

***Origanum dubium* and *Sideritis cypria* plant waste as a substitute growing medium component for *Portulaca oleracea* production in nurseries**

Antonios Chrysargyris*, Efraimia Hajisolomou, Nikolaos Tzortzakis

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

Abstract

Medicinal and Aromatic Plants (MAP) are not only attracting research interest, but there is an increase in the cultivation areas for the production of fresh and/or dry biomass and essential oils (EO). Indeed, EO are derived through water or steam distillation and this procedure results in a large amount of wastes, rising environmental concerns about their disposal. The research work was conducted in order to investigate the possibility of using *Origanum dubium* waste (ODW) and *Sideritis cypria* waste (SCW) derived through the extraction of essential oils via steam distillation, in different ratios (0-5-10-20-40% v/v) with peat, in the production of *Portulaca oleracea* (purslane). The addition of ODW higher than 10% resulted in decreased plant growth (plant height, leaf number and fresh biomass produced), while 5% of ODW in the substrate mixture maintained leaf number and plant height. The increased levels of ODW decreased leaf stomatal conductance while leaf chlorophyll decreased at $\geq 20\%$ of ODW. Additionally, the antioxidant activity and the total phenolic content appeared increased, as the percentage of the ODW in the mixture was increased. In case of SCW, plant height, leaf number and plant biomass decreased at $\geq 10\%$ of SCW, while the addition of 5% of SCW kept growth parameters up to control levels. Leaf stomatal conductance was decreased as the ratios of SCW into the growing media was increased, while the antioxidant activity remained unaffected, until the treatment of 20% of SCW. In both cases, mineral accumulation in the plant was affected by the presence of ODW and SCW. The presence of nitrogen for example was decreased, as the percentage of the tested materials in the mixture was increased. Based on these results, both materials under evaluation could be successfully used up to 10% in the substrate mixture, and additional research (i.e. fertigation, mixture of the materials) could provide useful data towards the exploration of such waste materials. MAP wastes derived from the distillation process, can be explored further for a partially peat substitution.

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Keywords: Oregano, sideritis, hydrodistillation, Medicinal and Aromatic plants, wastes, growth, peat

***Author of correspondence: Dr Antonios Chrysargyris**

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