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Evaluation of the Potential of Olive Pomace Compost for Using as a Soil Amendment

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Abstract : Context: In the Mediterranean basin, large quantities of lignocellulosic by-products, such as olive pomace (OP), are generated during olive processing on an annual basis. Due to the phytotoxic nature of OP, composting is recommended for its stabilisation to produce the end-product safe for agricultural use. Research Aim: This study aims to evaluate the applicability of olive pomace compost (OPC) for use as a soil amendment by considering its physical and chemical characteristics and microbiological parameters. Methodology: The OPC samples were collected from the surface and depth layers of the compost pile after 8 months. The samples were analyzed for their C/N, pH, EC, total phenolic content, residual oils, and elemental content, as well as colloidal properties and microbial community structure. The specific analytical approaches used are detailed in the poster. Findings: The results showed that the pH of OPC ranged from 7.8 to 8.6, while the electrical conductivity was from 770 to 1608 mS/cm. The levels of nitrogen (N), phosphorus (P), and potassium (K) varied within the ranges of 1.5 to 27.2 g/kg d.w., 1.6 to 1.8 g/kg d.w., and 6.5 to 7.5 g/kg d.w., respectively. The contents of potentially toxic metals such as chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), and zinc (Zn) were below the EU limits for soil improvers. The microbial structure follows the changes of the gradient from the outer to the innermost layer with relatively low amounts of DNA. The gradient nature shows that it is needed to develop better strategies for composting surpassing the conventional approach. However, the low amounts of total phenols and oil residues indicated efficient biodegradation during composting. The carbon-to-nitrogen ratio (C/N) within the range of 13 to 16 suggested that OPC can be used as a soil amendment. Overall, the study suggests that composting can be a promising strategy for environmentally-friendly OP recycling. Theoretical Importance: This study contributes to the understanding of the use of OPC as a soil amendment and its potential benefits in resource recycling and reducing environmental burdens. It also highlights the need for improved composting strategies to optimize its process. Data Collection and Analysis Procedures: The OPC samples were taken from the compost pile and charasterised for selected chemical, physical and microbial parameters. The specific analytical procedures utilized are described in detail in the poster. Question Addressed: This study addresses the question of whether composting can be optimized to improve the biodegradation of OP. Conclusion: The study concludes that OPC has the potential to be used as a soil amendment due to its favorable physical and chemical characteristics, low levels of potentially toxic metals, and efficient biodegradation during composting. However, the results also suggest the need for improved composting strategies to improve the quality of OPC.

Keywords : olive pomace compost, waste valorisation, agricultural use, soil amendment
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