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التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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EVALUATION OF PRODUCING SOME MEDICINAL AND AROMATIC HERBS UNDER AQUAPONIC CONDITION

By

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B.Sc. Agric. Sc. (Organic Agric. in English Program), Fac. Agric, Ain Shams Univ., 2011

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ABSTRACT

Sabah Abd El-Karim Mahmoud Salama. "Evaluation of Producing some Medicinal and Aromatic Herbs Under Aquaponic Condition". Unpublished M.Sc. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2021

Conventional agricultural systems facing problems due to declining resources resulting from overpopulation. Hence alternative agricultural techniques involving aquaponic system (includes aquatic

species e.g. Tilapia) and hydroponics (includes crop plant e.g. herbs, flowers, and vegetable) that have a great potential to provide high yield (fish and plant) per unit area with high water use efficiency and avoid soil problems. The current experiment was conducted at the Arid Lands Agricultural studies and Research Institute (ALARI), Ain Shams University, Egypt, during the summer seasons of 2017 and 2018 respectively. The study aimed to investigate the efficiency of aquaponic system compared to substrate culture (chemical nutrient solution (control)) as a nutritional source combined with french basil and mint in two different plant densities (6 and 8 plants / m²) performed in complete randomized blocks design. The vegetative growth, yield quality, the nutrient contents (N, P and K), total chlorophyll, the oil (%) and the essential oil components of basil and mint have been estimated periodically as well as the measurements of fish tilapia growth and yield.

The major oil component of mint *(Mentha longifolia)* using nutrient solution with 6 plants /m² was pulegone 65.82 %, 1.8 cineole 15.41 % and menthone 4.19 % and with 8 plants /m² was pulegone 61.80 %, 1.8 cineole 17.23 % and menthone 4.69 % .Whereas using aquaponic water with 6 plants /m² was pulegone 60.90 % , 1.8 cineole 18.10 % and menthone 4.55 % and with 8 plants /m² was Pulegone 58.54 % , 1.8 cineole 17.02 %, Menthone 9.07 %.

Whereas basil (*Ocimum basilicum var. minimum*.) The major oil component using nutrient solution with 6 plants /m² was linalool 42.81 %, Eugenol 19.59 % and Methyl chavicol 6.50 % using nutrient solution and with 8 plants /m² was Linalool 41.90 %, Eugenol 20.38 %, Methyl chavicol 6.33 % .Whereas using aquaponic water with 6 plants /m² was Linalool 37.74 % , Eugenol was 19.81 % and Methyl chavicol was 1.63 % and with 8 plants /m² was Linalool 37.42 % ,Eugenol 18.66 %, Methyl chavicol 7.99 % .

Exposed results indicated that both basil and mint were successfully grown in aquaponic and act as natural bio filter for fish rearing water hence overcome the problem of environmental effluent. Plant density 8 plants / m^2 treatment of both Basil and Mint had a higher capacity for enhancing the quality of fish rearing water in comparison

with plant density 6 plants / m^2 resulted in increased the fish yield (the final and gain tilapia yield). The use of the chemical nutrient solution provided higher plant height, fresh and dry yields of basil and mint than the aquaponic solution, as well as N, P, K and oil content (%) of basil and mint plants in both plant density (6 and 8 plants / m^2) and in both seasons. The highest plant height, N, P, K and oil content results were reported for the treatment of chemical nutrient solution + plant density 6 plants / m^2 while chemical nutrient solution + plant density 8 plants / m^2 had the highest fresh and dry yield of basil and mint. The chlorophyll content and number of branches, however, did not differ between Aquaponic systems and hydroponic systems. The need for increasing the food production to overcome the problem of over population , motivate to apply aquaponic technique for french basil and mint production provided food production (fish and vegetables) as well as the medicinal plants at the same time protecting the environment by avoiding the use of chemical fertilizers.

Keywords: Aquaponic system, French Basil, Mint, Hydroponics, Nile Tilapia, Plant Density.

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