

Domestic composting at universities

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The production of municipal solid wastes (MSW) from urban regions is a relevant environmental problem in view of the increase in the world population. In Europe the household recycling target is 70 % by 2030 (Araya, 2018).

In Portugal, 5.279 million tons of MSW were produced by 2020. The MSW have around 37% of biowaste (APA, 2021). Biowaste is defined as a “biodegradable waste from gardens and parks, food and kitchen waste from homes, offices, restaurants, wholesalers, canteens, catering and retail units and similar waste from food processing plants” (Decree-Law No. 102-D/2020).

According to APA (2021), 41% of MSW goes directly to landfill, and only 7,1% are treated by composting and/or anaerobic digestion. Decentralized solutions must be implemented in order to treat the waste as close as possible to the place where it is produced. For example, Italy has several projects for decentralized composting to create local solutions (Bruni *et al.*, 2020). Also, the academic institutions must contribute to circular economy promotion through the collection and treatment part of their own waste, namely with the implementing domestic composting. In the universities the biowastes are produce in canteens, bars and gardens.

Composting is a biological process that occurs under aerobic conditions, consisting in the organic waste’s transformation into compost. In this biological process it’s important to have adequate temperature and moisture conditions (Azim *et al.*, 2018). The compost can be applied in the university’s gardens, allowing the organic matter and nutrient reuse and closing the biowaste cycle.

The present work intends to analyse and evaluate the domestic composting of the biowaste produce in universities. For example, an academic institution from Lisbon has until now seven domestic composters, with around 320 L of capacity (Figure 1), that treat food waste and yards wastes. To achieve the objective of the present work, a characterization of domestic composting in higher education institutions will be made. Also, analysis of different fractions of biowaste (food waste and yard waste) will be carried out, through the determination of various parameters (for example, temperature, humidity, total solids, volatiles, etc.). After carrying out the experimental part of the work, improvement proposals will be presented, in order to increase the domestic composting at universities.



Figure 1. Composter in a university from Lisbon

References

APA, Relatório Anual de Resíduos Urbanos (RARU), Agência Portuguesa do Ambiente, (2021) available in: https://apambiente.pt/sites/default/files/_Residuos/Producao_Gest%C3%A3o_Residuos/Dados%20RU/RARU%202020_V1.pdf (In Portuguese).

Araya, M. N., A Review of Effective Waste Management from an EU, National, and Local Perspective and Its Influence: The Management of Biowaste and Anaerobic Digestion of Municipal Solid Waste. *Journal of Environmental Protection* 9 (2018) 652-670.

Azim, K., Soudi, B., Boukhari, S., Perissol, C., Roussos, S., Alami, I. T., Composting parameters and compost quality: a literature review. *Org. Agr.* 8 (2018) 141–158.

Bruni, C., Akyol, Ç., Cipolletta, G., Eusebi, A. L., Caniani, D., Masi, S., Colón, J., Fatone, F., Decentralized Community Composting: Past, Present and Future Aspects of Italy. *Sustainability* 12 (2020), 3319.

Decree-Law No. 102-D/2020. Regime geral da gestão de resíduos. *Diário da República* n° 239 (In Portuguese).

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