International Multilingual Journal of Science and Technology (IMJST)
ISSN: 2528-9810
Vol. 9 Issue 7, July - 2024

Effect of cow waste, nitropene fertilizer, phosphatine, potassimage and NPK fertilizer on the growth, yield and vegetative qualities of tomato fruits (*Solanum lycopersicum* L)

Nouri Kushlaf, Ahlam Rashed, Seham T.M. Oshkondali, Ahmed Belgasem Ahmed, Samira A alacrouk , Sajidah Jamal Alshawish, and Nuha Mohmmed Koudeekhah

Advanced Center for Plant Research and Complementary Medicine /Zawia University Libya.

***Abstract*—This field study was conducted on tomato cultivar (daffodils) in the city of Zawiya, Abu Zarah region during the spring season 2019 to compare the impact of organic fertilizer, cow residues, chemical fertilizer NPK (18 - 46), nitropene, phosphatine and potassium on the vegetative, growth and crop qualities of the tomato plant and the chemical qualities of tomato fruits.The results showed a difference in the effect of the coefficients on the vegetative growth qualities and the quality qualities of the fruits and the chemical properties of the tomato plant, so that the results indicated the superiority of the treatment (chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2) for the variable of the length of the plant and the number of plant stems, and the variable of the length of the leaves of the plant and the width of the leaves in the treatment (chemical fertilizer (18 - 46) 10 g/plant), while the variable of the number of infloves was characterized by a moral superiority in the treatment (organic fertilizer for cows 20 tons/Hectare + phosphatine 0.3 g/m^2), In addition, the treatment of (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g/m^2) for the variant of the number of fruits, and the treatment of chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare morally in the variant of the number of branches of the plant, as for the variant of the number of leaves of the plant, it was proven that the treatment of organic fertilizer for cows exceeded 20 tons/hectare + nitropine 0.3 g/m^2 on the rest of the transactions, as the results showed Fertilizer treatment exceeds chemical fertilizer (18 - 46) 10 g/ plant + phosphatine 0.3 g/m^2 for the variable length of the neck of the leaves when compared to the witness. The results also showed that the quality qualities of the fruit also had a moral superiority in chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare) for the variable length of the fruit and the wet weight of the fruit, while the results showed the primacy of the treatment (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatene 0.3 g/^{m2}) for the variable thickness of the fatty area and the dry weight of the fruit and the dry weight of the root total, and for the variable size of the fruit, the treatment was superior (organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/hectare M^2), As for the fruit width variant, the treatment (chemical fertilizer (18 - 46) may exceed 20 g/plant + phosphatine 0.3 g/m^2) than the rest of the transactions, while the treatment (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare) for the wet weight variant of the vegetative total, and the dry weight of the vegetative total, the treatment of chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m^2) exceeded the rest of the other fertilizers, as for the wet weight variant of the root total, it was recorded Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2) The highest value compared to the witness and the rest of the transactions.**

Keywords—Cow waste, nitropene fertilizer, growth, yield, vegetative qualities of tomato fruits

Introduction

Tomato plant Solanum lycopersicum L. A herbaceous annual plant belonging to the Solanaceae family. Tomatoes are one of the important economic crops that are cultivated in a wide environmental field, as their cultivation succeeds in the hot and temperate regions. Western South America is the original home of tomatoes (Hassan., 1998). Tomatoes come in first place among vegetable crops in terms of the area cultivated globally, reaching about 4,848,384 hectares with an estimated productivity of 37,600 tons, as its total global

production is estimated at 182,301,395 tons (FAO, 2016). Domestically, tomatoes are one of the crops spread in most areas of Libya. It is one of the most popular crops by the Libyan consumer. However, the cultivated area is 10,406 hectares with a productivity of 215,767, and this is very low compared to regional and global production, according to FAO, 2016)). The interest in tomato cultivation is due to its economic, nutritional and medical importance, as it represents a major part of daily diets. It can be consumed in fresh, dried, cooked or processed form, due to the fact that its fruits contain various nutrients such as sugars, acids, vitamins, minerals and fiber (Bradly, 2003). Tomatoes contain a group of carotenoids, the most important of which is lycopene (1989, Dimascio et al.). Also tomatoes have many medicinal benefits because they contain antioxidants against many diseases (Al-Fishawi,2005). Due to the importance of tomatoes, the demand for tomatoes has been increased that prompting producers to seek to increase the productivity of this type of crops. Fertilizers play an essential role in increasing productivity because they have a role in meeting the plant's necessary needs of mineral elements. Chemical fertilizers are more common and depend on the ready addition of mineral compounds to the soil or on the plant directly. As a result of the poor use of this type of fertilizer, scientists and farmers have in recent years tended to use natural alternatives instead of chemical fertilizers, which called clean agriculture. In this type of agriculture, organic fertilizers are used, such as plant and animal waste in their various forms, to provide the plant with the nutrients which it had needed, and vital fertilizers, fertilizers, or vital vaccines. Bio fertilizers are fertilizer additives originating from a group of microorganisms, fungi, bacteria, or both. Bio fertilizers are used to activate and improve the biological processes and properties of the soil. They also restore microbial balance to encourage the growth and fruiting of plants (Hassan, 2006). One of the most common bio fertilizers is the phosphobacterin vaccine containing phosphaticum Bacillus megatherium var, which increases the productivity of many crops to 10% (Mishustin & Emtsev, 1987). To grow plants in a strong and balanced manner, they need to add a set of nutrients needed by the plant in varying quantities. They are mainly divided into two groups: major and minor elements. Nitrogen is one of the most important elements needed by plants at different stages of their growth, as it contributes to building proteins, proteoplasm, enzymes and their accompaniments. PH2. NADH2and energy compounds (CTP/GTP, ATP) and in the composition of amino acids, which are the basic stone in the formation of proteins (Abu Dahi et al., 1988) and(Naimi et al., 1999) and (Mengel & Kirkby, 1982.). Potassium is a major nutrient essential for plant growth, with its requirement exceeding that of all other nutrients except nitrogen.. Physiologically, potassium stimulates more than 65 enzymes related to many biological reactions within the plant (Mengel & Kirkby, 1989). The element has an important and significant role in increasing the efficiency of the aqueous unit required to produce one gram of the product (1967 Mengel & Helal.,). As well as helping to reduce water consumption by (20-30%) (Science Symposium, 2000). Phosphorus is also an essential element in the plant because it has a great role in many enzymatic reactions inside it. It is also involved in the synthesis of nucleic acids, enzymes (NADP, NAD), phosphorus compounds with energy-rich bonds (ADP and ATP) , and fats (phospholipids) in the plant(Abu Dahi, 1988).

In this field study on tomato cultivar (narcissus), the effect of different treatments will be compared using several types of fertilizers, organic fertilizer (bovine residues), chemical fertilizer NPK (18 - 46), nitrobin fertilizer, phosphate and potassimag on vegetative qualities, growth, yield and tomato fruits.

Materials and methods

This study was conducted in one of the exposed fields of the Abu Sara area in the city of Al-Zawiya in western Libya on the tomato plant (Al-Narjis). Agriculture relied entirely on groundwater through drip irrigation. The distance between the line and the other 75 cm^2 and the distance between the points was 40 cm^2 and a distance of one meter was left between each pilot unit and another. The distance between the sapling and the other was (50cm). The experiment was carried out according to the RCBD design with three iterations (I, II, III. The total area of the experimental unit was about (6 ^{m2}). Table (1) shows the types of fertilizers used in the study and their quantities.

Table (1) shows the fertilizer transactions included in the study

Fertilizers	Comparison
Organic fertilizer (cows)	0 tons/hectare
	10 tons/hectare
	20 tons/hectare
Chemical Fertilizer (18 - 46)	0 g
	plant
	plant
Biofertilizer Nitropin	0.3 g/m^2
Biofertilizer Phosphatine	0.3 g/m2
Bio fertilizer potassium	0.3 g/m2

Organic fertilizers:

Organic waste (cow waste) **was** fermented for a year, where it was placed in the form of a pile and sprayed with water and covered with a plastic cover to increase the percentage of moisture and beam under the dirt for two months. Use after fermentation by mixing it with the soil and adding it according to the map key for some plants at a rate of (10 tons/e and 20 tons/e) for each section (pilot unit) and the second batch was 23 days after the first batch was placed and the addition was in the amount of (5 g and 10 g).

Addition of fertilizers

After the seedlings reached the age of 50 days, chemical fertilizer (18-46) was added directly to some plants according to the map key. The amount added was 10 g/plant and 20 g/plant. The amount added was divided into two groups, the first batch (5 g and 10 g). The second batch was 24 days after the application of the fertilizer of the first batch (the first dose) in the same amount (5 g and 10g), as the age of the seedlings on this date reached 73 days and the total addition rate per hectare was (5 kg).

Bio Fertilizer

It was prepared by adding and mixing a bag of both nitropene fertilizer and phosphatine fertilizer with an amount of (5 kg) dirt. Also, add and mix a bag of potassium fertilizer in (4 ml of water). The addition of the three bio fertilizers (nitropene, phosphatine, potassiumag) at a rate of (0.3 g/^{m2}) of each type of fertilizer and this addition was made according to the map key for the three refineries.

Field Study:

Where five plants were collected to measure their vegetative growth traits and the vegetative traits studied were the number of inflorescences, the inflorescences of the tomato plant were randomly counted for each experimental unit of five tomato plants. Also, **plant height (cm)** The height of the plant was measured by tape measure from ground level to the highest peak in the plant for five plants of tomatoes randomly per experimental unit. In addition to counting the stems of the plant by the normal counting method for five plants randomly for each experimental unit.

The total number of branches per tomato plant was taken and five plants were randomly selected per experimental unit**.**

The number of leaves were calculated from the appearance of the first leaf to the end of the exit of the last leaf, that is, the end of the trial period for five plants randomly for each experimental unit. **The length of the leaves was also** measured from the beginning of the leaf to the end using a ruler of five tomato plants randomly for each experimental unit**. The leaf width was measured** using a ruler for five tomato plants at random per experimental unit. **The** length of the neck of the leaves was measured from the beginning of their appearance from the stem until the beginning of the surface area of the leaves using the ruler of five plants of tomatoes randomly for each experimental unit. Five tomato plants were collected randomly, their roots were removed, and the soft weight of the vegetative total was measured using the sensitive scale.

After taking the soft weight of the vegetative total, it was placed in the electric oven at a temperature of 65 ° C for 72 hours (until the weight was fixed) and then the dry weight was taken using the sensitive scale of five plants of tomatoes randomly for each experimental unit. He took five roots from the tomato plant, cleaned the suspended dust and then weighed with a sensitive scale five tomato plants randomly per experimental unit. After taking the soft weight of the roots, they were dried in an electric oven at a temperature of 65 ° C for 72 hours, then the weight was taken using the sensitive scale of five plants of tomatoes randomly per experimental unit.

Quality qualities that included the number of fruits were studied, as the number of tomatoes of five tomato plants was calculated randomly for each experimental unit**. The length of the fruit was also** measured by the ruler of five tomato plants randomly for each experimental unit. **The width of the fruit (cm) was also measured**, where the fruit was divided into two halves and its width was measured using a ruler for five fruits for each tomato plant randomly for each experimental unit. **Also, measure the size of the fruit(mm^3)**, where the fruit was placed in a graduated container containing 200 ml of water, where the displaced product of the water is the size of the fruit for five fruits per tomato plant randomly for each experimental unit. **The thickness of the adipose area of the fruit (cm) was also measured** using the ruler after the fruit divided the tomatoes into two parts for five fruits for each tomato plant randomly for each experimental unit.

The dry weight of the fruit was also measured, as the fruit was cut into two pieces and spread on aluminum paper and placed in the nursery at a temperature of 65 C for 72 hours and its dry weight was measured using a sensitive scale.

Statistical Analysis:

The data were collected and analyzed statistically, the differences between the coefficients were tested, and the averages of all the studied traits were compared according to the test of the least significant difference (L.C.D) under the probability level of 0. 05L.S. D (Narrator and Khalafullah., 1980) used statistical software (SPss.v.26) to statistically analyze data under Widows 2007**.**

Results

Effect of coefficients on the vegetative growth qualities of the tomato plant.

It clears from Table (2) that the various fertilizer coefficients have had a significant impact on the vegetative growth qualities represented in the number of inflorescences and the number of fruits, and that there are significant differences between the study coefficients at the level of significance (0.05). Through the results in Table No. (2), where the treatment gave (organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2) the highest value in the number of inflorescences with an average of (45.00), followed by the treatment (18 - 46) 10g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2) with an average of (43.40), then the treatment (18 - 46) 20 g/ plant + organic fertilizer for cows 10 tons/hectare) with an average of (37.40) and the treatment (chemical fertilizer (18 - 46) 10 g / plant) with an average of (37.00). While the least effect of the treatment was chemical fertilizer. (18 - 46) 20 g/plant + organic fertilizer for 20 tons/hectare) with an average of (9.40), followed by chemical fertilizer treatment (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + potassiumage 0.3 g/m^2) with an average of (12.60) when compared to the witness. Where the lowest value was given with an arithmetic mean of (6.40) as shown in Table (1.4). As for the variable number of fruits, it was found that the highest effect of the treatment of chemical fertilizer is (18 - 46) 20 g/plant + cow organic fertilizer.20 tons/hectare + nitropine 0.3 g/^{m2}) with an average of (77.40), followed by the treatment (18 - 46) 10 g/plant + organic fertilizer.Cows 20 tons/hectare + potassiumage 0.3 g/m^2) with an average of (72.20) and then chemical fertilizer treatment (18-46) 20 g/plant + organic fertilizer for cows 10 tons/hectare) with an average of (70.20). While the treatment (biofertilizer nitropine 0.3 g/^{m2}) with an average of (17.60) gave the least effect. Followed by the treatment (potassium biofertilizer 0.3 g/m^2) with an average of (17.80). Then comes the treatment (nitrobin fertilizer 0.3 g/m^2 + phosphatine 0.3 g/m^2 + potassiumag 0.3 g /m^2) with an average of (18.40) when compared to the contro

Table 2 Effect of different fertilizer coefficients on the v ± egetative growth qualities of the tomato plant

TRANSACTION	Number of inflorescences	Number of Fruits Per Kg
	Means ± SE	Means ± SE
Control	+	11.8 ± 4.02
Biofertilizer Nitropin 0.3 g/m2.	26.6 ± 5.07	17.6 ± 4.15
Biofertilizer phosphatine 0.3 g/m2.	31.0 ± 5.33	21.6 ± 8.73
Bio fertilizer potassiumage 0.3 g/m2	34.3 ± 10.21	17.8 ± 6.76
Chemical fertilizer (18 - 46) 10 g/plant.	37.0 ± 13.03	38.8 ± 6.34
Chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m2.	33.2 ± 10.23	38.0 ± 9.69
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m2.	28.0 ± 7.03	47.6 ± 9.88
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m2.	21.4 ± 1.67	46.8 ± 12.09
Chemical fertilizer (18 - 46) 20 g/plant.	20.2 ± 4.54	41.4 ± 6.22
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m2.	20.6 ± 8.64	65.8 ± 23.40
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m2.	30.0 ± 4.69	61.6 ± 20.92
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m2.	26.2 ± 4.08	47.0 ± 12.28
Organic fertilizer for cows 10 tons/hectare	32.2 ± 4.43	58.0 ± 21.62
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m2.	16.0 ± 2.54	53.4 ± 15.37
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m2.	21.6 ± 1.81	40.0 ± 11.81
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m2.	28.0 ± 5.70	39.2 ± 17.02
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	32.0 ± 12.10	54.2 ± 12.61
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m2.	43.4 ± 11.39	58.8 ± 13.71
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m2.	27.8 ± 10.23	54.6 ± 4.56
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m2.	16.0 ± 3.39	55.0 ± 19.96
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	37.4 ± 6.14	70.2 ± 17.64
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m2.	36.2 ± 7.46	55.4 ± 14.53
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m2.	26.4 ± 11.58	69.2 ± 24.73
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m2.	24.8 ± 8.64	33.0 ± 14.07
Organic fertilizer for cows 20 tons/hectare.	27.8 ± 8.56	54.6 ± 29.29
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m2.	31.0 ± 9.30	46.4 ± 17.18
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m2.	45.0 ± 9.30	47.4 ± 16.14
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m2.	18.2 ± 5.40	37.4 ± 7.26
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	16.0 ± 3.74	54.4 ± 16.27

Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m2.	25. 0 ± 6.51	66.0 ± 18.08
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m2.	27.4 ± 10.76	61.0 ± 23.11
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m2.	12.6 ± 3.04	72.2 ± 10.63
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	9.4 ± 2.30	68.4 ± 13.88
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g/m2.	28.0 ± 80.15	77.4 ± 14.89
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m2.	15.8 ± 4.43	56.2 ± 10.20
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m2.	26.6 ± 7.98	64.4 ± 12.48
Nitropine fertilizer 0.3 g/m2 + phosphatine 0.3 g/m2 + potassiumag 0.3 g/m2.	16.0 ± 4.52	18.4 ± 6.54

As for the characteristic of the length of the plant, Table No. (3) showed a significant difference at the level of statistical significance 0.05, where the highest effect of the treatment was chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer cows 20 tons/hectare + potassiumage 0.3 g/m^2) with an average of (65.80) followed by chemical fertilizer treatment (18 - 46) 10 g/plant + organic fertilizer cows10 tons/hectare + b and tasiumage 0.3 g/m^2) with an average of (65.40). Followed by chemical fertilizer treatment (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitrobin 0.3 g/m^2) with an average of (58.60). Then the treatment is followed by chemical fertilizer (18 - 46) 20g/plant) with an average of (58.40). Followed by the treatment (chemical fertilizer (18 - 46) 10g/plant). with an average of (58.00). Then came the chemical fertilizer treatment (18 - 46) 20 g/plant + nitropine 0.3 g/^{m2}) with an average of (57.60). Followed by the transaction. chemical fertilizer (18 - 46) 10 g/plant+ organic fertilizer for cows (10 tons/hectare) with an average of (57.00). While the least effect resulting from the treatment (nitropine biofertilizer was 0.3 g/^{m2}) with an average of 4 (34.00). Then followed by the treatment (potassium biofertilizer 0.3g/m^2) with a mean of (36.20). Table (3) of the description of the number of plant branches also showed that there are significant differences between the coefficients at the level of statistical significance 0.05. The treatment of chemical fertilizer (18 - 46) 10g/plant + organic fertilizer for cows (10 tons/hectare) recorded the highest effect with an average of (6.20). The treatment is followed by chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2) with an average of (5.80). Then the treatment chemical fertilizer (18-46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2). The treatment is followed by chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows (10 tons/hectare) with an average of (5.40). Followed by the treatment (chemical fertilizer (18 -46) 10g/plant + nitrobin 0.3 g/m^2) and the treatment chemical fertilizer (18 -46) 20 g/plant) and the treatment chemical fertilizer (18 -46) 20 g/plant + organic fertilizer cows 20 tons/hectare) with an average of (5.20). While the lowest effect resulting from the treatment was (bio-phosphatine fertilizer 0.3 g/m^2) with an average of(2.80), followed by the treatment (bio- butasiomag fertilizer 0.3g/m^2) with an average of (3.00) when compared to the control. As for the variable number of plant stalks, Table (3) indicated that there is a significant difference at a significant level of 0.05, where the treatment (organic fertilizer for cows 10tons/hectare) and the treatment (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2) and the treatment (organic fertilizer for cows 20 tons/hectare) and the treatment (chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2) achieved the highest effect with an average of (2.60). Followed by the treatment (chemical fertilizer (18 - 46) 20 g/plant) and the treatment (chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2) and the treatment (organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2) and the treatment (18 - 46) 10 g/plant + organic fertilizer cows 10 tons/hectare + phosphatine 0.3g/m^2) with an average of (2.40) respectively, while the treatment (bio fertilizer nitropine 0.3 g/m^2) and the treatment (bio fertilizer phosphatine 0.3 g/m^2) and the treatment (Bio Fertilizer Potassiumage 0.3 g/m^2) and treatment chemical fertilizer (18 - 46) 10 g/plant) and treatment chemical fertilizer (18 - 46) 10g/plant + phosphatine 0.3 g/m^2) and treatment (Organic Fertilizer Bovine 10 t/ha + Nitropine 0.3 g/m^2) and treatment (Organic Fertilizer Bovine 20 t/ha + Phosphatine 0.3 g/m^2) and treatment (18 - 46) 10 g/plant + Organic Fertilizer 20 t/ha + Phosphatine 0.3 g/m^2) and treatment.(Nitropine fertilizer 0.3 g/^{m2} + phosphatine 0.3 g/m2 + potassiumag 0.3 g/^{m2}) has the lowest significant effect with an average of (1.20) when compared to the control.

Table No. (3) shows the effect of transactions on the characteristics of vegetative growth (length of the plant, number of branches of the plant and the number of stems of the plant)

TRANSACTION	Growth of plants in cm	Number of plant branches	Number of plant stems
	Means ± SE	Means ± SE	Means ± SE
Control	38.3 ± 7.79	3.2 ± 0.83	1.2± 0.44
Biofertilizer Nitropin 0.3 g/m^2.	34.0± 3.16	3.4 ± 1.34	1.2 ± 0.44
Biofertilizer phosphatine 0.3 g/m^2.	42.2 ± 5.26	2.8 ±0.83	1.2 ± 0.44
Bio fertilizer potassiumage 0.3 g/m^2	36.2 ± 6.45	3.0± 0.70	1.2± 0.44
Chemical fertilizer (18 - 46) 10 g/plant.	58.0 ± 7.48	0.70 ± 4.0	1.2 ± 0.44
Chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m^2.	55.8± 7.66	4.2 ± 0.44	1.2 ± 0.44
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2.	55.6 ± 4.27	4.2 ± 0.44	1.2± 0.44
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2.	56.6 ± 4.33	4.0 ± 0.70	1.2 ± 0.44
Chemical fertilizer (18 - 46) 20 g/plant.	58.4 ± 2.07	5.2 ± 0.44	2.4 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2.	57.6 ± 4.27	4.2 ± 0.83	1.6 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2.	51.6 ± 7.50	4.4 ± 0.89	2.4 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2.	56.8 ± 9.14	5.8± 0.83	1.6 ± 0.89
Organic fertilizer for cows 10 tons/hectare	50.8 ± 5.76	4.2 ± 0.83	2.6 ± 0.54
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2.	52.8 ± 4.65	4.6 ± 1.51	1.2 ± 0.44
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m^2.	44.8 ± 4.20	4.4± 0.54	2.2 ± 0.83
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	53.0 ± 12.34	4.2 ± 0.83	2.4 ± 0.54
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	57.0 ± 4.94	6.2± 0.83	1.4 ± 0.54
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	55.8 ± 5.53	5.4 ± 1.51	2.2 ± 0.83

Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2.	56.4 ± 6.34	5.2 ± 0.83	2.4 ± 0.54
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	65.4 ± 5.12	4.8 ± 0.83	2.6 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	55.0 ± 10.41	5.4 ± 0.54	1.4 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	55.0 ± 9.05	4.6 ± 0.89	1.6 ± 0.89
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m^2.	53.0 ± 6.48	4.4 ± 0.54	1.4 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2.	48.4 ± 1.81	4.4± ± 1.14	2.0 ± 0.70
Organic fertilizer for cows 20 tons/hectare.	43.2 ± 7.94	4.2 ± 0.44	2.6 ± 0.54
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m^2.	43.4 ± 6.54	4.8± 1.09	2.0 ± 0.70
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	52.6 ± 4.77	3.6 ±1.14	1.2 ± 0.44
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2.	50.4 ± 6.02	5.0 ± 1.41	2.0 ± 0.00
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	50.0 ±9.24	4.2 ± 0.83	1.8 ± 0.83
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m^2.	47.2 ± 5.40	4.6 ± 0.89	2.2 ± 0.44
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	53.6 ± 6.73	4.6 ± 0.54	1.2 ± 0.44
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2.	65.8 ± 6.22	4.6 ± 0.54	2.6 ± 0.54
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	54.4 ± 8.20	5.2 ± 0.83	2.0 ± 0.70
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m^2.	58.6 ± 8.11	3.6 ± 0.89	2.0 ± 0.44
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	53.8 ± 16.05	3.4 ± 1.34	2.2 ± 0.44
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2.	53.6 ± 5.94	4.0 ± 0.70	2.2 ± 0.44
Nitropine fertilizer 0.3 g/^{m2} + phosphatine 0.3 g/^{m2} + potassiumag 0.3 g/^{m2}.	47.0 ± 10.55	3.6 ± 0.89	1.2 ± 0.44

The results in Table (4) of the plant leaf number variable indicate that there are significant differences between the coefficients used, where the level of significance was 0.05. The results show the highest effect was recorded upon treatment (organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g/m^2) and chemical fertilizer treatment.18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (15.40) followed by chemical fertilizer treatment (18 - 46) 10g/plant + organic fertilizer cows 10 tons/hectare) with an average of (14.80) then chemical fertilizer treatment (18 - 46) 10 g/plant + organic fertilizer cows 20 tons/hectare + nitropine 0.3 g/m^2) with an average of (14.20) and chemical fertilizer treatment (18 - 46) 10 g/plant) with an average of(14.00). While the lowest effect was recorded at the treatment organic fertilizer for cows 20 tons/hectare) with an average of (7.60). The treatment with chemical fertilizer (46 - 18) 10g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2) gave average of (7.80) followed by chemical fertilizer treatment (18 - 46) 10 g/plant + organic fertilizer for cows 10tons/hectare + potassiumag 0.3 g/m^2). Then came the treatment (nitrobin fertilizer 0.3 g/m^2 + phosphatine 0.3 g/m^2 + potassiumag 0.3 g/m^2) with an average of (9.20), then came the treatment (18 - 46) 20 g / plant + organic fertilizer 10tons/hectare + potassiumag 0.3 g/m^2) with an average of(9.60). As for the characteristic of the length of the leaves, it achieved a significant difference at a level of statistical significance 0.05. When comparing the averages of the transactions in Table (4), the treatment with chemical fertilizer (18 - 46) 10 g/plant) gave the highest effect with an average of (14.00) , followed by the treatment (organic fertilizer for cows 20 tons/hectare + nitrobin 0.3 g/m^2) and the treatment (organic fertilizer for cows 20 tons/hectare + potassiumage 0.3 g/m^2) with an average of (12.90) , then the treatment (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2), then the treatment chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10tons/hectare) with an average of (12.70). While the lowest effect resulting from the treatment chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2) and the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatine 0.3 g/m^2) with an average of (8.70) and then the treatment chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2) with an average of (8.90). Followed by treatment (biophosphatine fertilizer 0.3 g/m^2) with an average of (9.50), chemical fertilizer treatment (18-46) 10 g/plant + bovine organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2) and treatment (nitrobin fertilizer 0.3 g/m^2 + phosphatine 0.3 g/m^2 + potassiumag 0.3 g/m^2) with an average of (9.30). Then the treatment (organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2) followed by (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2) with an average of (9.80). The results of the paper presentation variable shown in Table (4) also indicated that there are significant differences between the transactions used at the significance level of 0.05, where the treatment (chemical fertilizer (18 - 46) 10 g/plant) recorded the highest effect with an average of (12.2).

Then came (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + nitrobin 0.3 g/m^2) with an average of (11.8) and the treatment (organic fertilizer cows20 tons/hectare + nitrobin 0.3 g/m^2) with an average of (11.7) and then the treatment chemical fertilizer (18 - 46) 10 g / plant + organic fertilizer 20tons/hectare + nitrobin 0.3 g/m^2)with an average of (11.2) and then the treatment (chemical fertilizer (18 - 46) 20g / plant) with an average of (10.9). While the treatment (organic fertilizer for cows 20 tons/hectare) gave the least effect with an average of (7), followed by the treatment (chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m2) with an average of (6.6). Then came the treatment (potassium biofertilizer 0.3 g/m^2) with an average of (7.2) followed by the treatment (nitrogen biofertilizer 0.3 g/m^2) with an average of (8.0) and then the treatment (bovine organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (7.8). As for the variable of neck length,

it achieved significant differences at a significant level of 0.05, and this is evident from the results shown in Table (4), where the treatment (chemical fertilizer (18 - 46) 10g/plant + phosphatine 0.3 g/m^2) was obtained with an average of the highest effect with an arithmetic average of(3.60), followed by the treatment (chemical fertilizer (18 - 46) 10 g/plant.) With an average of (3.40) and then the treatment (chemical fertilizer (18 - 46) 10g/plant + potassiumag 0.3g/m^2) with an average of (3.30) followed by the treatment (organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2) and the treatment (organic fertilizer cows 20tons/hectare) with an average of (3.20), scored for the lowest moral impact at the treatment (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + phosphatine 0.3 g/m^2) with an average of (1.60) and then the treatment (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare) with an average of (1.70). Then is followed by the treatment chemical fertilizer (46 - 18) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2) with an average of (1.90). Then the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumage 0.3 g/m^2) with an average of (2.00) and then the treatment (chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer cows 20 tons/hectare + phosphatene 0.3 g/m^2) with an average of (2.10) compared to the control.

Table No. (4) shows the impact of transactions on the characteristics of vegetative growth (the number of leaves of the plant, the length of the leaves, the width of the leaves and the length of the neck of the leaves) for a plant

Transaction	Number of leaves	Leaves Length	View Papers	Leaf neck length
	Means ± SE	Means ± SE	Means ± SE	Means ± SE
Control	12.4 ± 1.14	10.1 ± 1.14	8.7 ± 1.78	02.5± .86
Biofertilizer Nitropin 0.3 g/m^2.	10.2 ± 1.48	10.2 ± 1.09	8.0 ± 1.45	02.4± .41
Biofertilizer phosphatine 0.3 g/m^2.	11.4 ± 3.84	9.5 ± 1.76	8.6 ± 0.65	02.7± .27
Bio fertilizer potassiumage 0.3 g/m^2	12.2 ± 2.94	9.0 ± 1.58	7.2 ± 2.07	03.0± .61
Chemical fertilizer (18 - 46) 10 g/plant.	14.00± .70	14.0 ± 2.26	12.2 ± 2.28	03.4± .54
Chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m^2.	13.4 ± 3.97	11.4 ± 1.78	9.9 ± 2.30	02.2± .57
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2.	12.6 ± 3.57	11.2 ± 1.44	10.0 ± 0.70	03.6± .65
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2.	10.8 ± 1.92	8.7 ± 4.22	10.5 ± 1.87	03.4± .65
Chemical fertilizer (18 - 46) 20 g/plant.	13.8 ± 4.86	12.1 ± 2.58	10.9 ± 2.40	2.8± .57
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2.	11.8 ± 2.58	12.3 ± 1.30	7.0 ± .61	02.7± .83
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2.	11.0 ± 1.41	12.0 ± 1.58	9.9 ± 1.81	02.4± .41
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2.	13.4 ± 4.92	11.0 ± 1.62	9.5 ± 1.06	2.8± 1.25
Organic fertilizer for cows 10 tons/hectare	11.4 ± 3.78	10.5 ± 1.41	9.4 ± 2.96	02.8± .27
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2.	11.0 ± 1.58	10.0 ± 1.87	8.3 ± 2.16	2.6± 1.08
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m^2.	12.6 ± 3.64	10.4 ± 2.32	9.7 ± 2.65	02.7± .83
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	11.8 ± 1.92	9.8 ± 1.82	8.8 ± 2.01	3.2± 1.03
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	14.8 ± 5.21	12.7 ± 1.64	9.8 ± 3.01	03.3± .44
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	13.8 ± 5.49	11.10 ± .89	9.4 ± 2.50	3.0± 1.22
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2.	7.8 ± 1.48	10.2 ± 1.98	10.6 ± 1.14	01.9± .82
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	9.2 ± 1.30	8.9 ± 1.94	10.8 ± 2.77	02.7± .75
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	11.4 ± 2.50	10.9 ± 2.01	10.9 ± 2.13	02.9± .65
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	10.4 ± 1.67	12.7 ± 3.03	11.8 ± 2.30	3.1± 0.74
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m^2.	11.2 ± 2.16	8.7 ± 1.20	8.8 ± 3.01	02.3± .57
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2.	9.6 ± 1.14	9.5 ± 1.58	9.5 ± 2.06	02.0 ± .70
Organic fertilizer for cows 20 tons/hectare.	7.6 ± 1.14	11.3 ± 1.95	6.6 ± 2.07	03.2 ± .57
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m^2.	15.4 ± 8.11	13.6 ± 1.63	11.7 ± 1.48	02.8 ± .75
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	12.2 ± 3.76	13.6 ± 1.63	10.9 ± 1.08	02.5 ± .50
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2.	13.2 ± 3.76	12.9 ± 2.04	7.8 ± 2.51	2.7 ± 1.20
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	12.6 ± 1.51	11.20 ± 0.75	9.0 ± 1.00	02.3 ± .44
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m^2.	14.2 ± 4.65	11.20 ± .83	11.2 ± 0.83	02.6 ± .82

Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	10.8 ± 2.16	11.5 ± 1.87	10.6 ± 1.14	02.1 ± .65
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2.	12.2 ± 2.58	9.3 ± 1.71	9.4 ± 1.29	02.6 ± .89
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	11.4 ± 2.70	12.4 ± 0.74	10.6 ± 0.41	01.7 ± .27
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g/$^{m2.}$	10.8 ± 1.64	11.3 ± 1.98	10.8 ± 2.01	02.9 ± .89
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	12.4 ± 4.61	9.8 ± 1.35	10.6 ± 0.41	01.6 ± .65
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2.	15.4 ± 4.21	11.0 ± 2.09	9.0 ± 2.09	02.7 ± .57
Nitropine fertilizer 0.3 g/^{m2} + phosphatine 0.3 g/^{m2} + potassiumag 0.3 g/^{m2}.	9.2 ± 1.78	9.30 ± .67	9.2 ± 2.25	2.5 ± .50

Effect of transactions on the size, width and length of the fruit and the thickness of the adipose area of the fruit of the tomato plant

The results in Table (5) indicate that the various fertilization factors have had a significant impact on some of the qualities represented in the size, width and length of the fruit and the thickness of the fatty area at a statistical significance of 0.05. Through the table (5) of the fruit size characteristic variable, it was found that the highest impact of the treatment was (organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (275.0), followed by the treatment (chemical fertilizer (18 - 46) 20 g/plant + phosphatine 0.3 g/m^2) with an average of (168.0), then the treatment (chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2) with an average of (166.0). While the lowest effect resulting from the treatment was (organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2) with an average of (26.0), followed by the treatment (organic fertilizer for cows 10 tons/hectare) with an average of (44.0), then the treatment (biofertilizer potassiumag 0.3 g/m^2) with an average of (46.0). The results in Table (5) of the fruit width variable indicated that there are significant differences between the transactions at a significant level of 0.05, as it achieved the highest level at the treatment (chemical fertilizer (18 - 46) 20 g/plant + phosphatine 0.3 g/m^2) with an average of (6.6), followed by the treatment (chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2) with an average of (6.2). Then came the treatment (18 - 46) 10 g/plant + organic fertilizer cows 10 tons/hectare + nitrobin 0.3 g/^{m2}) with an average of (6.0) followed by chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer cows 10 tons/hectare) with an average of (5.6). While the lowest moral impact was achieved upon treatment (organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2) with an average of (3.7) followed by treatment (nitrobin biofertilizer 0.3 g/m^2) and then treatment (potassiumag biofertilizer 0.3 g/m^2) and treatment (nitrobin fertilizer 0.3 g/m^2 + phosphatine 0.3 g/m^2 + potassiumag 0.3 g/m^2) with an average of (4.2) respectively compared to thewitness. As for the characteristic of the length of the fruit, Table 5 showed that there are significant differences between the coefficients, as the level of statistical significance was at 0.05. The highest effect of the treatment was (18 - 46) 20 g/plant + organic fertilizer 20 tons/hectare) with an average of (7.66) and the treatment was (18 - 46) 20 g/plant + organic fertilizer 10 tons/hectare + potassiumage 0.3 g/m^2) with an average of (7.60) and then the treatment was chemical fertilizer. 18 - 46) 10 g/plant + organic fertilizer 10 t/ha + phosphate 0.3 g/m^2) with an average of (7.53) followed by the treatment (chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2) with an average of (7.50) and then the treatment of chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 t/ha + phosphatene 0.3 g/m^2) with an average of (7.36). Then the treatment chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer chemical fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (7.00), while the least effect resulting from the treatment (bio fertilizer nitropine 0.3 g/m^2) and the treatment (chemical fertilizer (18 - 46) 20 g/plant) and the treatment (organic fertilizer cows 10 tons/hectare + potassium 0.3 g/m^2) with an average of (4.33) and then the treatment (organic fertilizer cows 10 tons/hectare) with an average of (4.63) and the treatment (chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2) with an average of (4.66) compared to the control. The results of the fatty zone thickness variable also showed significant differences between the coefficients used at the significance level of 0.05. Table (5) indicated that the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatine 0.3 g/m^2) with the highest effect with an average of (0.80) followed by the treatment is chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + nitrobin 0.3 g/m^2) with an average of (0.75) then the treatment chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer cows 10 tons/hectare + phosphate 0.3 g/m^2) with an average of (0.73), then the treatment (chemical fertilizer (18 - 46) 20 g/plant + potassium 0.3 g/m^2) with an average of (0.70). While the treatment (organic fertilizer for cows 10 tons/hectare + potassium 0.3 g/m^2) and the treatment (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare) gave the lowest effect with an average of (0.36), followed by the treatment (chemical fertilizer (18 -

46) 20 g/plant) and then the treatment (organic fertilizer for cows 10 tons/hectare + nitropine 0.3 g/m^2) with an average of (0.40) compared to the control.

Table No. (5) shows the impact of transactions on the size, width and length of the fruit and the thickness of the fatty area

TRANSACTION	Size of the fruit	Width of the fruit	Length of the fruit	Thickness of adipose area
	mean±s.d.	mean±s.d.	mean±s.d.	mean±s.d.
control	65.82 ± 53.4	4.2 ± 1.09	03.7 ± .64	0.3 ± .05
Biofertilizer Nitropin 0.3 g/m^2.	76.0 ± 15.16	4.2 ± 2.38	04.3 ± .57	0.4 ± .05
Biofertilizer phosphatine 0.3 g/m^2.	58.0 ± 25.88	5.2 ± 0.83	04.9 ± .90	0.4 ± .04
Bio fertilizer potassiumage 0.3 g/m^2	46.0 ± 20.73	4.2 ± 0.43	4.4 ± 0.89	0.4 ± .05
Chemical fertilizer (18 - 46) 10 g/plant.	106.0 ± 54.58	4.9 ± 0.72	4.9 ± 1.00	0.4 ± .11
Chemical fertilizer(18-46)10g/plant+ nitropine 0.3 g/m^2.	84.0 ± 55.94	4.9 ± 0.79	05.5 ± .61	0.4 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2.	146.0 ± 36.46	6.2 ± 0.44	06.0 ± .88	.4 ± 0.02
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2.	96.0 ± 25.09	5.4 ± 0.46	05.2 ± .46	0.5 ± .06
Chemical fertilizer (18 - 46) 20 g/plant.	100.0 ± 15.81	5.5 ± 0.50	04.3 ± .57	0.4 ± .10
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2.	166.0 ± 52.24	5.5 ± 0.50	04.6 ± .57	0.5 ± .05
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2.	168.0 ± 32.71	6.6 ± 0.54	05.6 ± .57	0.6 ± .10
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2.	78.0 ± 21.67	5.1 ± 0.65	07.5 ± .50	0.7 ± .10
Organic fertilizer for cows 10 tons/hectare	44.0 ± 39.74	4.1 ± 1.14	04.6 ± .55	0.4 ± .05
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2.	108.0 ± 43.24	4.4 ± 0.95	5.0 ± 1.05	00 .4 ± .10
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m^2.	52.0 ± 44.38	4.7 ± 0.78	05.3 ± .57	00.6 ± .10
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	26.0 ± 11.40	3.7 ± 0.25	4.3 ± 0.57	0 .3 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	118.0 ± 44.94	5.6 ± 0.54	5.0 ± 1.00	00 .3 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	114.0 ± 28.80	6.0 ± 0.61	05.3 ± .57	00 .5 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2.	102.0 ± 38.34	4.7 ± .67	07.5 ± .50	0.7 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	136.0 ± 15.16	5.4 ± 0.54	6.2 ± 0.72	00.6 ± .05
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	84.0 ± 39.74	4.9 ± 0.32	05.9 ± .85	00 .5 ± .10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	112.0 ± 13.03	5.2 ± 0.55	5.0 ± 1.10	00 .5 ± .11
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m^2.	74.0 ± 71.62	4.5 ± 1.14	07.3 ± .32	0.8 ± .00
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2.	118.0 ± 60.99	4.9 ± 0.54	07.6 ± .52	0.6 ± .05
Organic fertilizer for cows 20 tons/hectare.	78.0 ± 21.67	4.9 ± 0.54	05.5 ± .66	0.4 ± 0.05
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m^2.	78.0 ± 28.63	4.8 ± 0.57	6.2 ± 1.05	0.4 ± 0.05
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	110.0 ± 12.24	5.1 ± 0.38	6.3 ± 0.61	00.5 ± .07
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2.	275.0 ± 17.67	4.8 ± 0.44	6.0 ± 1.00	00.5 ± .11
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	58.0 ± 25.88	4.9 ± 0.54	5.6 ± 0.60	00.5 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m^2.	68.0 ± 31.14	4.6 ± 0.41	5.8 ± 0.80	00.4 ± .05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	93.0 ± 9.74	5.1 ± 0.40	5.9 ± 0.85	0.5 ± 0.05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2.	80.0 ± 39.37	5.0 ± 0.71	7.0 ± 1.00	00.5 ± .15
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	120.0 ± 53.85	5.4 ± 0.65	07.6 ± .57	0.6 ± 0.05
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3g/m2.	105.8 ± 14.77	5.3 ± 0.67	06.0 ± .11	00.7 ± .05
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	140.0 ± 40.62	4.8 ± 0.44	6.3 ± 1.52	0.5 ± 0.11
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2.	86.0 ± 19.49	4.9 ± 0.89	05.7 ± .83	0.4 ± 0.11
Nitropine fertilizer 0.3 g/m2 + phosphatine 0.3 g/m2 + potassiumag 0.3 g/m2.	56.0 ± 29.66	4.2 ± 0.75	5.3 ± 0.51	00.5 ± .02

Effect of transactions on the weight (wet and dry) of the fruit

It is clear from Table (6) that the fertilization coefficients studied have had a significant impact on the variable wet weight of the fruit at the significance level of 0.05. Where the treatment recorded chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer 20 tons/hectare) had the highest value with an average of (192.6) followed by chemical fertilizer treatment (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatine 0.3 g/m^2) with an average of (188.6), then the treatment

Table No. (6) shows the effect of transactions on the wet and dry weight of the fruit of the tomato plant

TRANSACTION	wet weight			dry weight		
	mean±s.d.			mean±s.d.		
control	67.0	±	1.00	1.60	±	.36
Biofertilizer Nitropin 0.3 g/m^2.	70.0	±	1.00	7.5	±	9.90
Biofertilizer phosphatine 0.3 g/m^2.	99.0	±	1.00	2.30	±	.10
Bio fertilizer potassiumage 0.3 g/m^2	58.60	±	0.57	2.60	±	.10
Chemical fertilizer (18 - 46) 10 g/plant.	118.3	±	1.52	2.80	±	.10
Chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m^2.	103.0	±	1.00	3.30	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2.	187.3	±	1.52	3.20	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2.	128.60	±	0.57	3.60	±	.05
Chemical fertilizer (18 - 46) 20 g/plant.	76.0	±	1.00	1.5	±	0.10
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2.	128.6	±	1.52	5.2	±	0.10
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2.	166.3	±	2.51	5.30	±	.11
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2.	111.3	±	1.52	5.40	±	.10
Organic fertilizer for cows 10 tons/hectare	77.0	±	2.00	2.5	±	0.10
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2.	64.6	±	1.52	2.6	±	0.10
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m^2.	115.6	±	1.52	4.20	±	.20
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	40.3	±	1.52	2.20	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	111.6	±	1.52	2.4	±	0.10
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	151.3	±	1.52	3.00	±	.11
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2.	144.3	±	1.52	8.30	±	.05
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	159.3	±	2.08	3.2	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	97.30	±	0.57	4.1	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	132.3	±	2.08	4.60	±	.15
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m^2.	188.6	±	1.52	10.60	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2.	180.0	±	1.00	4.80	±	.10
Organic fertilizer for cows 20 tons/hectare.	112.3	±	2.08	2.40	±	.15
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m^2.	107.6	±	1.52	2.40	±	.10
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	106.6	±	2.08	2.00	±	.00
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2.	107.3	±	1.52	4.80	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	121.3	±	1.52	5.20	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitropene 0.3 g/m^2.	56.6	±	1.52	1.20	±	.15
Chemical fertilizer (18 - 46) 10 gymnases + organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	100.0	±	1.00	2.20	±	.10
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2.	122.8	±	1.04	3.70	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	192.6	±	1.52	3.60	±	.15
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g/m2.	139.0	±	1.00	3.80	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	116.60	±	0.57	2.70	±	.10
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2.	90.30	±	0.57	3.70	±	.10
Nitropine fertilizer 0.3 g/m2 + phosphatine 0.3 g/m2 + potassiumag 0.3 g/m2.	74.30	±	0.57	0 1.50	±	.10

(chemical fertilizer (18- 46) 10 g/plant + phosphatine 0.3 g/m^2) with an average of (187.3), then the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2) with an average of (180.0), while the lowest effect of the treatment (organic fertilizer cows 10 tons/hectare + potassium 0.3 g/m^2) with an average of (40.3) followed by chemical fertilizer treatment (18 - 46) 10g/hectare + organic fertilizer cows 20 tons/hectare + nitrobine 0.3 g/m^2 with an average of (56.6) and then (bios massy potassium gumag 0.3 g/m^2 with an average of (58.6), respectively. While the results in Table (6) indicated that there is a significant effect between the transactions for the dry weight of the fruit, where the transaction gave (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatine

0.3 g/m^2) gave the highest value with an average of (10.6), followed by chemical fertilizer. (18-46) 10 g/plant + organic fertilizer 10 tons/hectare + phosphate 0.3 g/m^2) with an average of (8.3) and then the treatment (nitropene bio fertilizer 0.3 g/m^2) with an average of (7.5). While the least effect resulting from the treatment was chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + nitrobin 0.3 g/m^2) and treatment (chemical fertilizer (18 - 46) 20 g/plant) and treatment (nitrobin fertilizer 0.3 g/m^2 + phosphatine 0.3 g/m^2 + potassiumag 0.3 g/m^2) with an average of (1.2, 1.5,1.5) respectively. Then came the treatment (organic fertilizer cows 20 tons/hectare + phosphatine 0.3 g/m^2) and the treatment chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + phosphatine 0.3 g/m^2) and the treatment (organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2) with an average of (2.2, 2.0, 2.2) respectively compared to the control.

Effect of coefficients on vegetative and root (wet and dry) total weight of tomato plant

The results in Table (7) indicate that the addition of different fertilizers to the wet weight characteristic of the vegetative total caused significant differences between the coefficients, as the level of statistical significance was about 0.05. Where the treatment (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare) gave the highest effect with an average of (334.6), followed by the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + nitropine 0.3 g/m^2) with an average of (316.7), then the treatment came (chemical fertilizer (18 - 46) 10 g/plant + nitropine 0.3 g/m^2) with an average of (304.9), while the least resulting effect of the treatment was (chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + phosphatine 0.3 g/m^2) with an average of (90.3) and the treatment (nitropine biofertilizer 0.3 g/^{m2}) with an average of (90.6). Then came the treatment (organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (95.7) and also the treatment (organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2) with an average of (96.2) compared to the control. The results of the statistical analysis of Table (7) of the dry weight variable of the vegetative total showed that there are significant differences between the coefficients used at the significance level of 0.05. It recorded the highest effect of the treatment (chemical fertilizer (18 - 46) 10 g/plant + nitrobin 0.3 g/m^2) with an average of (165.6), followed by the treatment (18 - 46) 10 g/plant + cow organic fertilizer 10 tons/hectare) with an average of (144.0) and then treatment chemical fertilizer (18 - 46) 20 g/plant + cow organic fertilizer 20 tons/hectare + nitrobin 0.3 g/m^2) with an average of (142.2) and the treatment (chemical fertilizer (18 - 46) 20 g / plant) with an average of (142.8), while the lowest effect obtained at the treatment was (bio-nitrobin fertilizer 0.3 g/m^2) with an average of (40.0). Then came the treatment (bio-phosphatine fertilizer 0.3 g/m^2) with an average of (44.8) and the treatment (organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2) with an average of (48.11) and the treatment chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + phosphatene 0.3 g/m^2) with an average of (48.66) respectively compared to the control. Table (7) shows that all the coefficients of the wet weight variant of the root total gave a significant difference at a level of statistical significance of 0.05. When comparing the averages of the coefficients, the highest effect resulting from the treatment was (chemical fertilizer (18 - 46) 20 g/plant + potassiumage 0.3 g/m^2) with an average of (103.4) and the treatment (18 - 46) 20 g/ plant + organic fertilizer 10 t/ha + nitropine 0.3g/m^2) with an average of (96.0) and then the treatment (chemical fertilizer (18 – 46) 10 g/plant + phosphatine 0.3 g/m^2) with an average of (92.0) and the treatment (18 - 46) 20 g/plant + organic fertilizer 20 t/ha + potassium 0.3 g/m^2) with an average of (90.5) . While the treatment (organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2) gave the lowest effect with an average of (20.3) and the treatment (organic fertilizer for cows 20 tons/hectare + nitrobin 0.3 g/m^2) with an average of (23.0) compared to the control. As shown in the statistical analysis table No. (7) there were significant differences between the coefficients of the dry weight variable of the root total at a significance level of 0.05. The treatment (18-46) achieved 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatine 0.3 g/m^2) showed the highest effect (56.6) followed by the treatment (chemical fertilizer (18-46) 20 g/plant + potassiumage 0.3 g/m^2) with an average of (51.6) and then the treatment (chemical fertilizer (18-46) 20 g/plant + phosphatine 0.3 g/m^2) and the treatment (18-46) 10g/plant + organic fertilizer cows 10 tons/hectare + nitrobine 0.3 g/m^2) and the treatment (18-46) 20 g/plant + organic fertilizer cows 10 tons/hectare + nitrobine 0.3 g/m^2) with an average of (44.3) . While the treatment (nitrobin biofertilizer 0.3 g/m^2) and the treatment (cow organic fertilizer 10 tons/hectare) recorded the lowest effect with an average of (13.0) and the treatment (chemical fertilizer (18 - 46) 10g /plant + nitrobin 0.3g/m^2) with an average of (13.3) compared to the control.

Table No. (7) shows the impact of fertilizer coefficients on the wet and dry weight of the vegetative and root total

Transaction	Vegetative Total Wet Weight	Dry weight of vegetative sum	Wet weight of root sum	Dry weight of root sum
	mean±s.d.	mean±s.d.	mean±s.d.	mean±s.d.
control	36.8 ± 11.91	13.8 ± 5.41	21.3 ± 8.02	9.3 ± 1.52
Biofertilizer Nitropin 0.3 g/m^2.	90.6 ± 23.56	40.0 ± 21.04	27.2 ± 16.17	13.0 ± 6.24
Biofertilizer phosphatine 0.3 g/m^2.	78.5 ± 9.44	44.8 ± 13.40	29.3 ± 17.38	16.6 ± 10.78
Bio fertilizer potassiumage 0.3 g/m^2	130.8 ± 72.11	64.3 ± 49.21	30.2 ± 23.73	15.3 ± 8.38
Chemical fertilizer (18 - 46) 10 g/plant.	224.8 ± 13.22	79.4 ± 34.93	35.0 ± 19.51	16.3 ± 4.61
Chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g/m^2.	304.9 ± 77.37	165.6 ± 53.25	24.6 ± 4.61	13.3 ± 3.51
Chemical fertilizer (18 - 46) 10 g/plant + phosphatine 0.3 g/m^2.	157.7 ± 71.26	82.8 ± 30.18	92.0 ± 16.70	38.0 ± 10.58
Chemical fertilizer (18 - 46) 10 g/plant + potassiumag 0.3 g/m^2.	282.2 ± 104.13	113.3 ± 32.14	86.3 ± 15.82	40.0 ± 11.00
Chemical fertilizer (18 - 46) 20 g/plant.	243.7 ± 109.51	142.8 ± 73.83	58.7 ± 42.64	26.3 ± 21.22
Chemical fertilizer (18 - 46) 20 g/plant + nitropine 0.3 g/m^2.	243.6 ± 167.40	128.2 ± 35.20	32.6 ± 8.08	24.0 ± 5.19
Chemical fertilizer (18 - 46) 20 g/plant + phosphatene 0.3 g/m^2.	102.0 ± 64.87	55.0 ± 25.00	79.0 ± 10.14	44.3 ± 4.50
Chemical fertilizer (18 - 46) 20 g/plant + potassiumag 0.3 g/m^2.	222.8 ± 102.72	115.2 ± 69.40	103.4 ± 16.98	51.6 ± 10.40
Organic fertilizer for cows 10 tons/hectare	102.5 ± 40.02	51.6 ± 19.06	26.3 ± 15.63	13.0 ± 7.21
Organic fertilizer for cows 10 tons/hectare + nitrobin 0.3 g/m^2.	96.2 ± 36.34	62.3 ± 33.26	26.0 ± 15.71	17.0 ± 7.21
Organic fertilizer for cows 10 tons/hectare + phosgateen 0.3 g/m^2.	124.9 ± 55.45	54.8 ± 18.48	75.0 ± 31.00	29.6 ± 12.09
Organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	153.7 ± 27.63	56.3 ± 5.58	20.3 ± 5.68	12.6 ± 4.72
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare.	265.0 ± 193.88	144.0 ± 127.52	44.6 ± 18.50	24.0 ± 5.29
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	229.0 ± 24.32	107.0 ± 23.13	86.6 ± 15.27	44.3 ± 10.50
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + phosphate 0.3 g/m^2.	146.8 ± 48.57	59.8 ± 7.32	44.3 ± 10.50	25.6 ± 5.85
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare + potassiumag 0.3 g/m^2.	246.9 ± 122.47	52.1 ± 26.76	49.8 ± 27.66	31.3 ± 19.65
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare.	334.6 ± 232.43	130.0 ± 60.82	53.3 ± 31.94	27.3 ± 13.42
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + nitropene 0.3 g/m^2.	258.1 ± 75.91	102.9 ± 16.33	96.0 ± 12.16	44.3 ± 4.50
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare + phosphatene 0.3 g/m^2.	267.7 ± 61.96	118.8 ± 63.71	103.0 ± 15.39	56.6 ± 8.32
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 10 tons/hectare + potassiumag 0.3 g/m^2.	180.9 ± 40.48	80.7 ± 22.14	44.0 ± 5.57	25.3 ± 4.16
Organic fertilizer for cows 20 tons/hectare.	261.9 ± 56.06	113.3 ± 32.14	44.3 ± 10.50	19.6 ± 4.72
Organic fertilizer for cows.20 tons/hectare + nitrobin 0.3 g/m^2.	178.1 ± 75.78	99.4 ± 58.11	23.0 ± 10.53	14.0 ± 8.18
Organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g/m^2.	207.5 ± 38.05	71.8 ± 25.64	72.0 ± 7.21	35.6 ± 3.78
Organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2.	95.7 ± 4.99	48.1 ± 11.65	70.0 ± 17.32	30.3 ± 1.52
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare.	296.9 ± 90.75	120.2 ± 9.94	37.3 ± 22.50	26.3 ± 15.17
Chemical fertilizer (18 - 46) 10 g/plant +	270.9 ± 172.79	129.9 ± 130.0	70.0 ± 23.06	32.6 ± 8.73

organic fertilizer Cows 20 tons/hectare + nitropine 0.3 g/m^2.				9					
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	120.5	±	20.73	84.3	±	27.91	44.3	±	14.01	22.0	±	4.00
Chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer 20 tons/hectare + potassiumag 0.3 g/m^2.	145.4	±	81.61	76.8	±	47.48	34.6	±	18.58	14.6	±	7.02
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare.	171.1	±	30.86	78.6	±	17.53	65.6	±	23.02	38.6	±	9.86
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropene 0.3 g$^{/m2.}$	316.7	±	142.42	142.2	±	49.17	39.3	±	17.95	23.6	±	12.74
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + phosphatene 0.3 g/m^2.	90.3	±	42.74	48.6	±	24.88	49.6	±	13.79	26.6	±	15.14
Chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer cows 20 tons/hectare + potassiumag 0.3 g/m^2.	181.6	±	103.03	78.3	±	22.54	90.5	±	50.09	23.3	±	6.11
Nitropine fertilizer 0.3 g$^{/m2}$ + phosphatine 0.3 g$^{/m2}$ + potassiumag 0.3 g$^{/m2}$.	227.2	±	186.41	107.2	±	80.86	29.3	±	16.16	14.66	±	6.80

Discussion

The results shown in Table (3) of the plant length variant and the number of plant stalks showed that the treatment was superior (chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 20 tons/hectare + potassiumag 0.3 g/m^2). The treatment led to an increase in the height of the stem as well as an increase in the number of stems of the plant. Table (4) also showed the superiority of the chemical fertilizer (18-46) 10 g/plant) for the variable length and width of the leaves of the plant, where the fertilizer led to an increase in the length and width of the leaves of the plants. The results shown in Table(5,6) indicated the superiority of chemical fertilizer (18-46) 20 g/plant + organic fertilizer cows 20 tons/hectare) for the variable length of the fruit and the wet weight of the fruit, as it led to the increase in the length of the fruit and the wet weight, while the results showed the supremacy of the treatment (chemical fertilizer (18-46) 20 g/plant + organic fertilizer cows 10 tons/hectare + phosphatene 0.3 g/m^2) on the rest of the coefficients for the variable thickness of the fatty area and the dry weight of the fruit and the dry weight of the root total, as the treatment led to the increase in the dry weight of the root total, in addition to the increase in the thickness of the fatty area and the dry weight of the fruit compared to the control. These results obtained are similar to the results of (patrick *et al*., 2011), where he pointed to the role of chemical fertilizers in increasing the vegetative growth of the plant as a result of the role of potassium and nitrogen in this, in addition to the joint interaction between fertilizers, which led to an increase in biological activity, which increased the ability of the plant to absorb nutrients that had a significant role in improving vegetative growth and increasing the crop Mahmoud *et al*., 2015) & (Merghany *et al*., 2019 and (Hataf Hammoud., 2012). While Table (2) showed that the superiority of (organic fertilizer for cows 20 tons/hectare + phosphatine 0.3 g$^{/m2}$) for the variable number of inflorescences, as indicated by the results shown in Table (2) for the variable number of fruits, the treatment of chemical fertilizer (18 - 46) 20 g/plant + organic fertilizer for cows 20 tons/hectare + nitropine 0.3 g$^{/m2}$, which led to an increase in productivity. The variable number of plant branches, the superiority of chemical fertilizer (18 - 46) 10 g/plant + organic fertilizer for cows 10 tons/hectare by increasing the number of plant branches as shown in Table (2.4). The results in Table (4) for the variable number of plant leaves exceeds the organic fertilizer for cows.20 tons/hectare + nitropine 0.3 g$^{/m2}$, as it led to an increase the number of leaves in the plant, as for the length of the neck of leaves, as noted in Table (4), an increase in the length of leaves by adding chemical fertilizer (18 - 46) 10 g/phosphate/^{m2}. As for the size of the fruit, it has been proven that the superiority for the treatment (organic fertilizer for cows G for the wet weight of the vegetative total. Also it has been proven that the chemical fertilizer was superior (18 - 46) 20 g/plant + organic fertilizer for cows 10 tons/hectare), while the dry weight of the vegetative total is superior to the treatment of chemical fertilizer (18- 46) 10 g/plant + nitropine 0.3 g$^{/m2}$) over the rest of the fertilizers compared to a witness as shown in Table (7). As for the wet weight of the root total, the chemical fertilizer (18-46) recorded 20 g/plant + potassium (0.3 g/m^2), the highest value compared to the control. The rest of the transactions as indicated in Table (7). These results are consistent with what the scientists said that fertilizers of various kinds have a major role in improving the quality and value of production through their production of many materials that increase vegetative growth, increase productivity and improve

vegetative and fruit qualities (Snedecor, Cochran., 1980) & (Ahmed Jassim et al., 2014) and (Shehata et al., 2012).

Conclusion

Fertilizers have an important role in vegetative growth and fruit quality, but chemical fertilizers play an important role in the growth and productivity of the tomato plant. Fertilizers have also contributed effectively to increasing the rate of vegetative growth qualities and fruit quality and thus increasing productivity.

Recommendations:

- Expanding in the future with research that includes co-fertilization with organic fertilizers and chemical and biological fertilizers to study the mutual impact between them on the growth and productivity of the tomato plant.
- This study can be considered as the beginning of more in-depth studies in the field of agriculture and product quality improvement.

References

1. Abu Dahi Al-Younis, Youssef Mohammed, and Moayad Ahmed. Plant nutrition. Baghdad University Ministry of Higher Education and Scientific Research Republic of Iraq, 1988.
2. Ahmed Abdul Jabbar Jassim, Kazem Nabil Jawad, and Faraj Hussein Arnous. "The effect of phosphate, organic and biological fertilization on the yield and its indicators of the tomato crop. *Lycopersicon esculentum Mill.*". *Tarim Diyala Journal of Agricultural Sciences*, vol. 6, (2), 2014, pp. 195–204.
3. Al-Fishawi, Fawzi. "Lycopene food." Assiut Journal of Environmental Studies, vol. 28, no. 11, 2005, pp. 1–16.
4. Bradley, K. L. (2003). Tomatoes in the desert garden. Hort. News and Res. J. 1: 1 - 2.
5. Dimascio, P.; Kaiser, S. & Sies, H. (1989). Lycopene as the most efficient biological carotenoid singlet oxygen quencher. Arch Biochem Biophys. 274: 532 - 538.
6. FAO. 2016. FAOSTAT. https://www.fao.org/faostat/en/#data/QC. Accessed June 10, 2023.
7. Hassan, Ahmed Abdul Mun'em. Vegetable production technology. Arab House for Publisher and Distribution, Cairo, 1998.
8. Hassan, Atif Abdul Aziz. Bio fertilization and raising soil fertility. Organic Farming Eighth Conference of the Scientific Association for Agricultural Extension. The role of agricultural extension in the development of Egyptian agricultural exports. Conference hall at the Egyptian International Center for Agriculture, Cairo, 2006, p. 12.
9. Hataf Hammoud., M. 2012. “Impact of Some Nitrogen Fertilizer on Growth, Yield and Fruit Quality of Tomato (Lycopersicon esculentum) in Northern Iraq.” Journal of Agricultural Sciences 3 (4): 232-243.
10. Mahmoud, R. & Alia Qanadillo. (2015). Effects of Fertilization Patterns Using Mineral and Organic Fertilizers on Growth and Yield of Cucumber under Green house International Journal of Plant and Soil Science6 (4): 244 – 253.
11. Mengel, K. & Helal, M. (1967). Plant physiol. J. 57: 223.
12. Mengel, K. & A.Kirkby, E. (1989). principles of plant Nutrition. International potash institute Bern. Switzerland.
13. Merghany, M. M.; Mohamed, M. S.; Mahmoud, A. S.; Karima, F. & Amany F.R. (2019). Effect of nano – Fertizers on Cucumber plant growth fruit yield and its. s quqlity. Plant Archives Vol. 19. Supplement 2. pp. 165 - 172 .
14. Mishustin, E.H. & Emtsev ,V.T. (1987). Fundamentals of Soill. Microbioiogy Agropmizadat. Moscow In Rassian. pp357.
15. Al-Nuaimi, Saadallah, and Najm Abdullah. *Fertilizers and soil fertility.* Ministry of Higher Education and Scientific Research University of Al Mosul, 1999.
16. Patrick,J. W.; Zhang,W.; Tyerman, S. D.; Offler,C. E. & Walker,N.A. (2001). Role of membrane transport in phloem translocation of assimilates and water. Australian journal of plant physiology.28. 695 - 707.
17. Shehata, S. A.; Fawzy, Z. F. & El - Ramady, H. R. (2012). Response of cucumber plant to foliar application of chitosan and yeast under greenhouse conditions Australian J. Basic Appl. Sci. (4): 63-71.
18. Narrator, Y. M., and A. M. Khalafullah. 1980. Experimental Design. Baghdad: University of Baghdad, College of Agriculture.
19. Science Symposium. 2000. “The Role of Potassium in Plant Nutrition.” Symposium on Potassium in Plant Nutrition. Berlin: Springer-Verlag.
20. Snedecor, G. w. & Cochran, W. G. (1980). Statistcal Methods. 7ᵗ Ed lowa State. Press. Amer. Lowa. USA.
21. Al-Rawi is humble, Mahmoud and Abdel Aziz, Muhammad Khalaf. (1980). Design and analysis of agricultural experiments. National Library . University of Al Mosul . Ministry of Higher Education and Scientific Research. Iraq . Chapter Four, p. 95.