

Abstract

In order to investigate the effects of different sources of fertilizer and plant density on Quantitative and qualitative characteristics of chicory (*Cichorium intybus* L.) a split-plot experiment with 3 replicates was run as a randomized complete block design during April in the 2016/2017 crop year in the experimental field of the faculty of agriculture of the university of Birjand, located in the village of Amirabad. The main factor included: no fertilizer (control), manure at a rate of 20 tonnes/ha, vermicompost at a rate of 5 tonnes/ha, iron chelate Nano 9 percent and sub-factor was also bush density implemented in three levels with interbush distances of 10, 15 and 20 cm and interrow distances of 50 cm. The ANOVA results indicated that the density factor was significant on all traits. reducing the distance; wet weight, dry root and bush height showed the more increase. The increase in bush height could be considered due to competition for light and food. The maximum amount of protein, number of flowers per bush and number of leaves obtained by increasing the distance up to 15 cm². Organic fertilizer and iron chelate-nano treatments became significant on all morphological and physiological traits. The maximum amount and number was obtained by using manure, In terms of chlorophyll index, amount of protein, number of flower, number of leaves, fresh and dry weight of root and fresh weight of foliage. The maximum amount of inulin, the maximum number of sub-branches and the maximum height of bush was obtained by using vermicompost. The ANOVA results showed that the interaction between density and fertilizer treatment was significant on the fresh and dry weight of root, the chlorophyll index, the fresh weight of foliage, the amount of inulin, the number of leaves and the number of flowers per bush at the level of 1%. the maximum amount of inulin of 65/26% and the maximum height of bush of 97/55 cm was obtained at the distance of 10 cm by using vermicompost. Additionally, the maximum amount of fresh weight of foliage of 57691 kg/ha and the Maximum biological yield of 14613 kg/ha was obtained at the distance of 10 cm by using manure. Consequently the maximum amount of fresh and dry weight of root of 27/35 and 13/97 gr were obtained at the distance of 10 cm by using manure. the maximum number of 22/30 sub-branches was obtained at the distance of 20 cm by using vermicompost and the maximum amount of chlorophyll index of 64/60 was obtained at the distance of 10 cm by using manure. Furthermore, the maximum number of 110/39 flowers and the maximum number of 36/5 leaves per bush were obtained at the distance of 15 cm by using manure.

Keywords: Chicory, Inulin, Organic fertilizers, Protein, Nano-chelate iron



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**Effects of different sources of fertilizer and
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production of chicory (*Cichorium intybus* L.)**

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