

The effect of CultiVar and spraying with amino-alexin and trace elements and their interaction on some physiological characteristics and the Yield of two Varieties of cucumber (*Cucumis sativus* L.) grown in greenhouses.

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Abstract

this experiment was carried out in one of the unheated greenhouses at the station of the College of Agriculture and the Marshes / University of Thi Qar, Al-Mawhahiya area, during the autumn season 2019-2020, by designing a split split plot. The experiment included three treatments and three replicates, between two varieties of cucumber Jamela and Dats, three concentrations of trace elements (0, 20 and 40) gL⁻¹ and three concentrations of amino elxain (0,3.5 and 7) ml⁻¹ and the plants were sprayed. Three times, the first was at flowering, the second sprayed 15 days after the first spray, and the third sprayed 15 days after the second spray. This study aims to find out the effect of aminoxin and trace elements on the cucumber plant and study some of the physiological properties and yield and determine the best suitable hybrid that can be cultivated in the conditions of the southern region, especially Dhi Qar governorate. Total of leaves (mg. 100 gm⁻¹ soft weight), free amino acid content of fruits (mg. Liter⁻¹) and total yield of house (kg. Plastic house⁻¹) when spraying with trace elements treatment which gave (6.687 mg, 100 gm⁻¹ fresh weight, 2.2450 mg. Liters⁻¹ and 43.908 kg. Plastic house⁻¹), while when spraying with amino - xene, the highest rate was recorded (7.196 mg. 100 gm⁻¹) soft weight and 2.5011 mg. Liter⁻¹ and 38.475 kg. ⁻¹) While the comparison treatment recorded the lowest rate of these characteristics, and Jamela was superior to Dats in the content of amino acids and the total output of the house. As for the double and triple interactions, it was significant in these characteristics.

Key words : amino-alexin , trace elements , cucumber (*Cucumis sativus* L.) , greenhouses.

I. Introduction

The cucumber plant (*Cucumis sativus* L.) is one of the crops belonging to the Cucurbitaceae family that is important in the countries of the world, including Iraq, as it includes 90 genera and 750 species Group-Haifa, (2014), and is used whether fresh or pickled and for its economic importance, food and its various uses In many foods, cucumber fruits contain 96.3% water by weight of the fruit and that every 100 grams of fruit contains 0.7 mg protein, 14 calories, 24 mg calcium, 20 international units of vitamin A, 0.075 mg of riboflavin (vitamin B2) , And 0.3 mg of niacin (vitamin B2), cucumber contains a number of vitamins, the most important of which are vitamin A and C, and a small percentage of vitamin B, and it also contains a good percentage of mineral elements such as iron, manganese, iodine and copper (Al-Qubaisi, 2007). Foliar fertilization by microelements or stimuli is the possibility of these elements being lost or incompatible with the degree of pH reaction. Soil is subjected to adsorption and sedimentation and the formation of compounds that are not ready for plants and are not absorbed by the roots (Abu Dahi, 1993). El Himma used to regulate production, protect the environment and crop production and help to give botanical and laboratory indications with high content in terms of increased flowering, knot and increase vegetative indices. It benefits the plant and gives similar results and more than the rest of the stimuli, and increases the proportion of knots, carbohydrates, and vegetative and flower production is Amino Alexin that greatly stimulates growth, especially in the early stages and increases flowering, size and hardness of fruits. Biostimulants are one of the important pillars used to regulate production,



protect the environment, and produce crops and help to give vegetative and laboratory indicators with high content in terms of increasing flowering and knotting and increasing vegetative indicators, and thus these catalysts are known as fine materials used to improve plant growth, so some companies began to manufacture fertilizers To be used in the form of liquid solutions, where it is used as a spray through the leaves, from the manufactured fertilizers, which is a growth stimulator, which benefits the plant and gives similar and more results than other stimuli and increases the percentage of knots, carbohydrates, and vegetative and flower production. Amino Alexin, which stimulates growth significantly, especially in the stages The first increases flowering, fruit size and hardness, and enhances the plant's ability to produce phytotoxins, which in turn works to protect the plant from many diseases, especially downy mildew and late blight. It plays a role in regulating respiration and transpiration and maintaining the water condition of the plant Regulating the opening and closing of stomata. Amino Alexin is characterized by its high solubility and stability, which facilitates the absorption process on plants through roots, stems and leaves, especially with the presence of free amino acids.

In view of the lack of studies on the effect of the biostimulant Amino Alexin and microelements on the yield of cucumbers and the importance of this crop and for the purpose of increasing its productivity and improving its quality in greenhouses, we decided to carry out this study with the aim of the following: -

- Knowing the extent of the influence of amino-Alexine and microelements on cucumber crosses and studying the interaction between them and in achieving the highest yield in production.
- Determining the best suitable hybrid that can be grown in the conditions of the southern region, specifically Dhi Qar Governorate

II. Material and methods

The experiment was carried out in one of the unheated greenhouses at the station of thi- College of Agriculture and the Marshes / University of Dhi Qar Al-Mawhahiya area during the autumn Season 2019-2020 to find out the effect of the biostimulant aminoelxain and trace elements on the growth and yield of two varieties of cucumber and their bilateral and triple interactions under protected agriculture and means of transporting them to farmers. For this experiment, the Split Plot was used for this experiment. After preparing the land of the plastic house (9 * 50)m , the agricultural service operations were carried out from thinning, grafting and hoeing and for all transactions, then the felting process was carried out after the plant reached the sixth real leaf, where The climbing thread is placed from the bottom and it is wrapped along the plant and tied and fixed to a carrying wire in The Plastic House (Al - Muhammadi, 1990).

Studied traits

1- The total chlorophyll content in leaves (mg. 100 g⁻¹): The chlorophyll pigment in the leaves was estimated by extracting the chlorophyll with 80% acetone, and it was estimated with a Spectrophotometer at wavelengths of 645 nm and 663 nm, and the total chlorophyll was calculated according to Goodwin (1976) method.

2- The content of amino acids in leaves (mg. Liter⁻¹): The extraction method was used according to what was mentioned in (Stein and moore, 1968).

3- The total production of the greenhouse (KG. Pet⁻¹): The weight of the yield of the multiple fairies of the plot unit is calculated over the length of the harvest season until the last pound at the end of the season.

An analysis of variance for each of the studied traits was carried out according to the Split Plot design according to the Significant Difference Least LSD test with a probability level of 0.05(Al-Rawi and Khalaf Allah, 1980).



III. Results and discussion

Total chlorophyll content in leaves (mg. 100 gm⁻¹): It is noted from Table (1) that the varieties did not differ significantly in the content of their leaves of total chlorophyll, as for the treatment of spraying with trace elements, it had a significant effect as the treatment plants at a concentration of 4 gm. It reached 6.687 mg. 100 g⁻¹ soft weight compared to the comparison treatment, where it recorded 6.256 mg. 100 g⁻¹ soft weight. As for the spraying treatment with amino-xene, the same table indicated the presence of significant differences, as it exceeded at a concentration of 7 ml. L⁻¹ compared to the comparison treatment, which reached respectively 7.196 and The same table shows that the results of the interaction between the cultivar and spraying with trace elements reached the significant level, as the highest rate was reached for the Jamela variety 6.970 mg. 100 gm⁻¹ soft weight compared to the comparison treatment that amounted to 6.187 mg. 100 g⁻¹ soft weight For the Dats class. Also, significant differences were found for the interaction between cultivar and spraying with amino-xene, and it gave the highest average of Dats variety 7.288 mg. 100 gm⁻¹ soft weight at a concentration of 7 ml. L⁻¹ compared to the comparison treatment of 5.328 mg. 100 gm⁻¹ soft weight. As for the interaction between spraying with aminoxene and the elements The microorganisms rose to the level of significance, as it gave the highest rate of 7.357 mg. 100 g⁻¹ soft weight treatment 4 g l⁻¹ and 7 ml l⁻¹ compared to the comparison treatment, which reached 5.120 mg. 100 g⁻¹ soft weight. As for the interaction between the cultivar and the spraying with aminoluxin and trace elements did not significantly affect the This trait. It is evident from the review of the results of the leaf content characteristic of chlorophyll that the effect of the varieties, amino acid spray treatments and trace elements and their interactions had a significant effect, as the varieties differed among themselves, and the reason for this was due to the genetics of the variety responsible for some traits and their response to environmental factors.

Table (1) The effect of cultivar and spraying with trace elements (gm. Liter⁻¹) and amino-alexin (ml-liter⁻¹) and the interaction between them on the rate of chlorophyll in leaves (mg. 100 g⁻¹ fresh weight)

Variety×Microelements	amino-alexin (ml-liter ⁻¹)			Microelements gm. Liter ⁻¹	Variety
	7	3.5	0		
6.187	7.407	6.167	4.987	0	Dats
6.453	7.217	6.677	5.467	2	
6.403	7.240	6.440	5.530	4	
6.324	7.137	6.583	5.253	0	Jamela
5.952	6.700	5.837	5.320	2	
6.970	7.473	7.573	5.863	4	
0.2776	N.S			LSD 5%	
Mean	7.196	6.546	5.403	Mean	
	0.1947			LSD5%	
6.348	7.288	6.428	5.328	Dats	Variety×Amino alexin
6.416	7.103	6.664	5.479	Jamela	
N.S	0.2484			LSD 5%	
Mean					
6.256	7.272	6.375	5.120	0	



6.203	6.958	6.257	5.393	2	Microelements× Amino alexin
6.687	7.357	7.007	5.697	4	
0.2273	0.3387			LSD 5%	

This is consistent with what was found by Al-Bayati (2006) and Al-Sahaf et al. (2011). The reason for this may be due to the genetic differences between varieties resulting from different genetic factors. The reason for the increase in chlorophyll in the leaves is due to the increase in the leaf area of the Jamela variety, which in turn leads to an increase in the photosynthesis process. In leaves and dry weight gain of shoots Aktas et al., (2009).

The content of amino acids in leaves, mg. L⁻¹: The results of Table (2) showed that the variety Jamela was significantly superior to the variety Dats, as it recorded the highest rate of 2.118 mg. Liter⁻¹ compared to the variety Dats, which scored 1.73 mg. Liter⁻¹, and the same table shows that spraying with amino Alexin has a significant effect (1.513, 1.852 and 2.5011) mg⁻¹ liter were recorded respectively, and the results also showed that spraying with trace elements had a significant effect on the free amino acid content of the fruits, as the treatment exceeded 4 gm. L⁻¹ was significant, as it gave the highest rate of 2.2450 mg. L⁻¹ compared to the comparison treatment of 1.7606 mg. L⁻¹. The interaction between the cultivar and spraying with trace elements showed a significant effect, as Jamela cultivar gave the highest rate of 2.692 mg. L⁻¹ at concentration 4 The comparison treatment for the variety Jamela gave the lowest rate of 1.619 mg. Liter⁻¹, and that the interaction between the cultivar and the spraying with amino-luxin had a significant effect, as the concentration of 7 ml.Liter was given to the variety Jamela the highest rate of 2.790. The comparison treatment for the variety Dats gave an average of 1,474 mg. Liters⁻¹, the same table shows that the interaction between spraying with aminoxin and trace elements has a significant effect, as the treatment of concentration of 7 ml per liter⁻¹ and the treatment of trace elements 4 gm.L⁻¹ was significantly higher, and it gave the highest rate of 2,950 mg. Liters.⁻¹ As for the treatment of 2 gm.l⁻¹ for trace elements and compared to aminoaluxin, it gave the lowest rate of 1.33 mg.l⁻¹. As for the interaction between the cultivar and spraying with micro-elements and amino-alexin, it had a significant effect, as the interaction of the variety Jamela at a concentration of 4 gm.l⁻¹ for the trace elements With a concentration of 7 mL⁻¹ of amino-alexin, the highest rate was recorded at 3,650 mg-liter⁻¹ compared to The least significant effect was in the Dats variety, when it interacted with a treatment of 2 g. L⁻¹ for trace elements with the comparison treatment for aminoxin, which reached 1.363 mg.Liter⁻¹ The results showed that the amino acids increased the chlorophyll content of the leaves. These acids participate in the synthesis of many enzymes for the photosynthesis process as well as nitrogen treatment in the plant directly.

Table (2) The effect of the variety and trace elements (gm. Liter⁻¹) and amino-xene (ml.Lite⁻¹) and the interaction between them on the rate of free amino acids from the fruits (mg. Liter⁻¹)

Variety×Microelements	amino-alexin (ml-liter ⁻¹)			Microelements gm. Liter ⁻¹	Variety
	7	3.5	0		
1.902	2.353	1.713	1.640	0	Dats
1.680	2.033	1.643	1.363	2	
1.797	2.250	1.723	1.420	4	
1.618	1.770	1.713	1.373	0	Jamela
2.042	2.950	1.873	1.303	2	
2.692	3.650	2.446	1.980	4	
0.0621	0.0919			LSD 5%	
Mean	2.501	1.852	1.513	Mean	

		0.03812			LSD5%	
1.793	2.212	1.693	1.474	Dats	Variety×Amino alexin	
2.117	2.790	2.011	1.552	Jamela		
0.0791		0.06317			LSD 5%	
Mean						
1.760	2.061	1.713	1.506	0	Microelements× Amino alexin	
1.861	2.491	1.758	1.33	2		
2.245	2.950	2.085	1.700	4		
0.0350		0.0615			LSD 5%	

especially if the foliar spray is on the leaves (Wallsgrave, 1995) and it contains about (20%) of K₂O, which contributes to increasing cell division and growth and increasing the formation of cellulose. It helps in the transfer of starch and sugars between parts of the plant that need it (Tucker 1999), as well as its role in the growth and development of modern tissue cells Carel, (1972) and Sutham, (2007).

The total yield of the greenhouse (kg. Pet-1): It is evident from Table (3) that the varieties differed significantly in the total, as Jamela significantly outperformed the variety Dats and scored (36.60 and 32.25) kg. Greenhouse⁻¹ respectively. As for the treatment of spraying with small elements, we notice that it has risen to the level of significance, as the treatment of the two concentrations 2, 4 g. L⁻¹ outperformed the comparison treatment, reaching (43.90, 38.00 and 21.38) kg. A plastic house⁻¹ respectively, and we also note from the same table the presence of significant differences When spraying with the amino acid chlorine, where the concentration treatment of 7 ml liter⁻¹ significantly outperformed the comparison treatment, which recorded (38.47 and 29.56) kg. Plastic house⁻¹ successively. The results of the interaction between the variety and spraying with micro-elements showed the highest total household production of 44.93 kg. 1 plastic house for Jamela at 4 g L⁻¹ compared to a comparison treatment of 18.26 kg. plastic house for Dats. The results of the interaction between the cultivar and the spraying with amino-xene did not record any significant differences, as for the interaction of the spraying with trace elements and amino-xene, we note the presence of significant differences, as the highest value reached 45.0 kg. Plastic house⁻¹, while the lowest value when compared to 15.53 kg. . As for the interaction between the variety and the spraying with micro-elements and amino-xene, it gave a significant difference, as it gave the highest rate of 45.75 kg. A plastic house⁻¹ when spraying with micro-elements with a concentration of 4 g. A liter⁻¹ and its interaction with amino-chlorine at a concentration of 7 ml. L⁻¹ for the Jamela variety compared to the comparison treatment is less Value was 14.40 kg. plastic house.

Table (3) The effect of the variety, trace elements, and amino-xene, and the interaction between them on the rate of the plastic house (kg. Pet⁻¹)

Variety×Microelements	amino-alexin (ml-liter ⁻¹)			Microelements gm. Liter ⁻¹	Variety
	7	3.5	0		
18.267	24.050	16.350	14.400	0	Dats
35.617	40.200	39.800	26.850	2	
42.883	44.400	43.000	41.250	4	
24.509	32.800	24.050	16.677	0	Jamela
40.383	43.650	34.650	33.850	2	
44.933	45.750	44.700	44.350	4	
1.2363	1.1897			LSD 5%	
Mean	38.475	35.258	29.563	Mean	

	0.1777			LSD5%	
32.256	36.217	33.050	27.500	Dats	Variety×Amino alexin
36.609	40.733	34.467	31.626	Jamela	
1.5664	N.S			LSD 5%	
Mean					
21.388	28.425	20.200	15.538	0	Microelements× Amino alexin
38.000	41.925	41.725	30.350	2	
43.908	45.075	43.850	42.800	4	
0.4331	0.4764			LSD 5%	

A review of the results reveals that the variation in the total yield may be attributed to the genetic factors of the variety and their vulnerability to the climatic conditions inside the greenhouse Alsadon et al (2006). The effect of the varieties and the concentrations of trace elements and amino acid and their interactions have a significant effect on the total yield, so the reason for its increase may be due to To the role of the elements used in the vital activities of vegetative and floral growth and the role of iron in increasing the content of chlorophyll in leaves (Al-Naimi, 1987), and because iron is considered a stimulant for oxidation and reduction enzymes and the formation of energy compounds Al-Sahaf, (1989).

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