

Olive-mill and grape-mill waste as a substitute growing medium component for unexploded vegetables production in nurseries

Antonios Chrysargyris, Panayiota Xylia, Nikolaos Tzortzakis*

Department of Agricultural Sciences, Biotechnology and Food Science, Cyprus University of Technology, Limassol, 3603 Cyprus

Abstract

Oliveculture and grape-vines production are the main crops in Mediterranean basin and in several other places all over the world. Intensive crop production is revealing high yields but also great amount of wastes being of environmental and human health concern. The present research work was conducted in order to investigate the possibility of using olive-mill wastes (OMW) and grape-mill waste (GMW) in different ratios (0-5-10-20-40% v/v) with peat, in the production of *Portulaca oleraceae* (purslane) and *Sonchus oleraceus* (sowthistle) plants. In purslane, GMW affected plant growth with more pronounced effects at the high ratio of 40%. Plant height, leaf number, plant biomass and chlorophyll content (SPAD) did not change at $\leq 20\%$ GMW. Leaf stomatal conductance decreased as the GMW ratio increased into the growing media. The application of OMW had similar effects as GMW with the high ratios of $\geq 20\%$ to substantially decrease plant growth (height, number of leaves, fresh and dry weight) and physiological metabolism, with decreased chlorophyll content and leaf stomatal conductance. In case of sowthistle, the addition of GMW up to 10% stimulated or did not affect the plant height, number of leaves, fresh weight and chlorophylls. In contrast, OMW at $\geq 10\%$ decreased plant growth. Sowthistle leaf stomatal conductance was decreased proportionally with the increased ratios of GMW and OMW into the growing media. The application of GMW in the substrate had no significant effect in the antioxidant activity and the total phenolic content, with the exception of 5% GWM, which appeared to increase the antioxidant activity in purslane's leaves. As for sowthistle, the application of 10% and 20% GMW revealed the lowest antioxidant activity, while the addition of 40% increased the corresponding values 4-10 times. On the other hand, the higher the percentage of OMW in the substrate mixture, the higher the antioxidant activity and content of total phenolic and flavonoid content in both tested plants. Both GMW and OMW can be used in the growing media at low ratios of 10% and 5%, respectively.

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Keywords: *Olea europaea*, *Vitis vinifera*, olive stone, grape waste, growth, peat, plant

***Author of correspondence: Dr Nikolaos Tzortzakis**

Mailing address: Department of Agricultural Science, Biotechnology and Food Science, Cyprus University of Technology, 3603, Limassol, Cyprus. E-mail: nikolaos.tzortzakis@cut.ac.cy

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