

Valorization of Agri-Food Industry Waste: the case of Greek Olive Oil Mills

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Abstract

Nowadays, the dramatic increase of the world population has posed enormous challenges in the agri-food sector, in order to meet the demands of modern society, while depleting the planet's natural resources and producing huge amounts of waste (solid, liquid and gaseous) (Berbel and Posadillo 2018). The food industry, despite playing a leading role in many national economies, is attracting increasing social, political and scientific attention nationally and internationally due to the pressures, it exerts as an economic activity on environmental sustainability (Esposito et al. 2020). The olive oil industry is an extremely important economic and social activity, with a world production of around 3 million tons per year (Donner and Radic 2021). The olive oil extraction is a process in which significant amounts of by-products and waste, solid and liquid, are generated (Mechnou et al. 2021). Due to the extremely high levels of polyphenols, the low pH and the high concentration of inorganic and organic substances (Doula et al. 2021), this waste can cause significant environmental threats, such as degradation of soil and water resources and consequently affect neighboring ecosystems, if not treated and managed effectively (Abu Tayeh et al. 2020). The management of olive mill waste is considered a significant environmental challenge in the Mediterranean region, since the majority of world production is produced in Mediterranean countries (Nunes et al 2020). Given the risks of uncontrolled disposal of olive mill waste, as well as the huge amount of by-products and waste produced worldwide, the need for implementing the a circular economy (CE) in the olive oil industry is imperative (Esposito et al. 2020). CE is a paradigm shift in the way human society interacts with nature. It targets at the rational use of resources through the minimization of waste, in order to avoid the exhaustion of natural resources (Grafstrom and Aasma 2021). This study emphasizes the application of the principles of the circular economy to the production process of olive oil, which is considered a staple

food for the Mediterranean countries, both because of its role in the Mediterranean diet (Kashiwagi et al. 2020) and because of its significant share in the local economy. It also highlights the international best practices applied in the treatment and management of waste and by-products of olive mills, as well as possible options for their valorization. Many utilization solutions are proposed, including methane production, composting and soil applications, feed, source of phenolic compounds and biochar production (Donner and Radic 2021). Finally, this study aims to capture through the extensive review of the literature, the Greek reality, regarding the implementation of sustainable practices in waste management in olive oil industry, and to highlight the imperative need to convert the linear model to circular in the case of olive oil production, in a country that is confronting with the economic and refugee crisis in the era of the Covid-pandemic.

Keywords: circular economy, valorization of olive oil industry waste, waste management of olive oil mills

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