STUDIES ON USING DIFFERENT COMPOST TEAS AS NUTRIENT SOLUTIONS FOR CANTALOUPE PRODUCTION WITH NUTRIENT-FILM TECHNIQUE

By

SAAD ABOU EL-HASSAN ABD EL-AZIZ
B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 1987
M. Sc. Agric. Sc. (Vegetable Crops), Ain Shams University, 2003

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Approval Sheet

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ABSTRACT

Saad Abou El-Hassan Abd El-Aziz Osman: Studies on Using Different Compost Teas as Nutrient Solutions for Cantaloupe Production with Nutrient-Film Technique. Unpublished Ph. D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2010.

This study was carried out in the experimental site of Arid Land Agricultural Research and Services Center (ALARC), Faculty of Agriculture, Ain Shams University, Egypt. to test the ability of using compost tea as an organic nutrient solution for cantaloupe production under nutrient film technique (NFT). The experiment was conducted during two autumn seasons of 2006 and 2007. Cantaloupe plants (*Cucums melo L.*) cv. Royal F_1 hybrid were grown in nutrient film technique (NFT) under plastic house. Three compost accelerators organic, mineral and bio accelerators and all possible combinations among them were used in this work to perform seven heaps of compost. After the maturation composts, seven compost teas were prepared to be used as organic nutrient solutions compared with the inorganic nutrient solution. The electrical conductivity of the nutrient solutions were maintained between 2 -2.5 dS/m whereas, pH ranged between 5.5 and 6.5. Vegetative growth of cantaloupe plants were recorded as plant length, stem diameter, leaf number, total leaf area/plant and chlorophyll reading. Physical quality of fruits (average weight, diameter, flesh thickness, firmness and dry matter). Moreover, chemical quality of fruits (vitamins C, total sugars, TSS and titratable acidity) and fruit contents of Ca, NO_3 and heavy metals were measured.

The obtained results showed that using compost teas as organic nutrient solutions decreased the plant growth parameters, yield and most of physical and chemical properties in cantaloupe fruits especially with bio accelerator compost tea treatment. The reduction in the early yield was between 9.74 & 18.48 % and 11.28 & 20.98 % in the first and second seasons, respectively, while the reduction in the total yield was between

10.18 & 16.34 % and 14.11 & 21.26 % in both seasons respectively. There were no significant differences among the treatments concerning the percentage of dry matter and titratable acidity of fruits. Organic accelerator compost tea treatment increased the fruit content of vitamin C. Fruits produced from organic nutrient solution treatments have a low content of NO_3 as compared with those produced from inorganic nutrient solution treatment.

Key words:

Cantaloupe, Muskmelon, Organic fertilizer, Compost tea, Organic nutrient solution, Soilless, Hydroponic, NFT.

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1. INTRODUCTION

Cantaloupe is one of the most important vegetable crops grown under protected cultivation or open field in Egypt. It has become an important commercial crop for both local market or exportation. The total cultivated area in Egypt was 60343 feddans, produced about 625313 tons on annual basis with an average of 10.36 tons/feddan in season 2006 (**Ministry of Agriculture and Land Reclamation, 2006**). In this respect, the Egyptian cantaloupe could challenge in European markets from October to February. During this period, Egypt could export about 100000 ton per year with net income of 80 million dollars. Egyptian cantaloupe could be also exported to Arabian and Gulf markets **(Al-Saied, 1998)**.

The most important problem faces cantaloupe production in the soil is sensitivity of plants to soil pathogens especially fungal pathogens and nematodes. Therefore, cantaloupe farmers must perform soil disinfection by chemical methods before the cultivation to avoid soil pathogen and nematodes problems. To overcome these problems some growers start to use the virgin soil for one or two years and then moving to the other lands. This can overcome the problem for the short run but for the long run it will be a big problem.

Nutrient film technique (NFT) can be used to overcome soil problems where, plants grow in the nutrient solution directly, so it did not need any disinfection as will as it had an enormous latent potential for agriculture production under conditions of arid and semi arid regions to reduce the water consumption of crops. Also, NFT had a great potential for crops production in areas where soil has a pest and disease problems (**Burrage, 1992),** especially in near future when the methyl bromide will be band. **Abou-Hadid *et al*. (1989)** demonstrated that under Egyptian conditions, NFT produced higher yield in shorter time when compared with conventional

cultivation. As well as, the cost of production by the NFT is similarly to the soil gown crops.

Recently, production of vegetables with reduction of chemical fertilizers used is becoming very important due to increasing their prices also, for human health, environment and exportation, especially to Europe. In the near future, most of exported vegetable will be the safety production. Using organic fertilizer for vegetable production is growing now in Egypt to cover the increment requests of European markets where, the consumer is willing to pay higher price for healthy and safety product

So that the use of NFT with organic nutrient solution will be very important in the near future for environment and human health, while using chemical nutrient solution produced vegetables that contains high levels of nitrate which, is hazard for human health **(Hill, 1990).**

For these reasons, the aim of this study is to test the ability of using compost tea as an organic nutrient solution for cantaloupe production under nutrient film technique (NFT).