighting. This method was developed in 2011 by the research center of the European Union (JRC) and is one of the most reliable worldwide. The main purpose of the home composting operation was to manage organic waste in such a way as to produce compost that can be used as an organic amendment or fertilizer. The assumptions adopted are that: the average household needs 4 months to fill up with 300 L of bio-waste - as defined by the respective legislation. According to the above, the total amount of bio-waste that was diverted through household composting and did not end up in a landfill is 90,000L, of which 30,000 L was food waste. The conversion from volume units to mass units was done based on the apparent density of bio-waste represented by the value 338 kg/m³. In

summary, the functional unit was the management of food waste and green waste for one year. An amount corresponding to 30,420 kg of bio-waste in total, from which 14,400 kg of compost will result. At the same time, a comparison was made between the amount of bio-waste required for the compost produced at the household level and the disposal of the same amount in a landfill. Finally, it was found that the main categories in which savings are made by diverting waste through household composting are: climate change, human toxicity with carcinogenic effect, marine eutrophication, and depletion of water resources.

Keywords: Circular economy, Life cycle assessment, mitigation

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