

Effect Of Adding Different Organic Fertilizers In The Absorption Of Some Of Nutrient Elements From Soil In Properties Of Plant Growth And Yield Of Cucumber Plant.

Nasser Fahem Yasir¹, Mahdi Wasmey Seheib², Abdul Kareem Hasan Odhafa³
(Soil and water resources department, Agriculture college / University Wasit, Iraq)

Abstract: The experiment was conducted in one of the greenhouses of the College of Agriculture - University of Wasit for spring season 2013 to study the effect of adding some organic fertilizers in the growth of cucumber plant. The experiment included 6 Treatments: (T1 comparative treatment (without any addition), T2 adding ground for Fertilizer organic Humic plus by 250 g / Dunam , T3 adding the organic nutrient Vegeamino Foliar with concentration of 1 ml / l , T4 adding compost Humic plus Foliar concentration of 3 g / l , T5 adding organic fertilizer Humic plus Foliar + Vegeamino and T6 adding organic fertilizer Humic plus ground addition + Vegeamino) . The experiment was carried out using a Randomized Complete Block Design (RCBD) with three replications and tested moral differences between averages, according to the less significant moral differences between averages and the probability of 0.05.

The results showed a significant superiority of treatment T6 (Adding Organic Fertilizer Humic plus Add ground + Vegeamino Foliar) in the dry weight of the plant and the percentage of chlorophyll , nitrogen ,and potassium , and holds rate per plant , and the sum total of the plastic house as it was (23.99 g , 52.40 % , 4.50% , 2.970 % , 0.641 kg 0.721 kg) , respectively, with no significant difference for treatment T2 in the percentage of chlorophyll , nitrogen , potassium and rate yield per plant sum total of the plastic house which recorded (51.19 % , 4.48 % , 2.960 % , 0.585 kg 0.681 kg). From this study, we are conclude that using Organic Fertilizer Humic plus as ground applied + Vegeamino as foliar applied can be enhance from cucumber growth and increase the yield it.

Keywords: Vegemino, Humic plus, Cucumber plant, *Cucumis sativus L.*

I. Introduction

Cucumber (*Cucumis sativus L.*) is one of the oldest summer vegetables which belongs to family *Cucurbitaceae* planted by humans. It is believed that the original home of cucumber plant was India. This crop is characterized by its high nutritional value due to being rich with carbohydrate, proteins, vitamins C, B₁, B₂, as well as some of mineral salts such as iron, calcium and phosphors (Matlub *et al*; 1989).

The use of different chemical fertilizers has an effect in the increasing of agricultural production. In spite of the high efficiency for chemical fertilizers, modern trends , especially after the 1990s decade focused on the need to reduce the use of chemical fertilizers because of their negative effect that cause ecological and medical problems as well as the effect on the biological varieties and properties of soil and water which considered one of the purposes of organic agriculture is to produce plants that are free toxic effects of chemical ,herbicides in addition to the production of clean plants (AL-Rudhaiman and AL-Shenawi ;2005) .

Finding natural alternatives that are characterized by their readiness to increase the nutrients elements in soil and improving the chemical and physical properties and their less effect with the ecology such as the use of natural extractions or amino acids and regulator of extraction growth from sea biology or different plants is the most important recent trends in increasing production of vegetables crop (Al-Sehaf;1989). Leaf nutrition or non-root nutrition is one of important indicators in the development of modern agriculture because the experiments and researches showed its imposable supply of plant with nutrient elements by leafs and the amount of benefit which up to about 80% compared with land addition especially when soil conditions un suitable such rising of basic ,acidity degree and salty (Abdul ;1988) .

Moreover, leaf fertilization is more efficient compared to land fertilization where the nutrient elements are transported directly to leaf to contribute in the synthesis of food in plant tissues with carbonic immobilization without transporting to long distances from root to leaf (Peuke *et al*; 1998). In addition to that, the organic compounds soluble in water may affect the development and growth of plant because they contain many compounds such as sugars, proteins, amino acids, humus organic acids and non-humus acids. All these compounds contribute, directly or indirectly, in the growth and development of the plant. They boost growth by enzymic or harmonic because they contain the elements needed by the plant or affect it in increasing the readiness of the elements that already exist in the soil or added to it so that it lead to increase production and improve quality (AL-Fertusy ;2003) .

Some of studies showed that the use of organic fertilizers by spraying them will cause the increase in growth and component of yield in cucumber. For example, Kazemi (2013), found that humic acid foliar on cucumber plant has a significant effect in increasing the dry weight of plant and its content of nutrient elements of N, K and it was reflected positively in increasing average of plant yield. It is also found that the cucumber plant foliar with humic acid and amino acids (3 ml/L concentration) for everyone leading to a significant increase in the sum per plant and total yield (Elnemir *et al* ;2012). The addition of humic acid foliar to cucumber plant with level 20ml/L achieved a significant increase in the total yield for the season 2006-2007 in plastic houses (Unlu *et al* ;2011)

Yousif (2011) showed a significant increase when adding humic foliar or through soil on cucumber plant in the percentage of chlorophyll, dry weight of plant and, also, in the total yield and the sum per plant. Bayoumi and Hafez (2006) showed that using organic fertilizers foliar with different concentration led to a significant increase in the properties of vegetable growth which reflected on the increase of yield and present elements in *leafs*. El-Shabrawy *et al* (2010) showed that the land addition for humic acid on cucumber has resulted in a significant increase of the dry weight and the total yield of the plant.

This study was conducted for the objective of using some of the organic fertilizers as natural alternatives for chemical fertilizers and to know of the effect of organic fertilizers in the absorption of some nutrient elements of soil and growth and yield of cucumber plant.

II. Material And Methods

2.1 plant material and growth condition

The experiment was conducted in the fields of College of Agriculture / Wasit University for the season of spring 2013 in plastic house (50x9x3.5 m) long, width and height respectively. The area of the house is 450 m². First soil was tilled and a distance of 1 m was left from the two wards of the house for easy movement inside the house. Then limited three plates in middle of plastic house with 70cm width for every plate and 1m between the plates, the distant between plants 40cm, the long of experimental unit is 4.8m. Every experimental unit included 24 plants where Rula seed, Spanish origin, planted by Anzadadin Company 8/1/2013 in phylum plates. After that the plates were transported to the plastic house in 10/2/2013. Then plates were covered with black nylon, where the experiment designed with RCBD design.

2.2 treatments and design

- 1-Making a comparison (without any addition).
- 2- The addition of land organic fertilizer (Humic plus) with 250 gm/donum.
- 3-Addition of organic nutrient (Vegeamino foliar) with 1 ml/L.
- 4-Addition of organic fertilizer (Humic plus foliar) with 3 gm/L.
- 5- Addition of organic fertilizer (Humic plus foliar) with 3 gm/L + addition of organic nutrient (Vegeamino foliar) with 1 ml/L.
- 6- Land addition of organic fertilizer (Humic plus) with 250 gm/donm + addition of organic nutrient (Vegeamino foliar) with 1 ml/L.

The foliar was used in the morning until quite moisture and Genstat program in was used in statistical analysis (AL-Sahuky and Weheib ;1990)

2.3 Data collection

The measurements below were randomly taken from five plants from every experimental unit as follow:

2.3.1 Dry weight for the Plant (gm):

Five plants were taken from every experimental unit then they were put in oven on 70 heat degree to 48 hr until stable of weight and recorded its weight then divided on the number to estimate the dry weight per plant (Al-Sehaf ;1989).

2.3.2 The Percentage of Chlorophyll:

The relative percentage of leaf content of chlorophyll was measured by the use of Chlorophyll meter (Model Spad 502 Japanese) by taking reading for ten plants selected randomly for each experimental unit. The average was taken and then measured by the Spad units.

2.3.3 Determination of N. K. elements in plant leafs:

Plants samples were taken from each experimental unit then select leafs complete expansion which high physiology active (fifth leaf) and leach with distilled water then dried, digested and provided the extractions with (Al-Sehaf; 1989) method. Then the follow elements were evaluated:

*Nitrogen: with (Jackson; 1958) method

*Potassium: with (AL-Sehaf; 1989) method.

2.3.4 Average of the one plant yield (kg)

The average of yield per one plant is calculated by take yield of experimental unit divided them on the number of plants.

2.3.5 Total yield of plastic house (450m²)

Taking the average yield per plant (kg) multiplied by the number of plants per plastic house.

Table (1) some of physical and chemical properties of soil study

EC m.mohs.cm ⁻¹	PH	%soil fractions			texture	%N total	%P	soluble ions(meq/L)			
		Clay	Silt	Sand				K ⁺	Ca ⁺⁺	Mg ⁺⁺	Na ⁺
1.3	6.7	18.8	49.6	31.6	silty sand	0.33	1.19	0.5	6	4.4	6.19

III. Results And Discussion

1) The Effect of organic fertilizers in dry weight of plant (gm) and percentage of chlorophyll of cucumber plant.

Table (2) illustrates the effect of organic fertilizers addition in properties of vegetable growth. It is noticed that the 6th treatment is significantly positive different in giving high dry weight and without significant difference compared with 2nd treatment and control treatment which gave less dry weight of plant, also 6th treatment is superior significant compared with other treatments and without significant difference compared with 2nd treatment for giving high increasing in percentage of chlorophyll compared with n where cause increasing of plant growth and accumulation of carbohydrates ,increasing of weight and increasing of %chlorophyll then increase from photo thesis operation (Abdul;1988).

These results agree with those obtained by (Kazemi; 2013) and (Yousif; 2011) there found addition of humic foliar or land addition on cucumber plant was cause increasing of dry weight and % chlorophyll.

Table (2) effect of organic fertilizers in dry weight of plant (gm) and %chlorophyll of cucumber plant.

Treatments	Dry weight of plant(gm)	% Chlorophyll
T1=control (without any addition)	14.17	45.33
T2=Land addition of organic fertilizer (Humic plus)	19.44	51.19
T3=Vegeamino addition foliar 1ml/L	16.67	49.87
T4=Humic plus addition foliar 30gm/L	14.48	49.44
T5= Humic plus addition foliar 30gm/L + Vegeamino addition foliar 1ml/L	14.36	49.19
T6=Land addition of organic fertilizer (Humic plus) +Vegeamino addition foliar 1ml/L	23.99	52.4
L.S.D. 5%	3.993	4.067

2) The Effect of organic fertilizers in absorption of nitrogen and potassium in cucumber plant

The findings in Table (3) illustrate that the effect of organic fertilizers in the properties of vegetable growth where the 6th treatment is better than for giving high %N in leafs of cucumber plant and without significant difference compared with 2nd treatment and control treatment which gave %N in leafs of plant also 6th treatment was superior significantly compared with other treatments and without significant difference compared with 2nd treatment in giving high increase in the percentage of K in leaf of plant compared with control treatment. This is because the humic acid providing of available nutrient elements for absorption then increasing growth of plant which accumulation of carbohydrates ,increasing of dry weight and increasing of chlorophyll rate and increase of photosynthesis (Abdul;1988).

These results agree with (Kazemi; 2013) (Yousif; 2011) and (EL-Shabrawy *et al*; 2010) there research ensure Humic acid foliar or land addition with other nutrients its effect in content of plant from nutrient elements in cucumber.

Table (3) effect of organic fertilizers in %N and %K of cucumber plant.

Treatments	% N	% K
T1=control (without any addition)	3.05	1.537
T2=Land addition of organic fertilizer (Humic plus)	4.48	2.960
T3=Vegeamino addition foliar 1ml/L	3.94	2.700
T4=Humic plus addition foliar 30gm/L	3.85	2.570
T5= Humic plus addition foliar 30gm/L +Vegeamino addition foliar 1ml/L	3.48	2.363
T6=Land addition of organic fertilizer (Humic plus) +Vegeamino addition foliar 1ml/L	4.50	2.970
L.S.D. 5%	0.882	0.607

3) **Effect of organic fertilizers in average of the one yield plant (kg) and total yield of plastically house (kg) of cucumber plant.**

The findings in Table (4) show that effect of organic fertilizers addition in properties of vegetable growth. It is noted that the 6th treatment was significantly better for giving high average of the one plant yield and without significant difference compared with 2nd treatment and the control treatment which gave average of the plant yield. Also, the 6th treatment was superior compared with other treatments and without significant difference compared with 2nd treatment for giving high total yield of plastically house compared with control treatment because increasing of roots growth and increase its ability on absorption of nutrient elements because available of nutrients elements as result addition of organic fertilizers which increase of nutrient elements available concerning nitrogen which source of growth encourage (such as Oxines), amino acids and vitamins. That was reflected in the accumulation of carbohydrates, the increase of dry weight and increase of chlorophyll rate (Tables 2, 3) where cause increase in photo thesis and increasing of yield (Abdul; 1988).

These results agree with those concluded by (Kazemi; 2013), (Yousif; 2011), (Unlu *et al*; 2011) and (EL-Shabrawy *et al*; 2010), who found that the addition of organic fertilizers affect in increasing of the one plant yield and total yield of cucumber.

Table (4) the effect of organic fertilizers in average of the one plant yield (kg) and total yield of plastically house (kg) of cucumber plant.

Treatments	Average of the one plant yield(kg)	Total yield of plastically house(kg)
T1=control (without any addition)	0.380	428
T2=Land addition of organic fertilizer (Humic plus)	0.585	681
T3=Vegeamino addition foliar 1ml/L	0.497	559
T4=Humic plus addition foliar 30gm/L	0.454	511
T5= Humic plus addition foliar 30gm/L + Vegeamino addition foliar 1ml/L	0.437	429
T6=Land addition of organic fertilizer (Humic plus) +Vegeamino addition foliar 1ml/L	0.641	721
L.S.D. 5%	0.1444	165.8

IV. Conclusion

From this study, we are conclude that using Organic Fertilizer Humic plus as ground applied + Vegeamino as foliar applied can be enhance from cucumber growth and increase the yield it. Based upon the achieve results, we recommend the use of organic fertilizer (Humic plus) as land addition and foliar intertwined with organic nutrient (Vegeamino) and re-conduct the experiment on other plants and locations. The researchers also recommended the less frequent use of chemical fertilizers.

Acknowledgements

I would like to exprees gratitude to the wasit university for supporting me monetarily during my research work

References

[1] Abdoul.k.S.,Physiology of nutrient elements in the plant .Broad of kutub Dar of printing and publication. Ministry of higher education and scientific research .Salah AL-Deen University, 1988.

[2] AL-Fertusy B.A.J.Effect of water extraction for some of organic remains in the wheat growth .Thesis master .Soil Dept .Agriculture college .Baghdad University .Iraq, 2003.

[3] AL-Sahaf.F.H.Nutrition of implication plant .Dar al-Hekma printing. Ministry of higher education and scientific research .Iraq, 1989.

[4] AL-Sahukey .M. and Kreama .M.W.Implications in design and analysis of experiments .Baghdad University. Ministers of higher education and scientific research .Dar AL-Hekma of printing and publication, 1990.

[5] AL-Redhaiman .KH.N.and AL-Shenawy .M.Z.Introduction in organic agriculture .Series of scientific sources of Saudi society for agricultural science .8th source .5th year. Kingdom of Saudia Arabia, 2005.

[6] Matlub.A.N.,Ez-Aldeen .S.M.and Kream .S.A.Production of vegetables 2nd part .2nd printing .Dar AL-Kutub broad of printing .Mosul University . Ministry of Higher Education and Scientific Research .Iraq, 1989.

[7] Bayoumi,Y.A.and Hafez ,Y.M. Effect of organic fertilizer combined with benzo (1,2,3) thiadiazole -7-carbothioic acid S-methy ester (BTH) on the cucumber powdery mildew and the Yield production . Acta Biologica Szegediensis 50 (3-4), 2006, 131-136.

[8] El-Nemr, M.A.,M EL-Desuki, A.M.EL-Bassiony and Z.F.Fawzy .Respose of Growth and Yield of Cucumber plants (Cucumis sativus L.) to Different Foliar Applications of Humic acid and Biostimulators . Australian Journal of Basic and Applied Sciences, 6(3), 2012, 630-637.

[9] EL-Shabrawy, R.A., A.Y.Ramadan and S.M.EL-Kady .Use of Humic Acid and some Biofertilizer to reduce Nitrogen rates on cucumber (Cucumis sativus L.) in relation to vegetative growth, yield and chemical composition. J. plant production, Mansoura University .Vol.1 (8), 2010, 1041-1051.

[10] Jackson, M. L. Soil Chemical Analysis. (Englewood Cliff,N.J: Prentice Hall, 1958).

[11] M. Kazemi. Effect of Foliar Application of Humic Acid and Potassium Nitrate on Cucumber Growth.Bull.Env.Pharmacol. Live Sci. Vol. 2(11), 2013, 3-6.

- [12] Peuke, A.S., W.D. Jeschke and W. Hartung. Foliar application of nitrate or ammonium as sole nitrogen supply in *Ricinus communis*. II- The flows of cations chloride and abscisic acid. *New Phytol.* 140,1998, 625-636
- [13] Unlu,H. Ozdamar., H. Unlu., Y. Karakurt and H.Padem. Changes in fruit yield and quality in response to foliar and soil humic acid application in cucumber. *Scientific Research and Essays* 6(13), 2011, 2800-2803.
- [14] Yousif, K.H. Effect of humic acid, biofertilizer (EM-1) and application methods on growth, flowering and yield of cucumber (*Cucumis sativus* L.). A Thesis Submitted .College of