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Article

Evaluation of Orange and Biofertilizer on Some Yield Traits of Cucumber (*Cucumis sativus L.*)

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ABSTRACT
In the year 2021, in one of the communities in the Abu Ghraib area of Baghdad, a factorial experiment was carried out to study the effect of adding organic manure(poultry, cattle and sheep)and dry bread yeast suspension on certain yield characteristics of cucumber plants (Hadeel hybrid) grown in a greenhouse. Results showed that poultry waste had the best effects in the fruit set (67.21%), the diameter of the fruit(of 2.58 cm), the number of fruit (36.81 fruit plant^{-1}), the weight of fruit (66.00 g), and the yield (2.42 kg plant^{-1}). The poultry manure caused a reduction in the peel thickness to a minimum value of (0.145mm). Compared to the control treatment, adding dry yeast suspension to plants improved all yield parameters tested.

Keywords: Cucumber, sheep manure, cattle manure, dry yeast, poultry manure, yield.

INTRODUCTION

The cucumber plant is one of the important protected vegetable crops because of the high yield achieved from its cultivation due to its rapid growth in contrast to other crops and the lack of competition from open cultivations throughout the greenhouse production period[1]. Furthermore, the fruits produced are higher quality than those generated by open farming. After the spread of protected agriculture permitted the crop to be cultivated outside of its natural growth season, demand for its production increased due to its marketing value. Organic fertilization is a major topic in modern agriculture, particularly in sandy soil where organic matter is scarce[2]. It is also viewed as a necessary foundation for increasing the productive value of agricultural areas and preventing contamination caused by the overuse of chemical fertilizers. Consequently, the recycling of organic fertilizer is one of the key factors that lead to the provision of appropriate amounts of organic waste to meet the needs of agriculture. Research suggests that natural alternatives like dry yeast can help plants grow,

blossom, and produce more[4] Amino acids, hormones, and carbohydrates are all produced by dry bread yeast and are required for growth[5]; it is also important for increasing plant resistance to insects and diseases[6]. The experiment aimed to determine how adding organic animals and suspension of dry yeast affected some cucumber (Hadeel hybrid) yield features.

MATERIALS AND METHODS

During the 2021 growing season, an experiment was conducted to examine the utilization of animal feces and suspension of dry yeast on some yield traits of cucumber (Hadeel hybrid) grown in a controlled environment. The following treatments were used in the experiment

1. Control (T1).
2. 20 ton $ha^{-1}$of cattlefeces (T2).
3. 15 ton $ha^{-1}$of sheep waste (T3).
4. 12 ton ha^{-1} of poultry waste (T4).

5.6 g L^{-1} per plant of suspension of dry yeast (T5).

In the greenhouse, hybrid seeds were sown in a protected place, and The seedlings were moved to a greenhouse in Baghdad's Abu Ghrab district's Zadan village. The seedlings were raised on separate terraces (1.75 m). Each reproduction had a 12-meter-long terrace with five terraces. Furthermore, to the cattle, sheep, and poultry feces, a dry yeast suspension was added to the soil, in addition to a control treatment in which none of the above-mentioned research factors were used. The Randomized Complete Block Design was conducted, with the averages evaluated using (LSD) at a probability level of 0.05[7]; Genstat software was used to examine the data.

Studied traits

1. Fruit set percentage: The total number of fruit sets was counted for five plants from each experimental unit, and the fruit set percentage was calculated according to the following equation:

Fruit set ratio = number of fruit set in the main stem and branches / total number of flowers in the main stem and branches $\times$100.

2. The fruit diameter: The measurement was taken as an average of five fruits using Vernier.

3. The peel thickness: The measurement was taken as an average of five fruits, using Micro Vernier.

4. Number of fruits: The number of fruits for the experimental unit was counted from the beginning of the harvest until the end of the growing season and divided by the number of plants of the experimental unit according to the following equation: Average number of fruits = total number of fruits in the experimental unit \ number of plants in the experimental unit.

5. Fruit weight: The weight of the fruit was calculated as follows:

Fruit weight (g) = product of experimental unit/number of fruits of experimental unit plants

6. Plant yield: Calculated according to the following equation:

Plant yield (kg) = total yield of the experimental unit (kg) / number of plants in the experimental unit

RESULTS

The addition of organic feces had an obvious favorable effect, as seen in (Figure 1), especially in the treatment T4 (poultry feces), which achieved the highest values for the characters of fruit set percentage, fruit diameter, fruits number, fruit weight, and plant yield amounted to 67.21%, 2.58 cm. and 36.81 fruit plant^{-1}, 66.00 g and 2.42 kg plant^{-1} respectively. The control treatment T1 gave the lowest values for all studied traits (fruit set percentage, fruit diameter, fruit number, and plant yield), and they amounted to 45.85%, 2.31 cm, 19.18 fruit plant^{-1} and 1.12 kg plant^{-1}, respectively. On the other hand, the treatment caused a reduction in the peel thickness to a minimum value of (0.145mm). The T3 (sheep feces) treatment recorded the lowest fruit weight reaching 57.93 g.

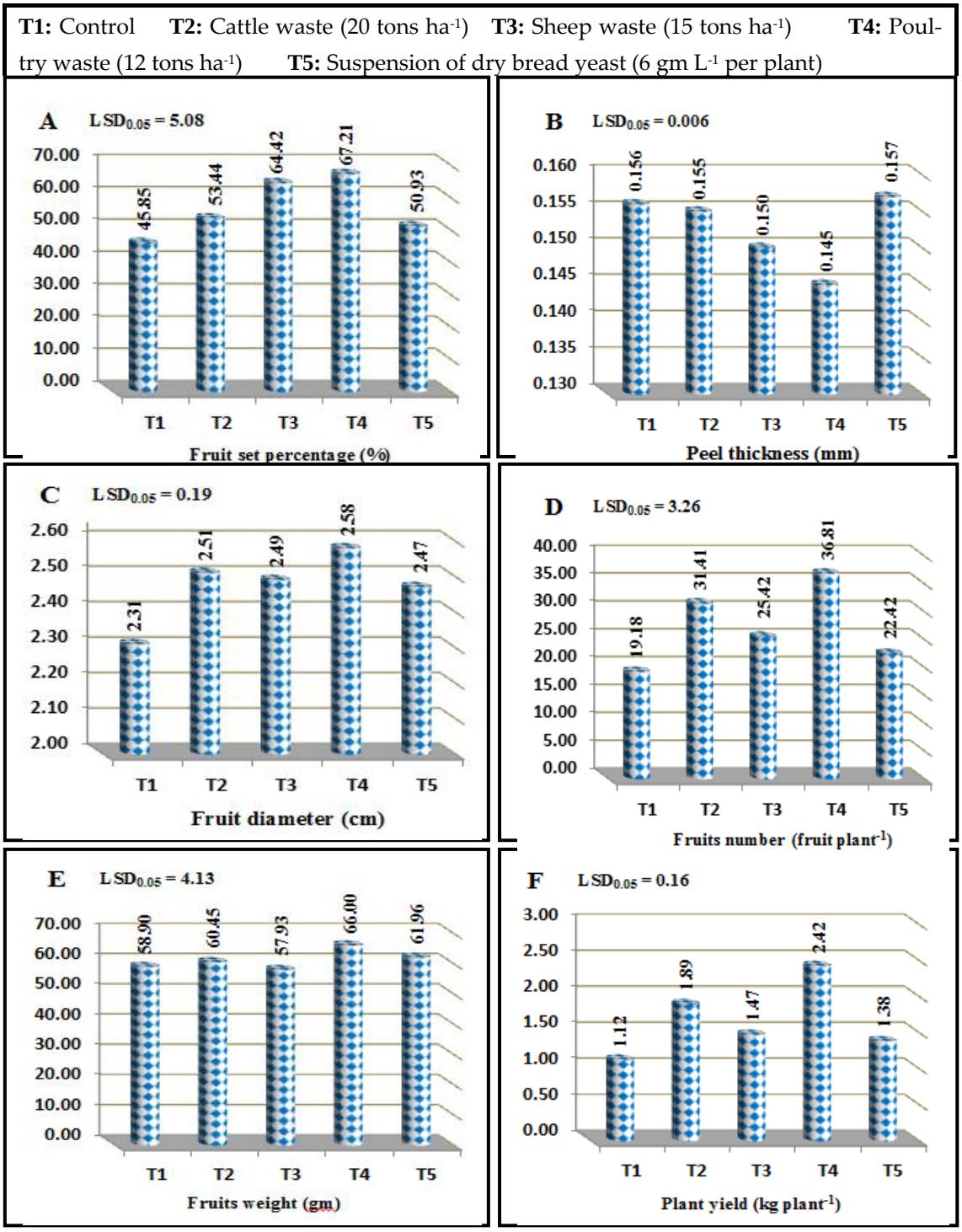

Figure 1. Effect of cucumber on animal feces and suspension and the of dry yeast on some characters

DISCUSSION

Because it includes good quantities of nutrients, the effect of the use of animal waste and dry yeast suspension can be linked to increasing all of the crop's features[8], and these nutrients have a clear effect in giving plants with strong vegetative growth capable of giving the largest number of flowers explained based on the effect of these elements on the development of the plant, which thus contributes to an increase in the number of fruits. Animal waste plays a joint role in increasing the leaf area and their chlorophyll content, which is positively reflected in an increase in the efficiency of photosynthesis and the manufacture of larger quantities of carbohydrates. Then, it reduces the competition of flowers and new fruits set for carbohydrates produced by leaves, reducing the proportion of flowers and fruit abortion[9]. Organic fertilizers also improve the soil's physical, chemical and fertility properties, which leads to an increase in the number of nutrients in the soil solution. In addition, the process of its decomposition causes an increase in vegetative growth rates as a result of an increase in organic acids that have an effective effect on and activate the physiological processes taking place in the plant, especially the process of photosynthesis, building amino acids and forming proteins, which helps in improving the vegetative growth of the plant [11] which is reflected positively on the number of fruits produced by the plants. Yeast contains carbohydrates and amino acids, which promote the transformation of vegetative buds to flower [12, 13]. It also contributes to reducing the number of fruit abortions resulting from the failure to complete the processes of pollination and fertilization through its role in the rapid growth of the pollen tube[14] as well as its role in inhibiting the activity of pathogens, especially the fungus, which reduces the percentage of fruits abortion [15, 16].

CONCLUSION

After evaluating the research findings, it can be concluded that adding organic waste (particularly chicken feces) and dry yeast to cucumber plants cultivated in a protected environment has a positive effect. As a result, we advocate using sheep, cattle, and poultry excrement, as well as dry yeast, for fertilizing cucumber plants, as improving production in quantity and quality depends mostly on a healthy nutritional balance, and malnutrition severely impacts plant development and production.

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