

ABSTRACT

The field work was carried out at the Experimental Farm "Demo farm" in Faculty of Agriculture, Fayoum University, Egypt, during two successive seasons of 2009/2010 and 2010/2011. The present study aimed to study the effect of sowing dates (15 Sep., 7th Oct. and 1st Nov.) , sow spacing (25 cm, 35 cm and 50 cm between hills with two plants in a hill) and bio-fertilization (spraying the plants with active dry yeast at 0, 2 and 5 gm/L thrice per season) on the growth, fruit yield, oil production and the main components of fennel (*Foeniculum vulgare*, Mill) plants to reveal the suitable treatments for the highest production of fennel fruits containing more volatile oil with the best quality. The results showed that sowing fennel plants in 7 Oct. at 50 cm and spraying them with 5 gm /L of yeast gave the highest vegetative growth attributes fresh and dry weight /plant and fruit yield /plant. The highest fruit yield /feddan, oil yield /plant and per feddan, total carbohydrates percentage and obtained from planting on (7 Oct.) at (35 cm) and with active dry yeast at (5 gm /L). The highest contents of carotenoids and the greatest branches' number were obtained from sowing on 15th Sept. at 50 cm with yeast at 5 gm /L. As well as when using the same treatment and culture, but at a distance of 25 cm has resulted in the highest values in terms of plant height, number of umbels/ plant and essential oil percentage /plant. The highest content of chlorophyll of the plant (a), (b) has been obtained from the interaction between sowing on 1st November, with a distance of 25 cm of culture and sprinkled with yeast plants at 5 gm /L. The lowest percentage of Estragole (48.96%) which is undesirable component, was resulted from (7th Oct. + 35 cm +2 gm /L) while the highest one (87.98%) was obtained as a result of (1st Nov. + 35 cm + 2 gm /L). On the other hand, treatment (15th Sept. + 25 cm + 5 gm /L) gave the maximum percentage of Limonene (23.99%). The third main component which is anethole reached to its maximum percentage (15.75%) as a result of (7th Oct. + 35 cm +2 gm /L). Hence, it can be

recommended that for obtaining higher fruit yield/feddan and oil yield/plant and per feddan, Fennel plants should be sown in the first week of Oct. at a distance of 35 cm between plants and spraying them with 5 gm/L of active dry yeast.

Key words: sowing date, sow spacing, biofertilizer, active dry yeast (*Saccharomyces cerevisia*), Fennel (*Foeniculum vulgare*).