

Influence of Magnetic Iron and Organic Manure on Fennel Plant Tolerance Saline Water Irrigation

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Abstract: This study was carried out during the two successive growing seasons of 2011/2012 and 2012/2013 at the farm in North coast, Hamam, Matroh Governorate, Egypt. to investigate effects of magnetite iron (M) at rates of 0, 50 or 100 kg/fed. and sheep manure (SM) at rates of 0, 15, 30 and 45 m³/fed. on growth, seed yield, essential oil %, essential oil yield and its components and chemical composition of Fennel (*Foeniculum vulgare* Mill.) under saline water irrigation (5664 ppm).

Gradual and significant increases in plant height, number of branches & umbels per plant, fresh & dry weights per plant, fruit yield per plant, essential oil percentage in fruits, and essential oil yield per plant were recorded with increasing the tested M level from zero up to 50 kg/fed. Also, 100 kg/fed. M produced the highest percentages of main components of the essential oil (β - Pinene, anise aldehyde and fenchone). While the highest percentages of (α - Pinene and anethole) resulted under the effect of 50 kg/fed M. On the opposite, The estragole gave lowest percentages comparing to untreated plants. Also, M treatments increased total carbohydrates % and nutrient percentages of N, P and K but it decreased the proline content.

As for SM application treatments, SM at the rate of 45 m³/fed. enhanced the above mentioned traits of growth and yield of fruits and essential oil. The highest percentages of (α - Pinene, anise aldehyde, fenchone and anethole) were recorded in essential oil extracted from plants treated with SM at the rate of 45 m³/fed, comparing to control. On the other hand, the same rate of SM resulted the lowest percentages of estragole compare of untreated plants. On the other hand, this treatment increased total carbohydrates % and nutrient percentages of N, P and K while the proline content decreased.

Interaction treatments of 50 kg/fed M X SM as 45 m³/fed. resulted in significant increases in the above mentioned traits (plant growth, fruit yield and essential oil determinations). The highest percentages of (α - Pinene and anise aldehyde) resulted under the effect of 50 kg/fed M X SM at 45 m³/fed. While the combined between 100 kg/fed. of M and SM at 45 m³/fed. show the highest values of the (fenchone and anethole) compared to the control. However, interaction treatments between the M and SM gave lower values of the estragole content. In addition, the highest total carbohydrates and Nutrient contents (N, P and K) percentages were recorded in fruits of treated plants with these 50 kg/fed M X SM as 45 m³/fed. On the opposite, the all tested treatments gave the lowest proline content compared to the control.

Conclusion: It could be recommend that apply magnetite iron (M) at 50 kg/fed. with 45 m³/fed. sheep manure (SM) for enhance fennel growth as well as fruit and essential oil yield and its components under saline water irrigation (5664 ppm).

Keywords: *Foeniculum vulgare*, magnetite iron, sheep manure, fenchone, anethole, anise aldehyde, estragole, proline, carbohydrates.