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EFFECT OF NITROGEN FERTILIZER, SEAWEED AND DRY YEAST EXTRACTS ON GROWTH AND YIELD OF TOMATO (*Solanum lycopersicom*)

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ABSTRACT: Two field trials were conducted during two consecutive summer seasons of 2022 and 2023 at the Experimental Farm, Faculty of Technology and Development, Zagazig University at Ghazala Region, Sharkia Governorate, Egypt to elucidate the effect of nitrogen fertilizer rates as soil application and foliar spray with seaweed and dry yeast extracts on growth and fruit yield of tomato hybrid (Master R.S.). Treatments included three rates of nitrogen applications (0, 50 and 100 kg/fed) and foliar spray with seaweed extract (2 g/L) and yeast extract (4 g/L). The experiment was laid out in split plot design with three replicates, where the main plot was nitrogen fertilizer rates and the sub-plot was foliar spray with seaweed and dry yeast extracts. The results indicated that nitrogen at the rate of 100 kg/feddan, seaweed extracts (2 g/L) and their interaction effect between them caused an increase in growth characters; plant height, number of leaves, plant dry weight and fruit yield; fruit length, number of fruit/plant, and fruit yield/plant. Consequently: It can be concluded that nitrogen at the rate of 100 kg/feddan and foliar spray with seaweed extracts at 2 g/L and dry yeast extract (4 g/L) increased plant growth characters and fruit yield of tomato cv. hybrid Master R. S.

Key words: Nitrogen fertilizer, Seaweed extracts, Dry yeast extracts, Tomato.

INTRODUCTION

Tomato is one of the paramount fruit vegetable grown around the globe and is terms of area it ranks next to potato, whereas, as a processing crop it ranks first in the world. Tomato (*Solanum lycopersicom*) is one of the most important, as well as popular vegetables all over the world, as well as in Egypt. It belongs to family Solanaceae. It is found in the market throughout the year months. In Egypt, tomato represents one of the most important vegetable crops for local consumption and exportation (Nouret *et al.*, 2010). It is widely used as salad as well as for cooking purposes. It is well known for its nutritional importance as it is the rich source of nutrients Na, K, Fe, vitamin A

and C and antioxidants, especially lycopene and salicylate. Lycopene is a powerful antioxidant that acts as an anticarcinogen. Tomato fruits are also an outstanding source of ascorbic acid, and are main source of vitamin C next to pepper and citrus (Nemonsa and Tesfaye, 2019).

Tomato needs to macro-nutrients like nitrogen and bio-stimulants, *i.e.* seaweed extract and dry yeast extract. Nitrogen plays an important role in growth and development process of the plant and encourages vegetative growth (Abd El-Rahman, 2001). Seaweed extract is a natural organic fertilizer which promotes faster seed germination, plant growth, yield and is highly nutritious to plants (Abou El-Yazied and Mady, 2011). Moreover, seaweed extract contains regulators, plant growth hormones, carbohydrates,

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auxins, gibberellins and vitamins, and helps to maintain soil fertility and plant growth and yield of plant (Zodape, 2001).

In addition, it is cost effective and eco-friendly for sustainable agriculture and the fertilizer obtained from seaweed extract is bio degradable, non polluting, non toxic and non-hazardous to humans, animals and birds (Massimiet al., 2020).

Yeast is a bio-stimulant and a natural source of cytokinin, which is responsible for stimulating the process of cell division and elongation, as well as the synthesis of protein and nucleic acid and chlorophyll formation (AbouElGhit, 2020).

Besides of that dry yeast extract is considered a natural of thiamine (B1), riboflavin (B2), niacin (B3), pyridoxine (B6) and cobalamin (B12) vitamins, as well as several nutrients and organic compounds (proteins, carbohydrates and lipids which leading to a balance between physiological and biological processes, and caused an increase in photosynthesis and an improvement in the plant growth traits plants in general (Al-Mousawiet al., 2024).

Consequently, this study was aimed to improve growth and yield traits of tomato plants by using nitrogen fertilizer and some bio stimulants extracts (seaweed and dry yeast).

MATERIALS AND METHODS

The experiments were conducted at the experimental farm of Faculty of Technology and Development, Zagazig University at Ghazala Rejion, Sharkia Governorate, Egypt during growing seasons of 2022 and 2023 to investigate the effect of nitrogen fertilizer soil application and foliar spray with seaweed and dry yeast extracts on the growth and yield of tomato plants cv. Master R.S. The soil analyses of the field experimental are presented in Table1.

The experiment included 9 treatments, which were the combination of three nitrogen fertilizer rates (0.0, 50 and 100 kg N/feddan) as soil application and three foliar spray of plant extracts (0.0, seaweed and dry yeast). Seaweed extract (Alga tun 80%) as powder contains of nutrients, phytohormones, amino acids, vitamins and some Algae (*Ascophyllum nodosum*) (Table2). It was obtained from El-

Salhiacompany for intermediate chemicals at New Salhia City, Sharkia Governorate, Egypt (Table2).

Dry yeast extract as powder was obtained from Market contains nutrients, hormone, amino acids and some vitamins (Table3).

Treatments were arranged in a split plot design with three replicates, where the nitrogen fertilizer rates were assigned in the main plots, while the plant extracts (seaweed and dry yeast) were distributed in sub plots. The seeds of tomato cv. Master R.S. were sown in nursery foam trays with soil of peatmoss and mixed with vermiculite and perlite (1:1:1) on 4th and 5th of March in 2022 and 2023 seasons, respectively.

The seedlings were transplanted on 7th and 10th of April 2022 and 2023 seasons, respectively. The plot area was 15 m² (plants were spaced at 40 cm apart, 3 dripper line 4 m in length, 1.25 m in width with about 30 plants, in every plot. One dripper line was left between each two plots without spraying as a guard row to avoid the contamination of spraying solution. One dripper line (5 m²) was earmarked for samples and the two other dripper lines (10 m²) were earmarked for estimating yield and its components.

Seaweed extract (2 g/L) and dry yeast extract (4 g/L, dissolved in tap water and added one small spoon from sucrose sugar to activate the fungi), The plant extracts (bio stimulants) were applied as foliar spray three times ten days intervals, the first one at 30 day after transplanting, and the other two sprays at ten days intervals (30, 40 and 50 days after transplanting. The control treatment was sprayed with tap water.

Nitrogen fertilizer rates were added at two equal portions, at 30 and 45 days from transplanting as soil application.

The normal agriculture practices of tomato plants under drip irrigation system were followed according to the recommendations of Egyptian Agriculture Ministry.

In this study, the treatments were carried out as follows:

Table1. The physical and chemical properties of the experimental soil (average of both seasons)

Content	Value
Sand (%)	20.6
Silt (%)	40.8
Clay (%)	38.6
Soil texture	clayloam
Field capacity (FC)	6.7
Water holding capacity	14.3
Organic matter (%)	0.04
Available N (ppm)	6.3
Available P (ppm)	6.1
Available K (ppm)	61
Calcium carbonate (%)	0.23
pH	7.9

Table 2. The chemical analysis of used seaweed extract

Components	Value
Moisture (%)	6.3
Organic matter (%)	43.6
Ash (%)	53.0
Micro. elements:	
Total nitrogen (%)	1.5
Available P ₂ O ₅ (%)	2.8
Soluble K ₂ O (%)	20.5
Magnesium (Mg) (%)	0.3
Calcium (Ca) (%)	0.2
Micro. elements: (pmm)	
Boron (B)	113.0
Iron (Fe)	130.0
Copper (Cu)	10.20
Zinc (Zn)	53.0
Vitamins (ppm)	
B1	6.2
B2	5.5
B12	5.1
Ascorbic acid (V.C)	280

Table 3. The chemical analysis of used activity dry yeast

Characters	Value
Protein (%)	34.87
Ash (%)	7.55
Glycogen (%)	6.54
Fats (%)	2.09
Cellulose (%)	4.92
Free Amino Acids	8.91
Nucleic Acids (RNA+ DNA fragments)	2.97
Micro-components (mg/L)	
Vitamins:	
B1(Thiamine)	0.25
B2 (Riboflavin)	0.08
B3 (Niacin)	1.60
B5 (Pantothenic acid)	0.14
B6 (Pyridoxine)	0.12
B7 (Biotin)	0.008
B9 (Folic acid)	0.12
Minerals :	
K	78.3
P	65.4
Mg	9.2
Ca	2.2
Fe	0.6
Zn	0.2

Main Plots (Nitrogen Fertilizer Rats)

- 1- Control (without nitrogen fertilizer addition)
- 2- 50 kg/feddan
- 3- 100 kg/feddan

Sub Plots (Plant Extracts, Bio Stimulants)

- 1- Control (Tap water)
- 2- Seaweed extract (2 g/L)
- 3- Dry yeast extract (4 g/L)

Data Recorded**Plant growth characters**

A random sample of three plants was taken from every plot at 60 days from transplanting in both growing seasons. For measure menting the vegetative growth characters, i.e. plant height (cm), number of both leaves and branches/plant, fresh and dry weight of leaves and shoots.

The samples were dried in an electric oven at 70°C till constant weight.

Fruit yield and its components:

Fruits of each plot were harvested at full-ripe (maturity) stage, and then counted, weighed and the following data were recorded,i.e. number of fruits/plant, fruit length (cm), fruit diameter (cm), fruit weight (g) and fruit yield/plant (kg).

Statistical Analysis

Obtained data were subjected to the analysis of variance according to **Gomez and Gomez(1984) split-plot**. Least significant difference (LSD) was used for the comparison among treatments using SAS software program (SAS, 2004).

RESULTS AND DISCUSSION

Plant Growth Characters

Effect of nitrogen fertilizer rates

Data in Tables 4, 5 and 6 show the effect of soil application with nitrogen fertilizer rates on vegetative growth of tomato plants. It is obvious from the data that the highest rates of applied nitrogen fertilizer 50 and 100 kg N/fed led to a marked stimulative effect on growth parameters expressed as plant height, number of leaves, number of branches, fresh of leaves and shoots, and dry of leaves and shoots as compared with the control treatment (0.0 kg/fed) in both growing seasons.

The results might be attributed to the beneficial effect of nitrogen as an important role in growth and developments processes of the plant and encourage vegetative growth (**Haqueet al., 2011**).

These results are in agreement with those reported by **Kumaret al. (2013)**, **Edossaet al. (2013)**, **Nemomsa and Mulu (2019)** and **Shewangizawetal.(2024)**. They concluded that nitrogen fertilizer increased tomato growth parameters.

Effect of bio stimulants (seaweed and dry yeast extracts)

Data presented in Tables 4, 5 and 6 reveal that there was a significant difference between seaweed extract and dry yeast extract in plant height, number of leaves and shoots, plants fresh weight and plant dry weight of tomato plants. The highest values of vegetative growth characters were recorded by seaweed extract followed by the dry yeast extract compared to control treatment.

Regarding the effect of seaweed and dry yeast extracts on vegetative growth characters, **Nouret al. (2010)** demonstrated that seaweed extract contain naturally occurring supplying nutrients, plant growth hormones (auxins, cytokines and gibberellins) as well as other plant bio stimulants, i.e. amino acid, vitamins that could maintain photosynthetic rates, improve plant resistance, delay plant senescence and control cell division (**Awadet al., 2006; Nouret al., 2010**). These results matched with those reported by **Zodapeet al. (2011)**, **Senadet al. (2018)** and **Peymanet al. (2022)** who used seaweed extracts as foliar spray on increased the tomato seedlings.

Moreover, dry yeast extracts increased plant growth characters of tomato, where **AbouElGhit (2020)** demonstrated that dry yeast is one of the bio-fertilizers that provide safe plant nutrition and free of any environmental damaging products. It is very rich in amino acids, and when yeast is put in water, it hydrolyses (i.e., formord extracted as a results of internal enzymes activity without the addition of external enzymes) to a large number of vitamins and mineral salts, amino acids, and the most important of then all is the cytokinin hormone, which is considered to activate the roots and increase the vegetative growth rate in the first ages of the plant life.

These results are in close agreement with those reported by **Abou El-Yazied and Mady (2011)**, **Yasamenet al. (2023)** and **Al. Mousawiet al. (2024)**, who indicated that dry yeast extract increased plant growth characters of tomato plants.

The interaction effect between nitrogen fertilizer rates and bio stimulants (seaweed and dry yeast extracts)

According to the effect of the interaction between nitrogen fertilizer rates (0, 50 and 100 kg N/feddan) and bio stimulants (seaweed extract at the rate of 2 g/L, and dry yeast extract at the rate of 4 g/L) on growth parameters of tomato plants, it is obvious from data in Tables 7, 8 and 9 that the interaction treatments reflected a significant effect on plant growth characters.

The highest values were obtained from the interaction between the highest rate of nitrogen fertilizer (100 kg N/feddan and 2 g/L seaweed extract), followed by the treatment of 100 kg N/fed. with 4 g/L dry extract, respectively. These results are true in both growing seasons.

Table 4. Effect of nitrogen fertilizer rates and bio-stimulants on plant growth characters of tomato plants during 2022 and 2023 seasons

Treatments	Plant height (cm)		No. of leaves		No of Branches	
	2022	2023	2022	2023	2022	2023
	season	season	season	season	season	season
N rates:						
0	47.08	45.63	51.31	43.64	5.97	5.92
50	52.59	51.29	59.81	59.82	6.46	6.47
100	56.82	55.33	64.47	63.84	6.75	6.74
L S D (0.05)	3.17	4.01	3.23	3.25	0.13	0.21
Bio-stimulants extracts:						
0	44.01	44.10	46.53	45.34	5.43	5.44
Seaweed	57.67	54.88	65.81	65.92	6.98	6.95
Dry yeast	54.81	53.27	63.26	56.04	6.77	6.74
L S D (0.05)	0.25	0.44	2.17	3.22	0.14	0.13

Table 5. Effect of nitrogen fertilizer rates and bio-stimulants on fresh weight of tomato plants during 2022 and 2023 seasons

Treatments	Fresh weight (g/plant)					
	Leaves		Branches		Total	
	2022	2023	2022	2023	2022	2023
	season	season	season	season	season	season
N rates:						
0	756.373	761.16	359.3	359.23	1115.67	1120.4
50	820.03	815.30	384.29	383.4	1204.3	1198.70
100	873.78	871.80	411.66	413.07	1285.44	1284.87
L S D (0.05)	41.15	42.79	22.17	21.11	60.13	66.31
Bio-stimulants extracts:						
0	695.83	692.95	349.51	349.26	1045.35	1042.21
Seaweed	912.60	915.69	408.08	408.52	1320.68	1324.21
Dry yeast	841.75	839.63	397.66	397.91	1239.41	1237.54
L S D (0.05)	60.21	69.23	7.21	7.36	60.35	71.45

Table 6. Effect of nitrogen fertilizer rates and bio-stimulants on dry weight of tomato plants during 2022 and 2023 seasons

Treatments	Dry weight (g/plant)					
	Leaves		Branches		Total	
	2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
N rates:						
0	32.54	32.86	18.73	18.73	51.27	51.59
50	34.24	34.23	20.04	19.99	54.28	54.22
100	38.69	26.48	21.48	21.54	60.16	48.01
L S D (0.05)	2.11	2.71	0.25	0.13	2.09	2.13
Bio-stimulants extracts:						
0	29.58	29.69	18.22	18.21	47.80	47.90
Seaweed	39.04	39.33	21.28	21.30	60.31	60.63
Dry yeast	36.86	24.54	20.75	20.75	57.59	45.29
L S D (0.05)	2.21	3.42	0.81	0.78	2.31	1.42

Table 7. The interaction effect of nitrogen rates and bio-stimulantson vegetative growth characters of tomato plants during 2022 and 2023 seasons

Interaction		Plant height (cm)		No. ofleaves		No.ofbranches	
		2022	2023	2022	2023	2022	2023
		season	season	season	season	season	season
	0	41.70	41.53	41.05	41.27	5.21	5.25
0	Seaweed	51.44	48.14	57.51	56.25	6.44	6.33
	Dry yeast	48.11	47.22	55.37	33.41	6.27	6.19
	0	44.26	45.39	47.43	45.61	5.44	5.47
50	Seaweed	58.36	55.33	67.66	68.35	7.07	7.12
	Dry yeast	55.14	53.15	64.35	65.51	6.87	6.81
	0	46.07	45.39	51.11	49.15	5.65	5.61
100	Seaweed	63.22	61.17	72.25	73.17	7.43	7.40
	Dry yeast	61.17	59.44	70.05	69.21	7.17	7.22
	0	46.07	45.39	51.11	49.15	5.65	5.61
L S D (0.05)		2.11	2.26	4.07	3.06	0.12	0.1

Table8. The interaction effect of nitrogen rates and bio-stimulants on fresh weight of tomato plants during 2022 and 2023 seasons

		Fresh weight (g/plant)					
		Leaves		Branches		Total	
		2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
	0	671.17	674.27	310.90	311.67	982.07	985.94
0	Seaweed	810.44	815.59	395.68	394.14	1206.12	1209.73
	Dry yeast	787.51	793.63	371.32	371.90	1158.83	1165.53
	0	693.17	697.22	351.56	349.26	1044.73	1046.48
50	Seaweed	951.55	959.59	403.73	404.69	1355.28	1364.28
	Dry yeast	815.38	789.11	397.60	396.25	1212.98	1185.36
	0	723.17	707.37	386.09	386.86	1109.26	1094.23
100	Seaweed	975.83	971.89	424.83	426.75	1400.66	1398.64
	Dry yeast	922.36	936.15	424.06	425.60	1346.42	1361.75
L S D (0.05)		0.45	0.27	0.43	0.48	0.51	0.53

Table 9. The interaction effect of nitrogen rates and bio-stimulants on dry weight of tomato plants during 2022 and 2023 seasons

		Dry weight (g/plant)					
N		Leaves		Branches		Total dry weight	
		2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
	0	27.51	27.55	16.21	16.25	43.73	43.80
0	Seaweed	36.21	37.29	20.63	20.55	56.84	57.84
	Dry yeast	33.89	33.75	19.36	19.39	53.25	53.14
	0	30.07	30.17	18.33	18.21	48.4	48.38
50	Seaweed	37.49	37.22	21.05	21.10	58.54	58.32
	Dry yeast	35.17	35.29	20.73	20.66	55.9	55.95
	0	31.15	31.36	20.13	20.17	51.28	51.53
100	Seaweed	43.41	43.49	22.15	22.25	65.56	65.74
	Dry yeast	41.52	4.58	22.15	22.19	63.63	26.77
L S D (0.05)		0.22	0.07	0.02	0.03	0.73	0.71

Fruit Yield and its Components

Effect of nitrogen fertilizer rates

Results in Tables 10 and 11 illustrate the effect of nitrogen fertilizer rates on tomato fruit yield components, *i.e.* number of fruits/plant, fruits length, fruits diameter, average fruit weight and Fruit yield/plant.

It is obvious from the data that the highest rate of nitrogen fertilizer (100 kg N/feddan) increased fruit yield of tomato, followed by the rate of 50 kg N/fed. These results are true in both growing seasons. Regarding the important role of nitrogen in increasing yield tomato, **Kumaret al. (2013)** stated nitrogen had a marked effect on photosynthesis and development of different parts in plant, then increased the Fruit yield.

These results according with those reported by **Haque (2011)**, **Edossa et al. (2013)**, **Mannino et al. (2020)** and **Melkamuet al. (2022)**. They pointed out that nitrogen fertilizer encourages vegetative growth and increased fruit yield of tomato plants.

Effect of bio stimulants (seaweed and dry yeast extracts)

The results listed in Tables 10 and 11 clearly show that foliar spray with yeast extract at a rate of 2g/L gave the highest values on fruit yield and yield components, followed by foliar spray with dry yeast extract at the rate of 2g/L, compared to the untreated plants (control).

Regarding the important role of seaweed and dry yeast extracts in increasing the fruit yield of tomato, **Nouret al. (2010)** stated that seaweed extract contain naturally occurring supplying nutrients, and plant growth hormones like auxins, cytokinins and gibberellins which promote plant growth (Tables 4, 5 and 6), and translocate carbohydrates and other compound, to fruits, then increased fruit yield. These results are agreement with those recorded by **Senadet al. (2018)** who mentioned that seaweed extract increased fruit yield and its components of tomato. In addition, **AbouElGhit (2020)** indicated that dry yeast extract had an amino acids, large number of vitamins and cytokinin hormone that stimulate cell division and promote plant growth and then increased fruit yield of tomato.

Obtained results are in harmony with those supported by **Abou El- Yazied and Mady (2011)** and **Al-Mousawiet al. (2024)** who demonstrated that dry yeast extract increased fruit yield of tomato.

Interaction effect between nitrogen fertilizer rates and bio stimulants (seaweed and dry yeast extracts)

Data shown in Tables 12 and 13 indicate that the highest rate of nitrogen fertilizer (100 kg N/fed.) with 2g/L seaweed extract, followed by 100kg N/fed. With 4g/L dry yeast extract, significantly increased fruit yield and its components.

Table10. Effect of nitrogen rates and bio-stimulants on fruit characters of tomato plants during 2022 and 2023 seasons

Treatments	No. of fruits/plant		Fruit length (cm)		Fruit diameter(cm)	
	2022	2023	2022	2023	2022	2023
	season	season	season	season	season	season
N rates:						
0	60.46	60.47	5.79	5.09	4.14	5.43
50	62.97	62.94	5.31	5.26	4.54	4.52
100	65.44	65.50	5.64	5.64	4.72	4.73
L S D (0.05)	2.21	2.17	0.22	0.32	0.13	0.13
Bio-stimulants extracts:						
0	53.91	53.94	4.35	4.30	3.63	4.96
Seaweed	68.79	68.80	6.61	5.93	4.95	4.90
Dry yeast	66.18	66.18	5.78	5.77	4.83	4.82
L S D (0.05)	1.07	1.05	0.07	0.21	0.06	0.06

Table11. Effect of nitrogen rates and bio-stimulants on fruit yield and its components of tomato plants during 2022 and 2023 seasons

Treatments	Average of fruits weight(g)		Fruit yield/Plant (kg)		Fruit yield / Feddan (ton)	
	2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
N rates:						
0	64.46	64.52	3.34	3.38	12.23	12.25
50	69.86	70.13	4.02	4.00	12.80	12.78
100	73.48	73.81	4.32	4.29	13.56	13.55
L S D (0.05)	2.21	2.12	0.27	0.22	0.05	0.08
Bio-stimulants extracts:						
0	53.07	53.42	3.15	3.19	12.71	12.72
Seaweed	81.00	81.02	4.36	4.32	13.10	13.10
Dry yeast	73.73	74.03	4.16	4.15	12.77	12.75
L S D (0.05)	4.87	5.91	0.17	0.13	0.05	0.02

Table 12. The interaction Effect of nitrogen rates and bio-stimulants on fruit characters of tomato plants during 2022 and 2023 seasons

		No. of Fruits/plant		Fruit length (cm)		Fruit diameter(cm)	
		2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
0	0	50.15	50.19	4.25	4.22	3.77	7.79
	Seaweed	67.15	67.22	7.69	5.62	4.39	4.27
	Dry yeast	64.09	64.01	5.43	5.44	4.27	4.22
50	0	53.41	53.39	4.31	4.27	3.45	3.49
	Seaweed	69.17	69.07	5.89	5.87	5.13	5.07
	Dry yeast	66.33	66.37	5.73	5.64	5.05	5.01
100	0	58.17	58.25	4.48	4.41	3.66	3.61
	Seaweed	70.05	70.10	6.25	6.29	5.33	5.37
	Dry yeast	68.11	68.15	6.19	6.22	5.17	5.22
L S D (0.05)		0.88	0.83	0.04	0.03	0.08	0.09

Table 13. The interaction effect of nitrogen rates and bio-stimulants on fruit yield and its components of tomato plants during 2022 and 2023 seasons

		Average of fruits weight(g)		Fruit yield/Plant (kg)		Fruit yield/Feddan (ton)	
		2022 season	2023 season	2022 season	2023 season	2022 season	2023 season
0	0	50.22	50.27	2.36	2.43	12.20	12.25
	Seaweed	76.47	76.55	3.89	3.96	12.25	12.29
	Dry yeast	66.69	66.73	3.77	3.74	12.23	12.21
50	0	53.11	53.19	3.47	3.49	12.71	12.75
	Seaweed	81.15	81.07	4.41	4.29	12.93	12.83
	Dry yeast	75.33	76.14	4.17	4.21	12.75	12.75
100	0	55.89	56.79	3.63	3.65	13.22	13.17
	Seaweed	85.39	85.43	4.79	4.72	14.13	14.18
	Dry yeast	79.17	79.22	4.53	4.50	13.33	13.30
L S D (0.05)		4.32	4.36	0.13	0.17	0.02	0.03

These results are true in both growing seasons.

Conclusively

It can be concluded that nitrogen fertilizer at the rate of 100 kg N/feddan, and seaweed extract at the level of 2g/L, as well as the interaction between them at the same rate and level caused an increases in vegetative growth characters and fruit yield and its components of tomato plants.

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تأثير التسميد النيتروجيني ومستخلصات الأعشاب البحرية والخميرة الجافة على نمو وإنتاجية الطماطم

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أجريت تجربتان حقليتان خلال موسمين صيفيين متتاليين 2022 و 2023 في المزرعة التجريبية بكلية التكنولوجيا والتنمية، جامعة الزقازيق بمنطقة غزالة، محافظة الشرقية، مصر، لتوضيح تأثير معدلات التسميد النيتروجيني كإضافة للتربة والرش الورقي بمستخلصات الأعشاب البحرية والخميرة الجافة على نمو ومحصول ثمار هجين الطماطم (ماستر ر.اس.). وتضمنت المعاملات ثلاث معدلات من التسميد لنيتروجيني (صفر و 50 و 100 كجم/فدان) والرش الورقي بمستخلصات الطحالب البحرية (2 جم/لتر) ومستخلص الخميرة الجافة (4 جم/لتر). ونفذت التجربة بتصميم القطع المنشقة في ثلاث مكررات، حيث كانت القطع الرئيسية هي معدلات التسميد النيتروجيني والقطع الفرعية الرش الورقي بمستخلصات الأعشاب البحرية والخميرة الجافة. وأشارت النتائج إلى أن التسميد النيتروجيني بمعدل 100 كجم/فدان ومستخلصات الأعشاب البحرية (2 جم/لتر) وتأثير التفاعل فيما بينهما أدى إلى زيادة في صفات النمو والتمثلة في ارتفاع النبات وعدد الأوراق ووزن النبات الجاف ومحصول الثمار والتمثلة في طول الثمرة وعدد الثمار/نبات ومحصول الثمار/نبات ومحصول الثمار الكلي/فدان. وبالتالي: يمكن أن نستنتج أن التسميد النيتروجيني بمعدل 100 كجم/فدان والرش الورقي بمستخلصات الأعشاب البحرية بمعدل 2 جم / لتر أدى إلى زيادة صفات النمو النباتي ومحصول الثمار في الطماطم صنف ماستر ار.اس.

الكلمات الإسترشادية: سماد نيتروجيني، مستخلصات الأعشاب البحرية، مستخلص الخميرة الجافة، الطماطم.

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