

## ORIGINAL ARTICLE

# Effects of Vermicompost and Magnetic Water on growth of *Ocimum basilicum*

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### ABSTRACT

The use of recent technologies for the increase of growth indexes and the plants yields is an important aspect and till now many research works for this has been done. One of these efforts is the usage of magnetic water and vermicompost for the increase of growth plants. In order to study the effects of magnetic water and vermicompost on the growth of *Ocimum basilicum* a glass house experiment was carry out in Islamic Azad University of Marand, Iran. The experimental design was factorial as RCB with two factors as a. Vermicompost at 5%, 15% and 30% volume of the pot mixed with sand and b. Magnetic Water at three levels as normal water, 1000 and 2000 Tesla, each treatment has three replicate. The results showed that the interaction use of vermicompost and Magnetic Water is significant on plant height and the effect of the use vermicompost and interaction between magnetic water use and vermicompost on stem length is significant and only the main effects are significant use vermicompost on root length and the effect of magnetic water use and interaction between magnetic water use and vermicompost significant number of leaves.

**Keywords:** Vermicompost, Magnetic Water, Growth plant, Violet basil.

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## INTRODUCTION

Increase of plant productions yield is the final aim in agriculture business. Till recent years many research works conducted to increase the plant is production yield. For example, some research works suggested chemical fertilizers to increase the plants yields. Then the chemical fertilizers can increase the plants yields but the negative effects of them on the products and water resource are obvious and frequent use of them cause the damage to environmental. Therefore, there are some needs to use of some soil fertilizer alternatives, that not to be harmful to environment. The use of zeolite for increase of water efficiency and increase of plants production is an important aspect towards sustainable agriculture. Zeolites belong to groups of aluminosilicate minerals, that capable storage of water in the soil and increase soil fertility [1]. Magnetic fields have been reported to exert a positive effect on the germination of seeds [2,3], on plant growth and development [4,5], on tree growth [6], on the ripening of fruits and vegetables and on crop yield [7]; some review papers also mention a number of controversial, early results [8, 9]. Kavoosi and Rahimi [13] reported that the effects of zeolite on rice product within confidence limit of 99 percent in Product of hay in 95 percent of confidence limit was meaningful. Wojcik [10] reported that in the beginning of 1980s Japanese called Fujiko Shimazaki working in Shimazaki Seed Company was the first who reported that stationary magnetic fields can improve the germination of seeds and speed up the growth of plants. According to Jones et al. [11] they found that the electromagnetic fields amplify the plant growth regulator induced Phenylalanine Ammonia Lyrase during cell differentiation in the suspended cultured plant cell. The studies of Danilov et al., [12] showed that the use of magnetic water increase the numbers of fruits in plant such as cheery and tomato. The researcher works shows that the usage magnetic water and zeolite was increased the production yields of *Lepidium Sativum* L.

**MATERIALS AND METHODS**

In this study vermicompost used were obtained from a workshop production of organic fertilizer. Washed sand to the amount of 60 kg was prepared. After air drying the washed sand sieve (2 mm) sieves and placed in a cotton Sack and for sterilizing with temperature was 121 °C and atmospheric pressure Was autoclaved. Seed Violet basil Qaramalek Tabriz was prepared. The seeds disinfected with acid chloride 0.5 percent and in plastic pots containing a mixture of vermicompost and sand washed, were grown in controlled conditions. In this study, two major factors, vermicompost and water magnetic with three replications. Treatments for vermicompost, vermicompost at 5%, 15% and 30% of the pot with sand mixed. To apply sprinkling after planting Violet basil in pots, sprinkling with three levels of normal water, Magnetic Water 1000 Tesla and Magnetic Water 2000 Tesla was performed every two days for 4 months. To create the magnetic field of device magnetic was fixed with magnets. The water sample was passed through a magnetic field created and watering the plants done. Regulation of lighting conditions and sprinkling was done every two days. Plant samples were manually harvested and each sample separately in bags labeled specifying their desired treatments assigned and to measure the specifications were transferred to the laboratory. Growth specifications such as plant height, Stem length, root length and number of leaves were measured. Specifications measured using the software SPSS was analyzed.

**RESULTS**

**Vegetative specifications**

The result of the effects treatments on plant growth specifications in Table 1 is presented.

Table1. Summary of analysis of variance of the effects on plant growth parameters

Source	df	Mean Square			
		Plant height	Stem length	Root length	Leaf number
Repeat	2	267.58 <sup>ns</sup>	16.91 <sup>ns</sup>	6.58 <sup>ns</sup>	18.48 <sup>ns</sup>
Magnetic Water	2	178.78 <sup>ns</sup>	0.50 <sup>ns</sup>	5.08 <sup>ns</sup>	130.26**
Vermicompost	2	459.75 <sup>ns</sup>	946.71**	27.69**	31.26 <sup>ns</sup>
Water × Vermicompost	4	192.78**	273.38**	3.40 <sup>ns</sup>	277.48**
Error	16	78.52	40.49	2.43	17.02

\*significance at 99% level, ns= non-significant

**Height plant**

The analysis of variance indicates that only interaction use of vermicompost and magnetic on plant height was significant at the level of one percent (Table1). The comparison of the mean showed that in concomitant use 1000 Tesla magnetic water and 5% vermicompost plants have the top heights and minimum heights a conventional water plants and 30% vermicompost recorded (Figure 1).

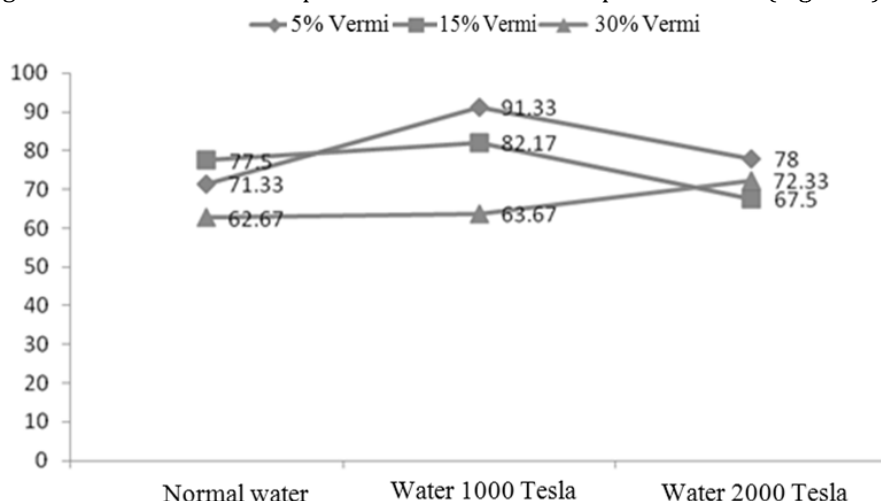


Figure 1- Comparison of the mean interaction magnetic and vermicompost on plant height

**Stem length**

Analysis of variance showed that the main effect of the use of vermicompost and interaction between magnetic water use and vermicompost the Stem length is significant at 1% (Table1). The comparison average showed that the highest stem length of 5% vermicompost exists and with other treatments there was significant difference and the increased use of vermicompost, Stem length is decreasing (Figure

2). Comparison of the mean interaction showed that the simultaneous of vermicompost and water 1000tesla Stem length is decreased compared to the control but water consumption 2000tesla and 5%vermicompost increased Stem length but there is no significant difference compared to control (Figure 3).

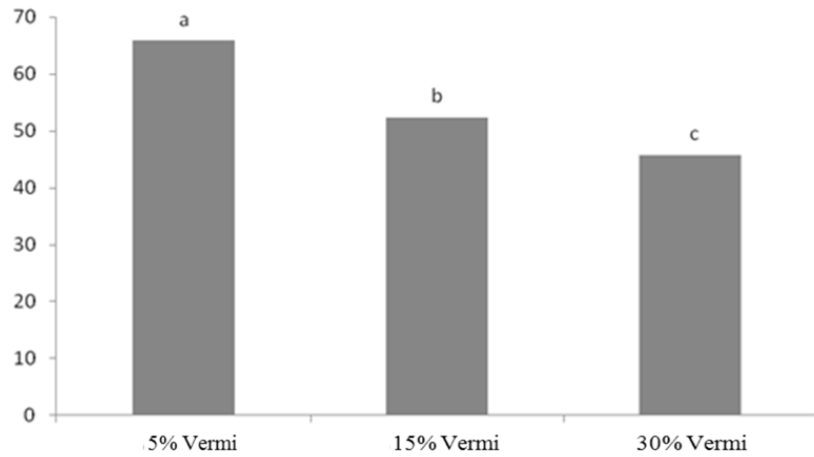


Figure 2- comparison of the mean effects vermicompost on Stem length

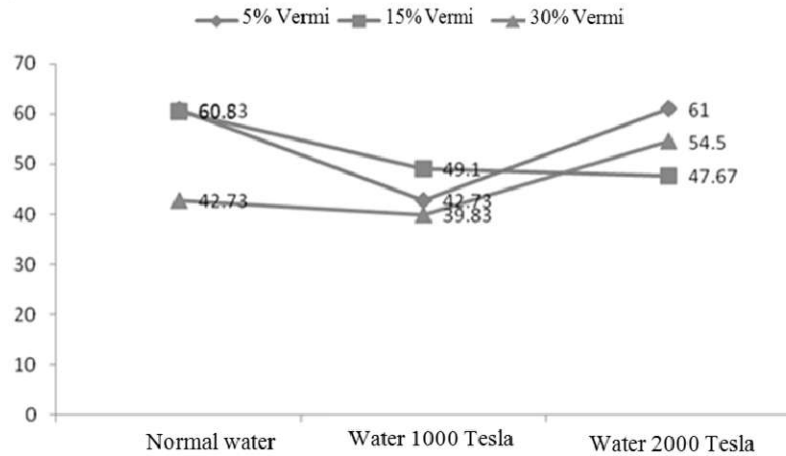


Figure 3- comparison of the mean the interaction consumption Vermicompost and water magnetic of the Stem length

**Root length**

Analysis of variance showed that the main effect of the use of vermicompost at 1% on the root length was significant (Table1). The comparison average showed that length of the longest root the treatments use of 5%vermicompost exists that the two treatments another is significant difference and by increasing the use of vermicompost, root length is decreasing (Figure 4).

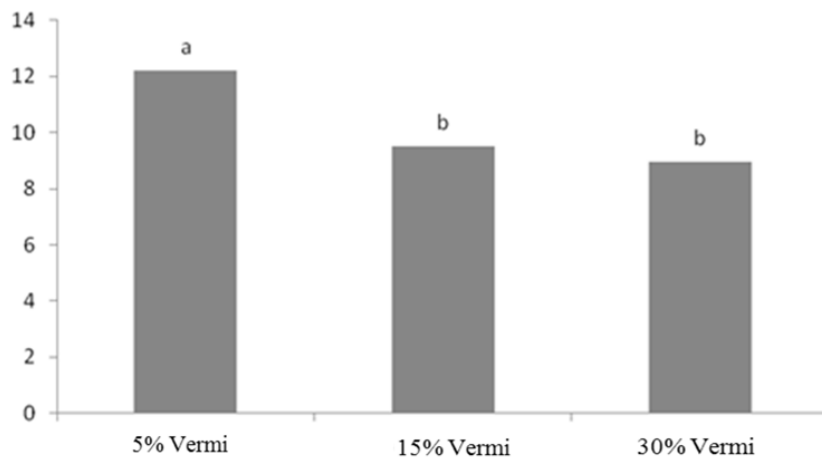


Figure 4- comparison of the mean effects vermicompost on root length

**Leaf number**

Results showed that the main effect of magnetic water use and interaction between magnetic water use and vermicompost at 1% significant number of leaves (Table 1). Mean comparison showed that the highest Leaf number obtained with normal water consumption and with increasing magnetic water Leaf number descending (Figure 5). Comparison of the mean interaction showed that the treatment tap water and 2000tesla consumption of vermicompost also has increased Leaf number Whereas the 1000 tesla was contrary and the maximum Leaf number with 5% vermicompost and water 1000 Tesla obtained (Figure 6).

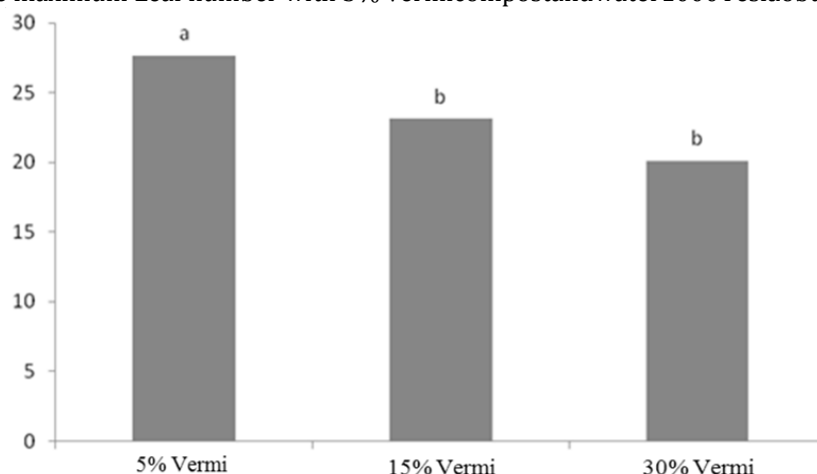


Figure 5- comparison of the mean effects magnetic water on leaf

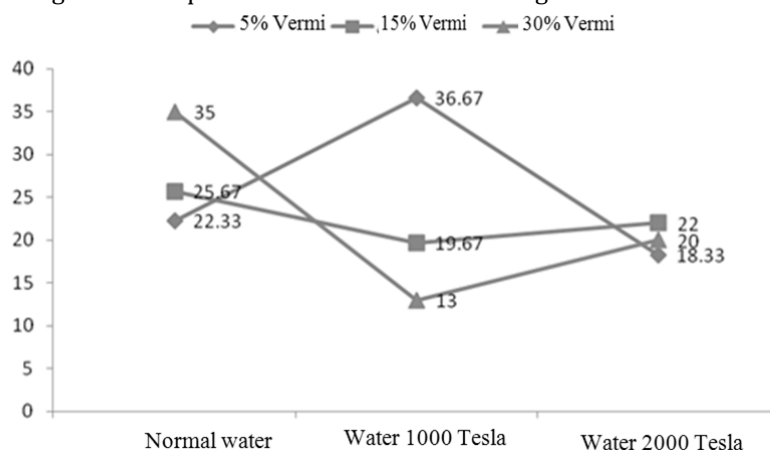


Figure 6- comparison of the mean interaction Magnetic Water and vermicompost on leaf

**DISCUSSION AND CONCLUSIONS**

During the evaluations conducted and the results of this research, about plant height indicates that only the interaction use of vermicompost and magnetic on plant height was significant at the level of one percent and about stem length the main effect of the use of vermicompost and interaction between magnetic water use and vermicompost the stem length is significant at 1% and about root length the main effect of the use of vermicompost at 1% on the root length was significant. Results on leaf number showed that the main effect of magnetic water use and interaction between magnetic water use and vermicompost at 1% significant number of leaves. Wojcik [10] reported that in the beginning of the 1980s Japanese called Fujiko Shimazaki working in Shimazaki Seed Company was the first who reported that stationary magnetic fields can improve the germination of seeds and speed up the growth of plants. The studies of Danilov et al., [12] showed that the use of magnetic water increases the numbers of fruits in plants such as cherry and tomato. The researcher's work shows that the usage of magnetic water and zeolite increased the production yields of *Lepidium Sativum* L.

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