Cyprus University of Technology

Faculty of Geotechnical Sciences and Environmental Management

Master's Thesis

Effect of different nitrogen, potassium and phosphorus levels of the nutrient solution on *Origanum dubium* grown hydroponically

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Limassol, May 2024

CYPRUS UNIVERSITY OF TECHNOLOGY

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Approval Form

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ABSTRACT

Medicinal and aromatic plants (MAPs) have been widely recognized of their usefulness. With the current growth of the market for aromatic and medicinal plants, there is a high demand to study the factors that affect their yield and quality. In this context, the main problem in cultivation of MAPs is the lack of precise information on nutrition management. In this study *Origanum dubium* plants were cultivated in coco coir substrate, with different nutrient solutions. *Origanum dubium* has great prospects to be cultivated commercially but it's nutritional needs have not been studied thoroughly. The effects of nitrogen, phosphorus and potassium on the plant performance, growth, antioxidants and minerals of *Origanum dubium* was studied. They were 7 treatments that each had a different N-P-K content in their nutrient solution. The results showed that the highest fresh weight of the plants was achieved with the high nitrogen (300-75-350) and low potassium (150-75-150) treatments. Unlike fresh weight dry matter was not affected by the applied treatments. The high nitrogen treatment increased nitrogen content in both upper body and root tissue on the plants. The high phosphorus treatment also increased phosphorus content mostly on the upper body of the plants. The high potassium treatment increased the potassium content of the roots alone. Nitrogen and potassium showed antagonism with each other. Leaf chlorophyll fluorescence was only affected by the high phosphorus treatment. Finally, there was a significant increase in antioxidant activity (DPPH, FRAP), total phenols and flavonoids caused by the high phosphorus treatment.

Keywords: *Origanum dubium*, hydroponics, coco coir, N-P-K

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