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EFFECT OF ORGANIC AND INORGANIC FERTILIZERS ON GROWTH AND YIELD OF SUMMER SQUASH (*Cucurbita pepo* L.)

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ABSTRACT

This experiment was carried out in the experimental vegetable farms of the Horticulture Department, College of Agricultural engineering sciences, University of Duhok, Kurdistan region, Iraq, during the spring growing season of 2021. The aim of the study was to investigate the response of summer squash cultivar, namely (Alexanderia F1) to four levels of organic (0 , 2 g.L^{-1} Fulvic acid, 2 g.L^{-1} Seaweed extract and 4 g.L^{-1} Amino acid) and three level of inorganic fertilizers (0, 1 ml.L^{-1} Cal-Mag and 5 ml.L^{-1} Phosphate-K) on growth and yield of summer squash plant (*Cucurbita pepo* L.). Fertilizers were used three times at the 25 days of planting and repeated in 10 days interval. Results showed that Spraying Summer squash with organic fertilizers especially amino acid significantly increased characters like (chlorophyll content in leaves, No. of fruit f.plant^{-1}, plant yield kg.plant^{-1} and total yield t.ha^{-1}), Also inorganic fertilizers especially Cal-Mag had higher increased in characters (plant length, leave area, chlorophyll content in leaves, No. of fruit f.plant^{-1}, plant yield kg.plant^{-1} and total yield t.ha-1), where as no significant differences occurred in (Fruit length (cm), Fruit Diameter (cm) and TSS) by using organic and inorganic fertilizers.

KEY WORDS :- Summer Squash, organic and inorganic fertilizers.

INTRODUCTION

Summer squash is the edible fruit of (*Cucurbita pepo* L.) a highly diverse species. This crop belongs to the family cucurbitaceae. Summer squash is adapted to temperate and subtropical climates and is grown in many regions, it's originated in Mexico and North America (Paris 1996). Summer squash is eaten as a vegetable, either boiled, fried or stuffed. It has various health benefits to human as well as medicinal potentials (Mohammed *et al*., 2011). It is rich in nutrients and bioactive compound contents such as phenolics , flavonoids, vitamins (including ß-carotene, vitamin A, B2, C and vitamin E), amino acids, carbohydrates, and it is low in energy content (about 17 Kcal/100g of fresh summer squash) and has a large amount of fiber (Tamil *et al*.,2012). Summer squash is planted in Iraq in two seasons in spring and fall seasons. It is illustrated according to their characteristics in terms of which differ significantly from other vegetables in summer vegetable. Squash fruits, shapes, sizes, colors, and pulp traits differ significantly from the cultivars (Yoldas *et al*., 2000; Kaygisiz *et al*., 2006).

The plant needs chemical substance to increase its growth. these chemical substance are inorganic fertilizer. Synthetic fertilizer made from perfect strength of solution of micro and macro nutrient. Fertilizers are the nutrient source which will provide sufficient nutrients for the plant growth. Fertilizers are essential for commercial farming and tremendous yields. Phosphorus is the main element required for the plant's growth. Phosphorus has a significant function in many physiological treatment in plant, for example photosynthesis energy storage, respiration and transfer, cell division, cell enlargement. It encourages seed formation, root growth and fruit tuning flowering. In addition, phosphorus is a significant constructional ingredient of numerous biochemical as nucleotides, coenzyme (RNA, DNA) nucleic acids, phospholipids and sugar phosphate (Merghany M., *et al.* 2019). Calcium plays a vital role in plant growth, which goes through the cell wall structure as a Calcium Pectate that promote the longitudinal growth of the cell, Calcium is also involved in numerous

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cellular functions that are regulated in plant cells by changes in cytosolic Ca_2 concentration, such as ionic balance, gene expression, and carbohydrate metabolism (Bush, 1995). Nzanza (2006) carried out a study to investigate the effects of different Ca:Mg:K and K:Ca ratios and rates on yield and quality of Tomato. High Ca:Mg ratios (20:1)in the nutrient solution decreased the Tomato fruit pH, titratable acidity, TSS, percentage class one fruits and dry matter yields. No relationship was established between these plant nutrients, fruit cracking and cat facing.

Application of organic matter together with activators should result in improved physical properties of soil (Šařec and Novák, 2016). A variety of organic materials such as seaweed extract and amino acids are being used as fertilizer supplements in potato management and are widely used in various bio stimulant product formulations. These compounds have been reported to contain phytohormones and osmoprotectants such as cytokinins, auxins, polyamines, and betaines. Manufacturer claims are that these products may be used as a new standard fertility programs by reducing mineral nutrient requirements while improving stress tolerance (Ezzat, Asfour and Tolba, 2011). fulvic acid (FA) is humus which is organic matter that regulate in soil when animal and plant material decompose and degradation through several years by microbial activity (Huajiuan *et al.,* 2020). El-Nemr, M., et al,(2015) Improved a study about the effect of amino acid and some organic fertilizer on fruit quality, growth and yield of eggplant. In this research 1, 2, and 4 g/L of stimufol 2, 4, and 6 cm/L Humic acid 1, 2, and 4 g/L Active dry yeast and 2, 4,and 8 cm/L are used. Result pointed that the maximum yield and its compound showed by amino acid at 8 cm/L. while all parameters of eggplant increase by using all various bio-stimulants in comparison with control. Historical benefits of seaweed in agriculture dates back to thousand years. They use seaweed as plant bio stimulants by applying microorganism to plant to increase a biotic stress possibility, nutrient efficiency, crop quality type, nutrient content (EL Boukhari M., et al, 2020). Tensingh N.,*et al*,(2017) carried out a study about the effect of seaweed on the yield character of Okra. They use a different concentration of seaweed extract (1 percent, 2percent, 3percent, 4percent, 5percent, 6percent and 7 percent) the result showed that concentration at the 5% seaweed increase the yield and also increase the micro nutrient in the soil. Amino acid is molecules including a groupe of carboxylic acid. A chelating effect on micronutrients contain in amino acid that effect on cell membrane permeability which make transportation and absorption of nutrient in the inner part of the plant more ease (Jannesari M., *et al*, 2016).

The main objective of this study is to investigate the impact of foliar spray of organic and inorganic fertilizers various concentrations on yield characteristic of summer squash plants under climatic condition of Duhok provinces, Kurdistan reign, Iraq.

MATERIAL AND METHODS

This research was practically investigated at the vegetable field, collage of Agricultural engineering science, University of Dohuk, Iraq. The farm is located on latitude (36^o, 51^o, 38^o N) and longitude (42^o, 52^o, 02^o E) and (473) m above the Dead Sea. The field study was started in March, 11^{th} 2021. After selecting the site of the experiment, the land was ploughed for two perpendiculars lines and at an approximate depth of (30-40 cm). The soil was well softened. Then it was divided into three blocks each of 18 terraces. Each experimental unit consisted of one terrace of (4×1.5m).The area of each experimental unit was 6 m^2. Drip irrigation system was done in the field before planting. The organic matter (sheep residues) was applied to the soil after decomposition for (25) days. They added on the lines of each terrace before seed sowing about (10) days (Matlob *et al.,* 1989).The field was irrigated two days before sowing to distinct the water level of the terrace. Squash seeds Alexanderia F1 seeds are sowed in fiberglass house started in March ,11th 2021. After 30 days from sowing seeds the seedling transplanted to the permanent place in farm at a distance of (35 cm) between the plants . The plants was irrigated by surface irrigation. Other agricultural practices were similarly carried out to each experimental unit as followed by farmers in the area.

The experiment consist of the effect of two factors, which are:

Organic fertilizers at four level:(0, 2 $g.L^{-1}$ Fulvic acid, 2 $g.L^{-1}$ Seaweed extract and 4 $g.L^{-1}$ Amino acid). Inorganic fertilizer at three

levels:(0, 1 ml.L^{-1} Cal-Mag and 5 ml.L^{-1} Phosphate-K)

First spray was done after 25 days from seed sowing in the April, While Second spray doses were after ten days of the first spraying and the third spray doses were after ten days of the second spraying.

The treatments of experiment were arranged in a factorial experiment within completely randomized blocks design (RCBD) with 3 replication . Each experimental units involves one line, with 5 plants/line as observation The number of experimental units was (3*4)= 12 treatments and 3 replication (36 units) and the data were collected on the crop growth and yield were analyzed using SAS program (SAS, 2001) and the treatments means were compared using Duncan's Multiple Range test at 0.05 level of probability.

Experimental Measurements were (Plant Length (cm), Leaf area (cm2), No. of leaves / plant, Chlorophyl content in leaves (SPAD), No. of Fruits / plant, Plant Yield (Kg. plants-1), Total Yield (ton. ha^{-1}) , Fruit length (cm), Fruit Diameter (cm) and TSS)

RESULTS

Plant length (cm)

The results are illustrated in table (1) shows that there is no significant effect of organic fertilizer on plant length, while there is significant effect of inorganic fertilizers, the maximum mean of plant length is (45.25 cm) when Cal-Mag fertilizer was used, while the minimum mean of plant length is (38.25 cm) when Phosphate-K used. The interaction between Fulvic acid and Cal-Mag had highest results (48.00cm) as compared to others interactions.

Table(1): Effect of Organic and inorganic fertilizers and their interaction on Plant length (cm) of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphate-K	
Control	40.83 abc	46.83 a	36.83 abc	41.50 a
Fulvic acid	36.83 abc	48.00 a	32.83 c	39.22 a
Seaweed extract	33.67 bc	42.33 abc	40.50 abc	38.83 a
Amino acid	45.83 ab	43.83 abc	42.83 abc	44.17 a
Inorganic Fertilizer	39.29 b	45.25 a	38.25 b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Leaf Area (cm^2)

The results in table (2) describes that no significant differences in Leaf Area cm^2 had been noticed when sprayed by organic fertilizers. But The maximum results of leave area (369.62 cm^2) when Cal-Mag was used, and the minimum is (245.11cm^2) when Phosphate-K was used comparing with control. The interaction between Cal-Mag and control had highest results (414.71cm^2) as compared to others interactions.

Table (2): Effect of Organic and inorganic fertilizers and their interaction on Leaf Area (cm^2) of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphate-K	
Control	286.90 bcd	414.71 a	250.57 Cd	317.39 a
Fulvic acid	291.98 bcd	325.31 a-d	251.22 Cd	289.50 a
Seaweed extract	302.36	346.88	223.55	290.93

	bcd	abc	d	a
Amino acid	382.26 ab	391.60 ab	255.09 cd	342.98 a
Inorganic Fertilizer	315.87 b	369.62 a	245.11 c	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

No. of Leaves. plant^{-1}

The results in table (3) show that no differences of the effect of various types of fertilizers on No. of Leaves per plant. The interaction between organic and inorganic fertilizers had significant effect, the maximum mean of No. of Leaves per plant is (45.67 leaves) when Cal-Mag and fulvic acid were used comparing with minimum mean of control case and seaweed extract fertilizers.

Table (3): Effect of Organic and inorganic fertilizers and their interaction on No. of Leaves.plant^{-1} of summer squash plant.

Organic Fertilizer	Inorganic Fertilizer			Organic Fertilizer
	control	Cal-Mag	Phosphite-K	
Control	42.17 abc	41.17 abc	40.17 abc	41.17 a
Fulvic acid	37.17 bc	45.67 a	38.67 abc	40.50 a
Seaweed extract	36.00 c	40.83 abc	40.00 abc	38.94 a
Amino acid	44.83 ab	42.83 abc	41.50 abc	43.06 a
Inorganic Fertilizer	40.04 a	42.63 a	40.08 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Chlorophyll content in leave (SPAD)

The results shown in table (4) shows that amino acid recorded the mean of leave's chlorophyll of (91.34) and had the maximum effect as compared with the other types of organic fertilizers. While the minimum of Fulvic acid and control treatment recorded the mean of leave's chlorophyll of (58.89 and 59.62) respectively. The two inorganic fertilizers had significant increased as compared to control treatments (72.84 & 72.94) respectively. The interaction between fertilizers had significant effects, the highest value (104.94) recorded between amino acid and control treatment as compared to others interaction.

Table (4): Effect of Organic and inorganic fertilizers and their interaction on Chlorophyll in leave (SPAD) of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphate-K	
Control	53.76 fg	66.63 de	58.48 ef	59.62 c
Fulvic acid	58.17 ef	61.18 ef	57.33 efg	58.89 c
Seaweed extract	47.68 g	92.18 b	78.25 c	72.70 b
Amino acid	104.94 a	71.38 cd	97.70 ab	91.34 a
Inorganic Fertilizer	66.14 b	72.84 a	72.94 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

No. of fruits. Plant^{-1}

The results are illustrated in table (5) shows that significant effect of organic fertilizer on No. of fruit per plant, the highest value was recorded when sprayed squash plant with amino acid (7.22 fruit.plant^{-1}) as compared to fulvic acid and seaweed extract and no differences with control treatment. Also significant effect of inorganic fertilizers, the maximum mean of No. of fruit is (7.64 fruit.plant^{-1}) when Cal-Mag fertilizer was used. The interaction between amino acid and Cal-Mag had highest results (9.33 fruit.plant^{-1}) as compared to others interactions.

Table (5): Effect of Organic and inorganic fertilizers and their interaction on No. of fruits. Plant^{-1} of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphite-K	
Control	7.50 abc	8.17 ab	5.33 cd	7.00 a
Fulvic acid	6.17 bcd	6.17 bcd	2.33 e	4.89 b
Seaweed extract	5.17 cd	6.17 bcd	4.00 d e	5.11 b
Amino acid	5.67 bcd	9.33 a	6.67 bcd	7.22 a
Inorganic Fertilizer	6.13 b	7.46 a	4.58 c	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Plant Yield (kg.plant^{-1})

The results in table (6) shows that significant effect of organic fertilizer on plant yield, the highest value was recorded when sprayed squash plant with amino acid (1.08 kg. plant^{-1}) as compared to other treatments. Also significant effect of inorganic fertilizers, the maximum mean value (1.12 kg.plant^{-1}) when Cal-Mag fertilizer was used and no differ with control treatments. The interaction between control and amino acid and Cal-Mag had highest results (1.33 and 1.31 kg.plant^{-1}) respectively as compared to others interactions.

Table (6): Effect of Organic and inorganic fertilizers and their interaction on Plant Yield (kg.plant^{-1}) of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphate-K	
Control	1.07 ab	1.33 a	0.78 bc	1.06 ab
Fulvic acid	0.91 abc	0.93 abc	0.58 bc	0.81 cb
Seaweed extract	0.82 abc	0.91 abc	0.52 c	0.75 c
Amino acid	0.97 abc	1.31 a	0.97 abc	1.08 a
Inorganic Fertilizer	0.94 a	1.12 a	0.71 b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Total Yield (ton.ha^{-1})

The results in table (7) shows a significant effect of organic fertilizer on plant yield, the highest value was recorded when sprayed squash plant with amino acid (16.24 ton.ha^{-1}) as compared to other treatments. Also significant effect of inorganic fertilizers, the maximum mean value (16.76 ton.ha^{-1}) when Cal-Mag fertilizer was used and no differ with control treatments(14.14 ton.ha^{-1}). The interaction between control and amino acid and Cal-Mag had highest results (19.89 and 19.61 ton.ha^{-1}) respectively as compared to others interactions.

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Table (6): Effect of Organic and inorganic fertilizers and their interaction on Total yield (ton.ha^{-1}) of squash plant.

Organic Fertilizer	Inorganic Fertilizer			Organic Fertilizer
	control	Cal-Mag	Phosphate-K	
Control	16.12 ab	19.89 a	11.67 bc	15.89 ab
Fulvic acid	13.65 abc	13.95 abc	8.73 bc	12.11 cb
Seaweed extract	12.24 abc	13.65 abc	7.85 c	11.25 c
Amino acid	14.54 abc	19.61 a	14.57 abc	16.24 a
Inorganic Fertilizer	14.14 a	16.78 a	10.70 b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Fruit Length (cm)

The results in table (8) shows a significant effect of organic fertilizer on fruit length cm, the lowest value was recorded when sprayed squash plant with seaweed extract (13.97 cm), while the highest value (15.49cm) in control treatments as compared to other treatments. No significant effect of inorganic fertilizers were produced. The interaction between control and amino acid and Cal-Mag had highest results (15.98and 15.75 cm) respectively and interaction between fulvic acid and control (15.77cm) produced as compared to others interactions.

Table (8): Effect of Organic and inorganic fertilizers and their interaction on Fruit Length (cm) of summer squash plant.

Organic Fertilizer	Inorganic Fertilizer			Organic Fertilizer
	control	Cal-Mag	Phosphate-K	
Control	15.34 ab	15.98 a	15.16 ab	15.49 a
Fulvic acid	15.77 a	15.44 ab	14.64 abc	15.28 a
Seaweed extract	15.26 ab	12.92 c	13.74 bc	13.97 b
Amino acid	14.77 ab	15.75 a	15.26 ab	15.26 a
Inorganic Fertilizer	15.28 a	15.02 a	14.70 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Fruit diameter (cm)

The results in table (9) shows a significant effect of organic fertilizer on fruit length cm, the highest value was observed in control (3.86 cm) as compared to other treatments. No significant effects of inorganic fertilizers were produced. The interaction between fulvic acid and Cal-Mag had highest results (3.96 cm) as compared to others interactions.

Table (9): Effect of Organic and inorganic fertilizers and their interaction on Fruit diameter (cm) of summer squash plant.

Organic Fertilizer	Inorganic Fertilizer			Organic Fertilizer
	control	Cal-Mag	Phosphate-K	
Control	3.87 a	3.91 a	3.79 A	3.86 a
Fulvic acid	3.86 a	3.96 a	3.43 Ab	3.75 ab
Seaweed extract	3.86 a	3.25 b	3.56 Ab	3.56 b

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Amino acid	3.58 ab	3.75 ab	3.87 A	3.73 ab
Inorganic Fertilizer	3.79 a	3.72 a	3.66 A	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Total Soluble Solid (TSS)

The results in table (10) shows that no significant effect of organic and inorganic fertilizer on TSS of squash plant, The interaction between control and amino acid and Phosphate-K had and between fulvic and Phosphate-K highest results (4.97 and 4.97) respectively as compared to others interactions.

Table (10): Effect of Organic and inorganic fertilizers and their interaction on TSS of summer squash plant.

Organic Fertilizer	**Inorganic Fertilizer**			**Organic Fertilizer**
	control	Cal-Mag	Phosphate-K	
Control	4.00 abc	4.20 abc	4.97 a	4.39 a
Fulvic acid	4.55 abc	4.47 abc	4.97 a	4.66 a
Seaweed extract	3.70 c	4.68 abc	4.77 abc	4.38 a
Amino acid	4.93 ab	4.15 abc	3.80 bc	4.29 a
Inorganic Fertilizer	4.30 a	4.38 a	4.63 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

DISSCOUSION

The summer squash yield characteristics significantly enhanced when treated with nutrition those may be due to the role of nutrition in increase vegetative growth and yield characters. Amino acid enhanced some vegetative and yield characters of summer squash plant as shown in table (4, 5, 6, and 7) this may be due to Amino acid are the antecedent of growth substances and phytohormones, enhance plant quality, advance nutrient availability, support plant growth, the use of amino acid as plant hormones for both plant and soil microorganisms, chelating effect on micronutrients contain in amino acid that effect on cell membrane permeability which make transportation and absorption of nutrient in the inner part of the plant more ease (Jannesari M., *et al*, 2016), Amino acid properties play an important function in soil N and C cycles (Perez P., *et al*, 2015), The first steady product of inorganic N assimilation is the amino acid and amides (Barnelx and Causin, 2018), Amino acid are the antecedent of growth substances and phytohormones, encourage plant growth, progress nutrient availability, increase plant quality (Khan, 2019). because amino acid fertilizer contain total nitrogen, organic matter and free amino acids.

The increase in growth and yield characters of squash plant sprayed with Ca-Mg table (1,2,3,5and 6) may be due to the role of calcium for integrity and stability of the cell membrane and membrane permeability, enhancing pollen germination and growth, activating a number of enzymes for cell mitosis, division and elongation, possibly detoxifying the presence of heavy metals in tissues, increasing nitrogen absorption by plants, delaying sensory, affecting fruit yield, quality and health conductive tissue (Jones, 2008).

CONCLUSION

In this studied, it can be concluded that from mentioned the above results the use of organic (Amino acid) and inorganic fertilizers (Cal-Mag) as individual or combination via foliar spray gave the best results on the yield traits of summer squash plants.

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كارتێكرنا زبلێ ئورگانیك و یێ نه ئورگانیك لسەر گەشەكرنێ
و بەرهەمی فێقێ كۆلندی(Cucurbita pepo L.)

پوختە

ئەڤ ڤەكۆلینە هاتە ئەنجامدان ل زەڤیێن زەرزواتی سەر ب پشكا بیستانكاری ییّن كۆلێژا چاندنێ ل زانكۆیا دهوكێ /هەرێما كوردستانا عێراقێ ل دەڤەرا سێمێلێ ل بهارا سالا 2021. مەرەم ژ ئەنجامدانا ڤێ ڤەكۆلێنی بۆ تاقیكرنا چار ئاستێن جیاواز ژ زبلێ ئورگانیك (0, 2 غم.لتر ڤوڤیك ئەسید, 2غم لتر سی وویدی و 4 غم.لتر ئەمینوئەسید و غرام بۆ هەر لیترەكی ئاڤێ دگەل رەشاندنا زبلی نه ئورگانیك ب سێ ئاستێن جیاواز (0، 1 مل.لتر كالسیومی-مگنسیوم و،5 مل .لتر فسفوری بوتاسیومی)غرام بۆ هەر لیترەكێ ئاڤێ ل سەر ساخلەتێن چەندایتی بەرهەمێ رووەكێ كۆلندی (cucurbita pepo L.).ژ جورێ هەجین (Alexanderia F1). تاقیكرن هاتە بنەجهكرن ب شێوەیێ تاقیكرنا فاكتەریّ ل دویڤ دیزانیا بلوكێ هەرەمەكی تەواو دارشتن (F-RCBD) ب سێ جاران. ئەنجام دیار بوون ژ لایێ ڤێ ڤەكۆلێنی كۆ رەشاندنا ب زبلێ ئورگانیك ل سەر ئاستێ 2غرام/لیترەكی یی ئەمینو ئەسی كارتێكرنەكا جیاواز هەبوو ل سەر زێدە بوونا ساخلەتێن بەرهەمی(ریژا كلوروفیلی د بەاگاداو, ژمارا فێقی د رووەكی دا, بەرهەمی فێقیكغم/رووەكی و بەرهەمێ فیقی د هكتاریّدا تەن/ هكتاری). رەشاندنا ب زبلێ نه ئورگانیك كالسیوم-مگنسیوم ل سەر ئاستێ1مل/لیترەكی كارتێكرنەكا بەر چاڤ هەبوو ل سەر زێدەبوونا َ ساخلەتێن بەرهەمێ كولندی هەر ژ (دریژیا رووەكی سم, رووبەریّ بەلكا سم, ریژا كلوروفیلی د بەلگادا,ژمارا فێفی دروەكی دا, بەرهەمی كغم/رووەكی و بەرهەمێ ب كێرهاتی بۆ فروتنێ تەن/هكتار).هەردوو زبلا چ كارتیكرن ییّت بەرچاڤ نەبوون سالوخەتێن (دریژاهیا فێقی(سم)، تێرەیا بازنەیێ فێقی (سم) و وریژا TSS د فیقی دا).

تأثير السماد العضوي و الغير عضوي على نمو و حاصل قرع الكوسة
(*Cucurbita pepo* L.)

الخلاصة

أجريت هذه التجربة في حقل الخضراوا ت التابع لقسم البستنة / كلية علوم الهندسة الزراعية /جامعة دهوك/ أقليم كردستان/العراق. خلال موسم النمو الربيعي لعام (2021) هدف هذا البحث هو دراسة أستجابة قرع الكوسة صنف (Alexanderia F1) لأربعة مستويات من السماد العضوي (0 ، 2 غرام/ لتر من حامض الفولفيك ، 2 غرام/ لتر من مستخلص الأعشاب البحرية ، 4 غرام/ لتر من الحامض الأميني) و ثلاث مستويات من السماد الغير عضوي (0، 1 مل/لتر من سماد الكالسيوم والمغنسيوم، 5 مل/لتر من سماد الفوسفات و البوتاسيوم) وتأثيره على نمو و حاصل قرع الكوسة (Cucurbita pepo L) . استعمل السماد ثلاث مرات خلال الموسم ، 25 يوم بعد الشتل و من ثم كل 10 أيام مرة. أظهرت النتائج ان رش قرع الكوسة بالسماد العضوي و خاصة الحمض الأميني أدى الى زيادة معنوية في بعض الصفات مثل (نسبة الكلوروفيل في الأوراق ، عدد الثمار لكل نبات ، حاصل النبات الواحد و الحاصل الكلي) . و أيضآ السماد الغير عضوي أدى الى زيادة معنوية في بعض الصفات و خاصتآ سماد الكالسيوم والمغنسيوم ، هذه الصفات هي (طول النبات ، المساحة الورقية ، نسبة الكلوروفيل في الأوراق،عدد الثمار لكل نبات، حاصل النبات الواحد و الحاصل الكلي) . بينما لم يكن هناك أية فروقات معنوية في (طول الثمار ، قطر الثمار و نسبة المواد الصلبة الذائبة في الثمار) عند أستعمال السماد العضوي و الغير عضوي.