

Selective collection of biowaste in a scatter rural region – producers' characterization

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Abstract

The new targets from European circular economy and waste policies increasingly focus on bio-waste as one of several key waste streams, including the obligation to their separate collection. In non-intensive urban regions this task is a challenge due to the high dispersion of producers. In the present work it was intent to characterize the producers of equated to domestic bio-waste in the Planalto Beirão region (Portugal) and define strategies for their management. The methodology to carry out the study was made the compilation of data survey of domestic and equated non-domestic producers based in the Portuguese databases such as SABI. From the 3 categories of non-domestic producers studied, the hotels, restaurants and coffes represented 53% of these producers, followed by retail grocery and tea houses with 42% and 5%, respectivley.

Introduction

Waste management in the European Union (EU's) should be improved and transmuted into a sustainable management, with a view to protecting, preserving and improving the quality of the environment, protecting human health, efficient and rational utilization of natural resources, promoting the principles of the circular economy, enhance the use of renewable energy, increasing energy efficiency, providing new economy opportunities. In order to implement the economy circular, it is necessary to implement measures on sustainable production and consumption, by focusing on the whole life cycle of products in a way that preserves resource and close loop. The more efficient use of resources would also bring substantial profit savings for businesses, public authorities and consumers, while reducing total annual greenhouse gas emissions. Therefore, European circular economy and waste policies increasingly focus on bio-waste as one of several key waste streams. These include new targets for the recycling and preparing for reuse of municipal waste and an obligation to separate collection for bio-waste. Bio-waste accounts for more than 34% of municipal solid waste generated, amounting 86 million tonnes in 2017 in the EU (EEA, 2020). Bio-waste is essentially green waste and food waste and has considerable potential to contribute more widely to the circular bioeconomy, namely by the production of fertilizers, soil improvers and non-fossil fuels. Under EU's circular economy action plan, efforts to use bio-waste as a resource have gained additional traction, and technical developments going beyond the current end products of bio-waste treatment, such as biogas and compost are emerging. In European Directive 2018/98/EC of 30 May 2018, the target regarding bio-waste management is that by 31 december 2023, this waste is either separated and recycled at source, or is collected separately and is not mixed with other types of waste. To reach these goals, in the Portuguese Strategic Plan for Municipal Solid Waste 2020 (PERSU, 2020) are set several targets to increase the recycling for 55%, 60% and 65% by 2025, 2030 and 2035, respectively; the change in the method for calculating recycling rates and, the new target for landfilling (10%) only inert materials or without possible recovery.

The collection activity is one of the most relevant in this bio-waste management, due to both the cost and the potential impact on the quality of the urban context. The level of separation bio-waste collection differs considerably across Europe, and it has been implemented in some areas for more than 20 years (Di Maria et al, 2020). However, many countries are far from capturing bio-wastes full potential (EEA, 2020). Portugal is one of these countries where the bio-waste separation collection is scarce and must be significantly increased to reach the European goals. According to Di Maria et al (2020), depending on different socio-economic aspects, different schemes were adopted for this important phase of waste management such as road, proximity and door-to-door collection. Road collection refers to the use of large containers, up to 3000 L volume, able to serve a large number of users, positioned in given areas along main roads was the lowest cost scheme due to the collection rapidity and reduced number of operators and trucks (large size up to 30 m³) involved. Due to many factors such as the lack of adequate control and possibly the need for residents to transport bio-waste in bags, the percentage of impurities in the waste arising by road collection. Thus, the planning of waste collection models requires information on environmental impacts, economic indicators, technical aspects and efficiencies in order to understand the best option to implement (Rodrigues et al, 2016). Moreover, several conditioning factors of the bio-waste collection and treatment options should be taken into account (Gomes et al, 2014): social factors, since it is the population that does the separation at source; cultural influences; building typology; selection of deposition equipment, among others. According to the Portuguese Environment Agency (APA) there is a need to collect this type of waste at large producers as there is a higher rate of capture with reduced contamination (APA, 2019).

In the present work it was intent to characterize the non-domestic producers of bio-waste in the Planalto Beirão region (Portugal) and define strategies for it selective collection.

Methodology

The study area, Planalto Beirão Region, is composed by 19 municipalities of Viseu, Guarda and Coimbra of Portugal. The Association of Municipalities of the Planalto Beirão Region (AMPBR) is the inter-municipal system responsible by the waste management of these municipalities. It has an area of 4,661 km² and 348,914 inhabitants (~75 inhabitants/km²) but with a representative urban focus, Viseu, with about 20% of the population. AMPBR has implemented an Organic Recovery Plant which is dimensioned to receive and valorize 130,000 tons of municipal solid waste per year. The methodology to carry out the study was divided in two steps. First, it was identified the economic activities of non-domestic producers, equated to domestic, and then the survey in Portuguese databases such as SABI to collect all the important information from the producers to plan the feasible bio-waste collection.

Results

The non-domestic bio-waste producers were divided in three categories: Hotels, restaurants and coffes; retail grocery and pastries and tea houses. The total of non-domestic producers is 2319 and Viseu registered more than 37% of these producers (Figure 1). The Hotels, restaurants and coffes represented 53% of the non-domestic producers, followed by retail grocery and tea houses with 42% and 5%, respectivley.

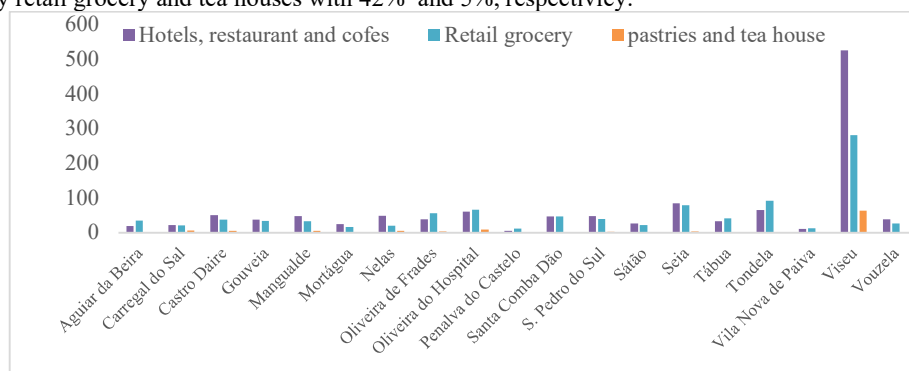


Figure 1. Numbers of non-domestic producers in Planalto Beirão region.

Considering an average production of 4 ton/year by these producers, it may be considered that approximately 9300 ton can be selective collected that represent approximately 10% of the undifferentiated wastes collect in 2019. Another advantage would be the reduction of bio-wastes collect along undifferentiated and that have good quality to directly be uploaded to the plant digestor. With the selective collection, it is expected that beyond 2023, in the AMPBR region the quality of final product of the organic valorization, biogas and compost, will be improved.

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