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Interaction effect of amount of irrigation water and levels of applied nitrogen on tomato yield and quality using drip irrigation

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ABSTRACT: In the current study, in order to application of nitrogen with appropriate management water in pressurized irrigation system to obtaining desired function was investigated. Also, the costs and environmental pollution in tomato tillage test as random splits was studied. The results showed that the main factor from water volume based on need water was determined in three surface 75%, 100% and 125%, and also the absolute factor of nutritional element from nitrogen as purify nitrogen was measured in four surface 0, 75, 150 and 225 kg in per hectare. This evaporates and potential were used to determine the irrigation coefficient and efficient rainfall. The potential evapotranspiration, precipitation and efficient irrigating coefficient was used to determine the need for irrigation. Also the Hager's method was used to account for evaporation and potential transpiration. Plant response include product performance and some fruit quality characteristics such as TSS, Vitamin C and pH as well as water use efficiency by using Danken analysis. According to results of this study, the effect of each factor on the surface of the water level irrigation and nitrogen N on yield and water use efficiency is another factor influenced. Also, increasing the amount of vitamin C in fruits due to an increase in surface irrigation and other results in low levels of the nitrogen. Sea-level rise at low nitrogen levels led to a reduction in water use efficiency, but it is N, T meaningful to reduce water use efficiency in the high level of increase nitrogen levels were increased nitrogen.The amount chlorophyll, the density of nitrogen in level of and the concentration of nitrate the fruits increase density and reduce nitrate in the soil due to increased levels of nitrogen will call attention to increased levels of irrigation water from other plants. Also, increasing the amount of vitamin C in fruits reached due to an increase in surface irrigation and other results in low levels of the nitrogen.

***Keywords*:** Azote, Drip, Nitrogen levels, Tomato production

INTRODUCTION

Nitrogen over any element of plant nutrition scholars have been studied. About 78% of atmospheric molecular nitrogen (N2) form a column of the atmosphere of an area of one hectare, weighs 72 tons is included, except some factors such as increasing nitrogen fertilizers are very limited. Because of consolidation in the tropics 100-25 kg per hectare per year and through the rain 20. 1 kg per hectare per year and decaying plant and animal material 25 kg per ton and gradually add it to the soil should stay moist (Barrett, 1977; Isfand 2005).

Lack of good quality water resources and development of the most important factors limiting production is the cultivation of tomatoes in the province. In addition to reducing the increasing quality of groundwater contributes to the problem and the need for efficient use of existing water resources is necessary. Many factors including

irrigation systems, remote management, irrigation depth and effective water use efficiency (Thompson et al., 2016). Nitrogen including elements dietary required for plant. Due to the significant role in the production of agricultural products including tomato and its application in agriculture in arid and semi-arid alternative is necessary and inevitable shortage of soil organic matter (Tohmpson & Doerge, 1995; Cheralier, 2001).

Among of important crops, the vegetables the daily food of millions of people around the world gained attention in scientific communities and the world to examine the most important sources of food sanitation and agriculture is likely to draw. Agriculture has been formed, and it has continued to the present. This indicates the importance of food and its role in human life (Bolton, 1990). Tomatoes after potatoes is one of the most important eggplants family that it is used in human nutrition. The use of fruits including vegetable consumption is very important, becuase these fruits including many necessary vitamins for human (Jian & Gzheng, 2009; Burman et al., 2011). Tomato is one of the most important vegetables in terms of vitamins C and A, and this fruit plays an important role in public health (Loccatus & Botez, 2017). Tomato have high energy (about 20 calories), so this fruit use in many countries as an important source of vitamins and minerals as well as salad greens (Bremner, 2000). The objective of study was to investigation of interaction effect of amount of irrigation water and levels of applied nitrogen on tomato yield and quality using drip irrigation.

MATERIALS AND METHODS

View the location and method of the project

This study was conducted in the agricultural center of Zimnicea province. The list of soil test including Coarse Loamy, Carbonatic, Hyer thernic, ustic Torror Thens and some of its properties presented in Table 1 and Table 2. The average annual precipitation is about 257 mm and 4000 mm annual evaporation rate.

Table 1. Some of the physicochemical properties of soil to plan

K	P	Clay	Silt	Sand	O.C	CCE	SP	Soil deep	PH
mgkg.1			0.0		dSm.1 (cm)				
30	-	7.6	7.1	37.5	55.4	0.43	58	31 9.3	9.7	140

Table 2. Some characteristics of irrigation water

Na^+	SO_4^{2-}	Ca_2^+	Mg^{2+}	Cl^-	HCO^{3-}	pH	EC
Meq. Lit-1				(ds.m-1)			
12	39	37	7	3	7.9	3.8	2.9

Experimental design

The experiment split-plot in a randomized complete block with two factors (including: nutrient nitrogen and water on Tomato plant) was used. Also, the main factor of irrigation water in three levels of 75%, 100% and 125% crop water requirement and sub-plots as well as nutrient nitrogen zero, 75, 150, 225 kg ha nitrogen were used.

Seed selection, land and transplanting tomato

Seed selection was the first step in the implementation of the plan. Thus, based on research by the seed and plant improvement Zimnicea agricultural research Center, adaptable and most productive tomato seeds sent the college selection 99% purity and germination was 85%. The average number of fruit per plant early varieties of dwarf and 34-30 numbers and average weight of fruit 55 -50 grams. After selecting seeds to prepare treasury was developed. Land that in terms of fertility, uniform and at least 3 years of its history, the plowed soil moisture and then disking operations. Testy to build an atmosphere of action and then transplanting tomato plant was transferred to the main land.

Fertilizers, watering and fertilizing operations

Fertilizer from the bottom of the predicted values in treatments every two to three weeks, and the total was consumed during the 10th stage. Other nutrient requirements and recommendations based on soil test soil and water research, as well as 20 tons per hectare sheep manure was applied equally in all treatments. Notes: the notes are necessary, including the time of irrigation, fertilization, combating weeds, spraying against pests and

diseases, time of flowering, fruit ripening, harvesting and product weighing, measuring length and diameter and the average weight of each fruit in China various took place.

Laboratory operations soil, leaves and fruit

The leaves at the time China was second and leaves near fruit harvesting and weighing the samples sent to the laboratory, and fruit quality characteristics were determined. Tests on soil samples of soil before transplanting tomatoes composite relevant preparation and testing was conducted in agricultural research center of Moara domneasca and Zimnicea on them. Kajeldahl method, total nitrogen, phosphorus and sodium bicarbonate extraction by Olsen or intensity of color with the substrate, available potassium and ammonium acetate extraction methods extract Flaym photometry measurements of potassium, calcium and magnesium solution by titration, TNV percent to titration with acid soil texture by the hydrometer methods of organic carbon in organic oxidation, pH with a pH meter and the electrical conductivity of soil saturation extract with a conductivity meter was used. To measure the micronutrients iron, manganese, zinc and copper absorption DTPA extraction method first, then by atomic absorption was read.

Sampling, analysis leaf to leaf analysis, determine the status of the main elements, micronutrients in front of tomato plant leaves, fruit, from all the treatments and 3 replications were sampled. Soil and water samples to the laboratory immediately Agricultural Research Center, Zimnicea and washing steps were taken. Once the samples are dried, milled and prepared for analysis were necessary. Measuring key elements to conventional methods at the Institute of Soil and Water Research conducted the wet digestion method (Wet digestion) for the measurement of K, P, N and digestion method on how to burn dry (Dry digestion) for the measurement of Zn, Mg, Ca, Mn, Fe, Cu was used. The measurements were carried out in this way and by means of Micro kajeldhal total nitrogen, phosphorus by colorimetric spectrophotometer, a device Flaym potassium and calcium and magnesium were evaluated in Zimnicea agricultural research center of Cu, Zn, Mn, Fe atomic absorption machine in Moara Domneasca was measured.

Tests related to quality characteristics of tomatoes

In China thirds of all treatments in 3 replications sample of more than 2 kilos picked up was sent to the Research Institute of Agricultural Engineering. Hunter lab system using the following components include color texture, firmness with texture, soluble solids using a refractometer, pH or the dominant acid titration using phenolphthalein adjacent normal profit 2%, Vitamin C from eudiometry method or manual testing (iodine test Method) and density hydrometric method was used. The density was observed in all extracts equal to 024.1. Using a pH meter was used to determine the degree of fruit juices from Hunter lab system.

Check nutrients remaining in the soil after harvest of tomatoes

Macro, Micronutrients and chlorine under the influence of different fertilizer treatments after harvest before planting them set and the values were compared and analyzed.

Statistical analysis

Data was analyzed by MSTATC software, and the corresponding averages were compared by Duncan's multiple range test. SPSS software was used for Normalization of data and ANOVAs analysis.

RESULTS

In this study, SPSS software was used for normalization of data and ANOVAs analysis, and the results of this analysis presented in Table 3.

Table 3. Analysis of variance in tomato plant

Square means					Free degree	S.O.V
Vitamin C	PH	Performance(ton/ha)	WUE(kg/m3)	clorofil		
15.344	0.012	46.328	2.666	37.552	2	block
102.044 **	0.032 *	107.827 ns	18.896 ns	3.097 n.s	2	Water treatment
33.331	0.004	627.303	16.884	5.465	4	error
13.347 n.s	0.005 n.s	2655.980 **	60.602 **	63.084 **	3	N treatment
26.510 n.s	0.011 n.s	276.813 *	4.481 *	3.999 n.s	6	Corresponding effect

9.730	0.006	78.878	1.716	7.416	18	error
6.53	1.77	14.26	13.28	5.90	CV	

** Significant at P * ns significance at 5% level of significance

Continued Table 3

Square means						Free degree	S.O.V
Fruit w (gr)	%leaf azote	No (ppm)soil	No3 (ppm)fruit	TSS	acidity		
88.361	1.209	3.583	0.071	0.005	37.713	2	block
253.028 n.s	0.441 n.s	9.750 *	0.120 n.s	0.333 *	28.755 n.s	2	Water treatment
132.111	0.428	0.708	0.053	0.025	369.969	4	error
125.148 n.s	1.882 **	19.184 **	0.447 **	0.447 **	9544.174 *	3	N treatment
8.065 n.s	0.593 n.s	2.120 n.s	0.026 n.s	0.129 **	4738.104 n.s	6	Corresponding effect
009.44	354.0	852.0	080.0	032.0	538.2853	18	error
90.15	94.14	51.20	76.36	3	26.17	CV %	

The results of laboratory analysis of soil and water:

Soil physical and chemical analysis:

Physico-chemical analysis of the soil presented in Table 4, and calcareous soil (calcium carbonate equivalent of 2.61 percent), texture Sandy Loam and sweet soils are quite poor in terms of food (all elements following the food crisis).

The results of chemical analysis of water:

The results of Table 5 showed that the suitability of water quality for irrigation tomatoes due to the nature of the soil. C4s1 irrigation water temperature were determined. 7.3 Siemens per meter dessert Soviet irrigation water and the chlorine was 5.8 mEq per liter.

Table 4. Physical and chemical properties of the soil before planting tomatoes 1378

body	Ros	Cl	Fe	Cu	Mn	K	p	Mg	Ca	O.C	T.N.V	PH	EC	%	deep
soil														saturate	soil
	%									**%**	**%**		DS.M		Cm
Sandy loom	12	60.53	8.2	76	76	0.17	140	0.19	276	580	0.39	6.21	3.4	30	-300

Table 5 .Irrigation water chemistry tomato crop year 1378

SAR	Na	bicarbonate	Ca, Mn	cl	acidity	conductivity	Sample properties
mEq.l						DS.M	3 WELL
2.79	12	4.5	37	5.8	7.6	3.7	agricultural center of Zimnicea province

The results of the effect of different amounts of nitrogen, water and their mutual influence on the performance of tomato presented in Table 6. It is clear the comparison of the main effects of Nitrogen factor on product performance, and this results shows with an average use of this nutrient up to 150 kg per hectare increased yield. Also, higher values is not significantly different from the levels of nitrogen. As with the application of 150 kg nitrogen per hectare Nitrogen have seen 85% performance increase .Therefore, statistical analysis by Duncan test the treatment effect of nitrogen on tomato yield increase was significant at the one percent level. Comparison of the effects of water bills the consumer on product performance also showed that this treatment had a significant effect on performance enhancement. It has not been so consumed 100% water requirement to use 75% only 7% performance increase with consumption of 125 water requirement.

Table 6. The effect of water and nitrogen on tomato yield (Tonnes per hectare)

	water use based on needs			
mean	125%	100%	75%	N (kg.ha) range
42.789 C	43.3 CD	43.367 CD	41.7 D	0
45.389 BC	43.967 BCD	45.7 ABCD	46.5 ABCD	75
47.589 AB	48.633 ABC	47.867 ABC	46.267 ABCD	150
48.811 A	49.767 A	48.9 AB	47.767 ABC	225
	46.417 A	46.458 A	45.558 A	mean

Averages in each column or row a common uppercase or lowercase letters presented in Figures 1, 2 and 3 that have shared an average of no significance Duncan test at 5%.

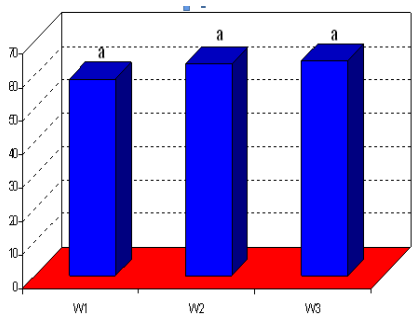

Figure 1. Effect of different irrigation levels on yield

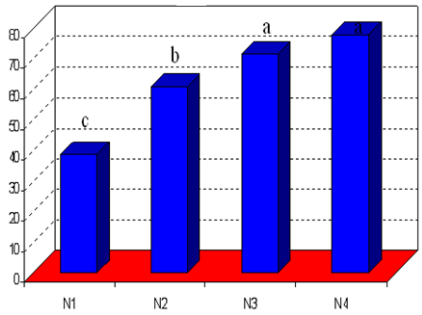

Figure 2. Effect of nitrogen on yield (Ton /ha) Tomatoes

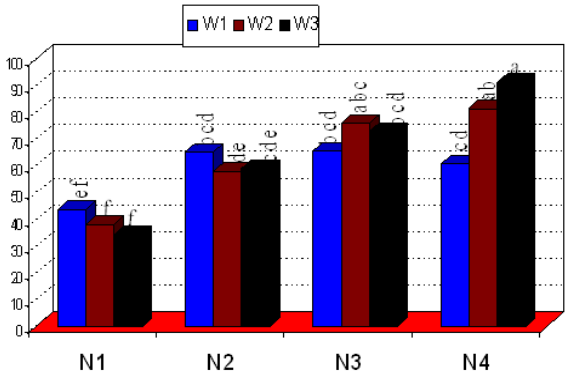

Figure 3. The effect of nitrogen on yield under different irrigation levels

The results of the impact of nitrogen and water and their interaction on tomato fruit weight:

The results of presented in Table 7 is clear compare average main effect factor nitrogen on Tomato fruit weight gain tomato fruit. Statistical analyzes suggested that the different levels of this nutrient had significant effects on weight gain tomato fruit. Investigate the interactions between nitrogen and water the plant response shows with increasing levels of irrigation water. The effect of nitrogen on increasing fruit weight resonance will not be overwhelmed with 100% water demand, adding 75 kg N ha only 1% and the addition of 150 kg. Only 6% nitrogen, and 21% by weight of fruit with the addition of 255 kg of nitrogen was added. In this experiment, different levels of irrigation and nitrogen levels and their interaction had no significant effect on fruit weight gain.

Table 7. The effect of water and nitrogen on fruit weight (g) Tomatoes

	Water use based on need			
mean	125 %	100 %	75 %	(Kg/ha)N range
b 778.37	333.42 ab	b 38	b 33	0
ab 444.4	ab 333.45	b 333.38	b 6667.6	75
ab 42	ab 46	b 333.40	b 667.39	150
a 667.42	a 333.53	ab 46	ab 667.5	225
	a 75.46	a 667.40	a 75.37	mean

Averages in each column or row a common uppercase or lowercase letters have shared an average of no significance Duncan test at 5% and presented in Figures 4, 5 and 6.

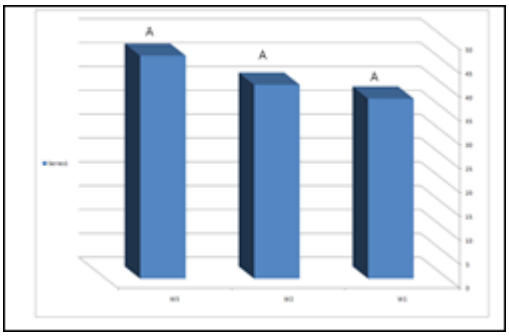

Figure 4. The effect of different levels of irrigation water on average fruit weight

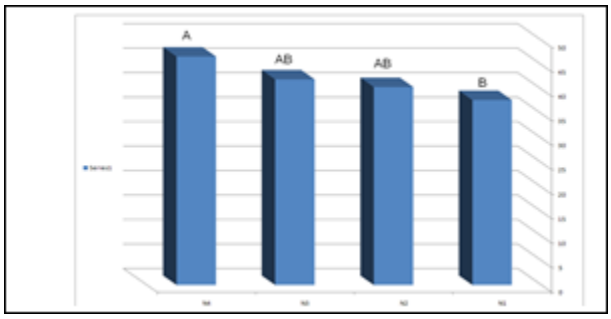

Figure 5. Illustrates the effect of different levels of nitrogen on fruit weight (g) tomatoes

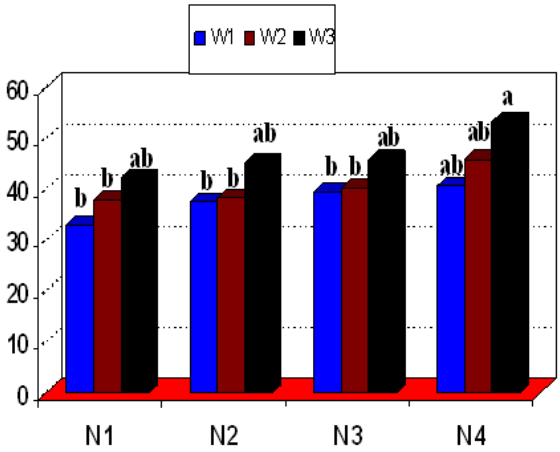

Figure 6. The effect of nitrogen on average fruit weight at different levels of irrigation

The results of the Nitrogen and water consumption and their interaction effects on water use efficiency in tomato:

The results of statistical analysis of the main effect of nitrogen on the surface of a percentage factor and two-factor interactions were imposed on water use efficiency, and also it was significant at 5%. Comparison of the average of water use efficiency also showed product performance under the influence of each factor applied to the plant response under the influence of other levels. As at 75% of the water requirement of nitrogen application only up to 75 kg per hectare increased water use efficiency and significant difference and it does not exist between the levels of nitrogen and 75 kg. But at 150 and at 125% 100% water requirement, water requirement of 225 kg nitrogen per hectare significantly increased water use efficiency (Table 7). Also, the results of this Table 7 shows in terms of nitrogen or at low level this nutrient increase the amount of irrigation water reduced efficiency water consumption, but high levels of nitrogen had no significant effect on the plant response. Therefore, in terms of nitrogen, increase the water requirement of irrigation water from 75% to 125% water requirement from 239.8 to 578.4 reduce water use efficiency is kilograms per cubic meter. In the 75 kg N per hectare reduced from 307.12 to 869.7 and in the presence of 150 kg nitrogen per hectare from 4.12 to 72.9 kg per cubic meter dropped. But in the presence of 225 kg nitrogen per hectare increased levels of irrigation had no significant effect on reducing water use efficiency (Table 7).

The effect of nitrogen on water use efficiency in irrigation water levels, and it can be attributed to an increase in Mlkrdmhsvl under these conditions. According to a March (Isfand, 2005) in low soil moisture, nitrogen application not only a positive effect on corn yield and water use efficiency no longer have adverse effects **.**But in conditions of high humidity soil nitrogen fertilizer application, water use efficiency is significantly increased. Loccatus and colleagues (Burman et al., 2011) by analyzing levels of water, nitrogen and phosphorus on wheat plants under greenhouse conditions which have reported severe water stress, the use nitrogen to reduce the potential root water, evapotranspiration and leaf area while moisture is adequate in terms of positive effect on plant responses have been mentioned (Table 8).

Table 8. the effect of water and nitrogen on water use efficiency in tomato (kg . m3)

mean	Water use based on need			N (kg.ha) range
	125%	100%	75%	
6.265 c	4.578 e	5.979 de	8.239 cd	0
9.742 b	7.869 cd	9.05 c	12.307 a	75
11.334 a	9.721 bc	11.878 ab	12.402 a	150
12.117 a	12.181 a	12.734 a	11.435 ab	225
	8.587 a	9.91 a	11.096 a	mean

Averages in each column or row a common uppercase or lowercase letters presented in Figures 7, 8 and 9, and they have shared an average of no significance Duncan test at 5%.

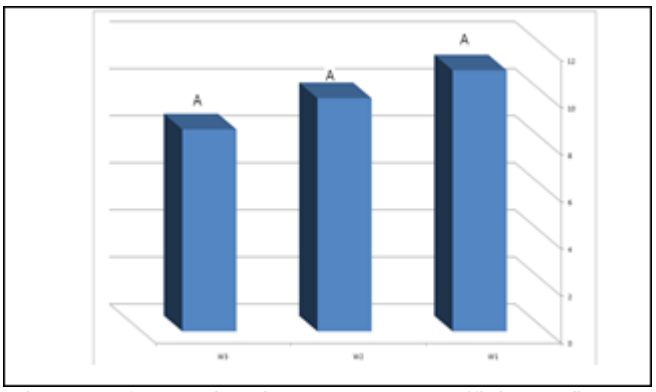

Figure 7. The impact of water levels on water use efficiency (kg . m3) tomatoes

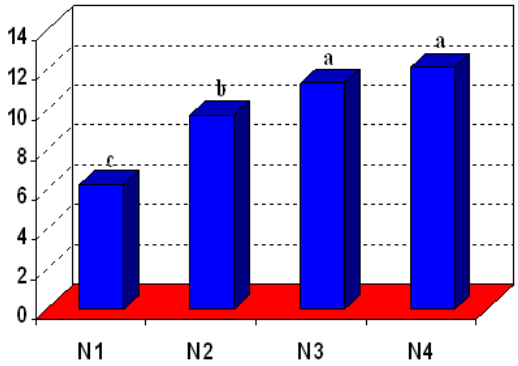

Figure 8. Effect of nitrogen (kg / ha) on water use efficiency in tomato

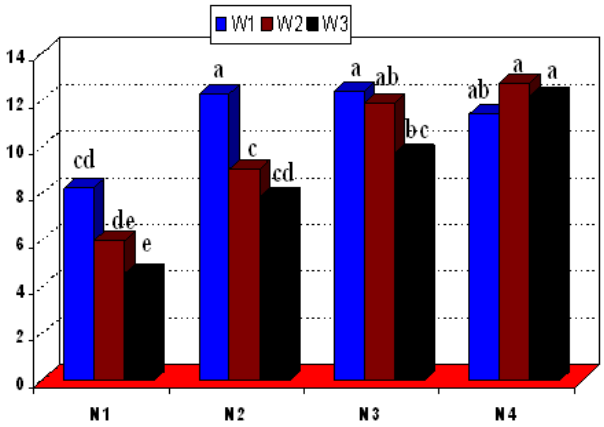

Figure 9. The effect of different levels of nitrogen on water use efficiency in irrigation

Comparison averages Vitamin C Fruit:

The rise in water level irrigation particular in the absence of nitrogen and 75 kg of nitrogen per hectare. The consumption of fruit was associated with increased doses of vitamin C in high levels of nitrogen in the plant response therefore has no significant effect (Table 9). However, the main effects of nitrogen factor on vitamin C in fruit not significant, but investigate the interactions between nitrogen and water consumption showed that in the 75 and 100% of water and irrigation, increased nitrogen significant effect on vitamin C not yet at the level of 125% of 150 or 225 kg N resulted in a significant reduction in the amount of vitamin c in fruit (Table 9).

Table 9. The effect of water and nitrogen on tomato vitamin C

mean	Water use based on need			N range)Kg.ha(
	125 %	100 %	75 %	
a 884.47	a 4.55	c 8.46	c 533.43	0
a 227.43	ab 213.53	bc 16.48	c 3.7.43	75
a 249.46	bc 16.48	c 573.43	c 13.47	150
a 751.34	bc 16.48	c 933.46	bc 16.47	225
	a 143.13	b 187.46	b 3.46	means

Averages that in each column or row a common uppercase or lowercase letters presented in Figures 10, 11 and 12 that have shared an average of no significance Duncan test at 5%.

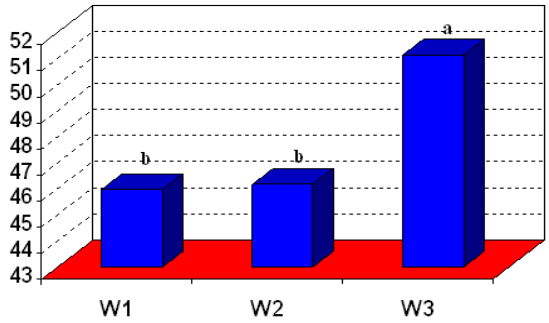

Figure 10. The impact of different levels of vitamin C tomato juice

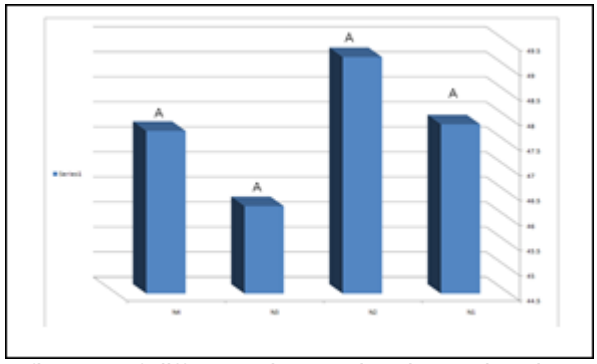

Figure 11. Influence of different nitrogen levels on vitamin C. Tomatoes

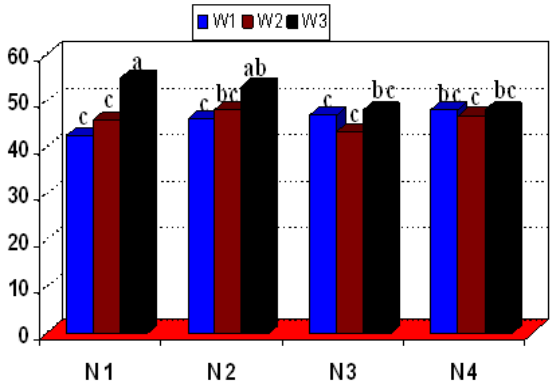

Figure 12. Influence of different levels of nitrogen on irrigated Tomato Vitamin C

The results of the effect of different amounts of nitrogen and water, and their mutual influence on the acidity of tomatoes (mg per 100 g)Tomatoes acid is mainly citric acid, acidity on the same principle. It is calculated on the

basis of citric acid. Obviously acidity such as malic acid in the tomatoes are dark and blurry. The results of Table 10 is clear Comparison of the effects of nitrogen on the acidity of the tomato fruit, and it was the main factor nitrogen application increased. The fruit is on acidity and this increase, and it has had a significant difference at 5% level. A survey conducted by the application of 75 kg nitrogen, 20% and 23% of 150 kg and 225 kg N per hectare consumption of fruits Tomato Committee acid 28% is added to the lack of nitrogen. Comparison average nitrogen levels in water the acidity of the tomato fruit. It shows that the treatment had no significant effect on the increase in the acidity of the tomato. The fruit is consumed as a 100% water requirement of 28% was added to the acidity of the fruit, and the use of 125% water requirement will be reduced by 2% of fruit acidity. Interactions mentioned treatment the survey revealed that no significant effect is not increased acidity of the tomato fruit as with consumption of 75% water requirements. The application of 75 kg N/ha 16% increase and the application of 225 kg N/ha 150 kg of 14% of the acidity of the fruit is reduced. The same formula is repeated with different levels of irrigation water nitrogen levels, and no significant effects were is not observed. Bremner (2000) a similar trial arrived to this conclusion with nitrogen the soil along with irrigation water increased sugar content in fruits and plants are forced to hold water potential and this action increases the acidity of the fruit is sent.

Table 10. The effect of water and nitrogen on tomato vitamin C

Mean	Water use based on need			N range)Kg/ha(
	125 %	100 %	75 %	
b 363.262	abc 67.269	c 8.266	bc 947.267	0
a 52.315	abc 44.239	307.343 ab	abc 813.309	75
A769.434 a	abc 56.326	abc 88.288	ab 867.355	150
a 329.366	abc 187.318	a 173.385	abc 627.306	225
	a 627.305	a 86.310	a 813.345	mean

Averages that in each column or row a common uppercase or lowercase letters that have shared an average of no significance Duncan test at 5% and presented in Figure 14, 15 and 16.

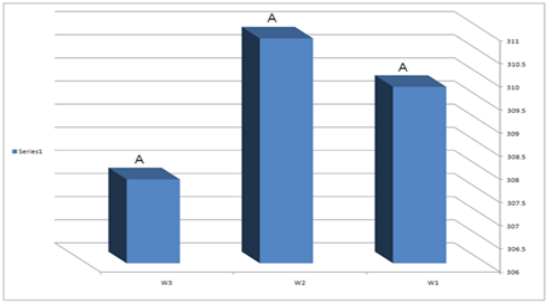

Figure 13. Effect of water on the acidity of tomatoes

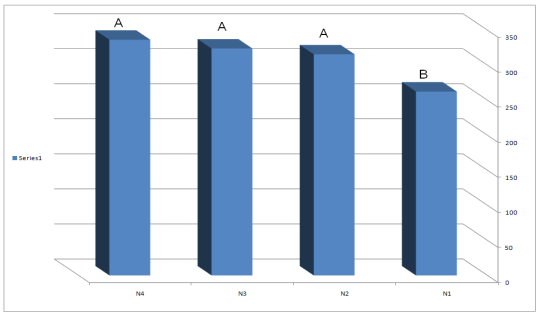

Figure 14. Influence of different nitrogen levels on the acidity of tomatoes

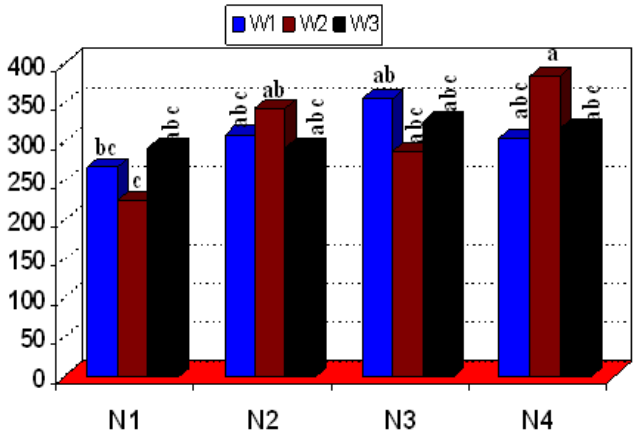

Figure 15. Effect of water and nitrogen on the acidity of tomatoes

Results of the impact of nitrogen water consumption and the interaction between them:
The amount of nitrate and in tomato juice as well as other factors that affected by nitrogen levels. It placed And different levels of consumption significant differences in soil nitrate in the juice showed a percentage increase. The trial of the 75, 150 and 225 kg N per hectare increased the amount of nitrate in the juice of 554.0 mg in the average levels of nitrogen, respectively, 672.0, 794.0 and 067.1 mg per liter respectively (Figure 23). We can see in Table 11 of different levels of water use based on water demand and water demand or interactive effects of different levels of nitrogen effects will not be significant. Cheralier (2001) in similar experiments on pea found that increased levels of nitrogen in nitrate concentration has increased. This is due to the hydrolysis of urea to ammonia and carbon dioxide in the soil mentioned and explained that the ammonia is oxidized to nitrate by chemical processes.

Table 11. The effect of water and nitrogen on tomato fruit

Mean	Water use based on need			N range)Kg.ha(
	125 %	100 %	75 %	
b 544	bc 6	c 5	bc 533	0
b 672	667 bc	abc 733	bc 617	75
ab 794	abc 933	abc 8	bc 65	150
a 67.1	a 267.1	ab 67.1	abc 867	225
	a 867.1	a 755	a 667	mean

Averages that in each column or row A common uppercase or lowercase letters that have shared an average of no significance Duncan test at 5% and presebted in Figures 16, 17 and 18.

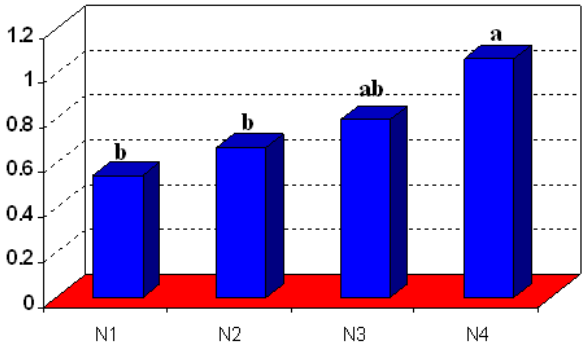

Figure 16. Effect of water on nitrate concentration (ppm) in tomato fruits

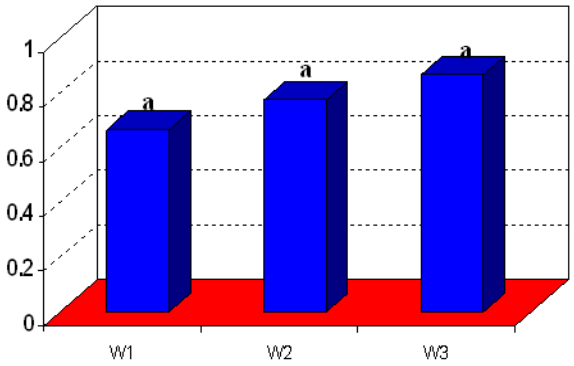

Figure 17. Influence of different nitrogen rates on nitrate concentration (ppm) tomato fruit

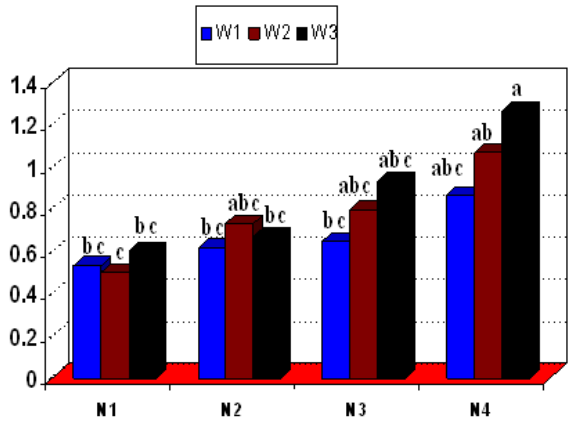

Figure 18. The interaction of different levels of nitrogen and water use in tomato fruits

The results of the effect of different amounts of nitrogen and water, and their mutual influence on the level of dissolved solids in the tomato extract:

The results of Table 12 showed that the main factor is the comparison of the effects of nitrogen on tomato soluble solids in the extract. Also the results showed that the average use of treatments has been finally into a significant percentage. Studies conducted with the use of 150 and 225 kg N ha respectively 3% and 6% was added to the TSS in tomato juice. Statistical analysis of the interaction of the TSS also mentioned treatments of tomato juice a significant difference in level so that the use of 0, 75, 150 and 225 kg N with 75% water consumption respectively 2.1%, 3.10 and 2.13 percent was added to the TSS. The application of 225 kg N per hectare, with 125% water consumption requirements have the greatest impact on the TSS. Isfand (2005) due to increase in the analysis of grains, sugar and other fruit solids and sediment to maintain osmotic potential until they have considered increasing water consumption.

Table 12. The effect of water and nitrogen on tomato TSS

Mean	Water use based on need			N range)Kg/ha(
	125 %	100 %	75 %	
c 852.25	def 753.5	bcd 77.6	ef 727.5	0
c 7.5	f 457.7	cde 843.5	de 8.5	75
b 33.6	ef 7.5	bcd 8.5	ab 32.6	150
a 214.6	bc 143.6	bcde 13.6	a 487.5	225
	b 763.6	a 3.6	A 83.6	mean

Averages that in each column or row A common uppercase or lowercase letters that have shared an average of no significance Duncan test at 5% and presented in Figures 19, 20 and 21.

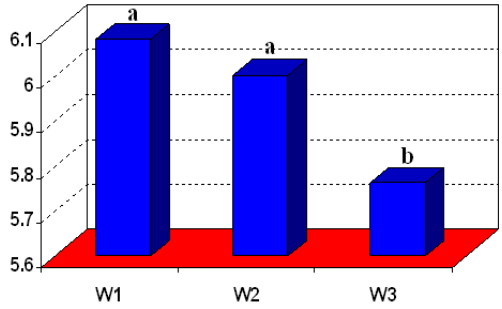

Figure 19. Effect of water on tomato TSS

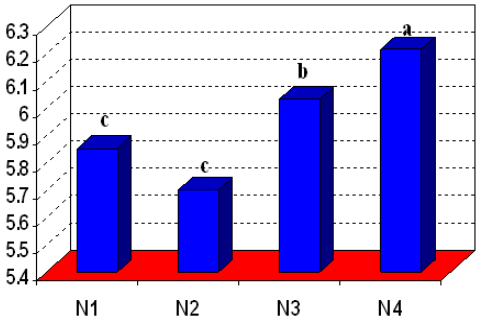

Figure 20. Influence of different nitrogen levels on TSS tomatoes

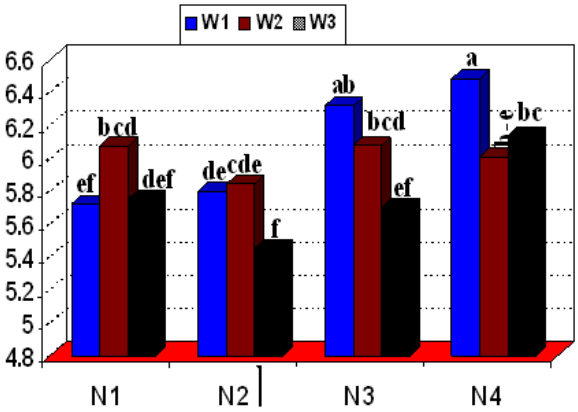

Figure 21.the interaction of different levels of nitrogen and water on tomato TSS

The effect of water and nitrogen on tomato PH:

PH Tomatoes reflects the degree of corruption as it exceeds a certain limit if the tomatoes are susceptible to corruption. Treatments above mentioned the survey shows that increase the amount of irrigation water In level of 5% had no significant effect on PH tomatoes, but increase the amount of nitrogen to the soil and even interaction Add tomato nitrogen and irrigation water PH no significant effect.

Table 13. The effect of water and nitrogen on tomato PH

Mean	Water use based on need			N range)Kg.ha(
	125 %	100 %	75 %	
A 328.4	bc 35.4	bc 317.4	bc 317.4	0
A 35.4	bc 317.4	c 284.4	ab 45.4	75
A 322.4	bc 317.4	bc 317.4	bc 333.4	150
A 373.2	bc 33.4	c 283.4	a 5.4	225
	AB 329.4	B 3.4	A 4.4	mean

Averages that in each column or row a common uppercase or lowercase letters that have shared an average of no significance Duncan test at 5% and presented in Figures 22, 23 and 24.

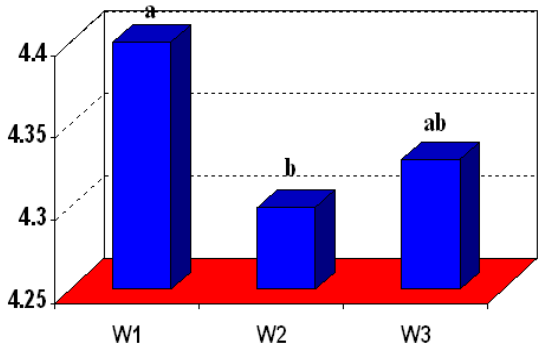

Figure 22. Influence of different levels of water use on tomatoes PH

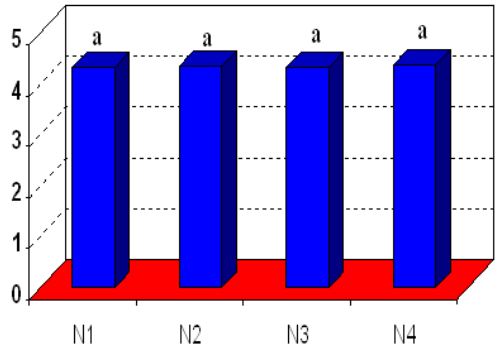

Figure 23. Influence of different nitrogen levels on PH tomatoes

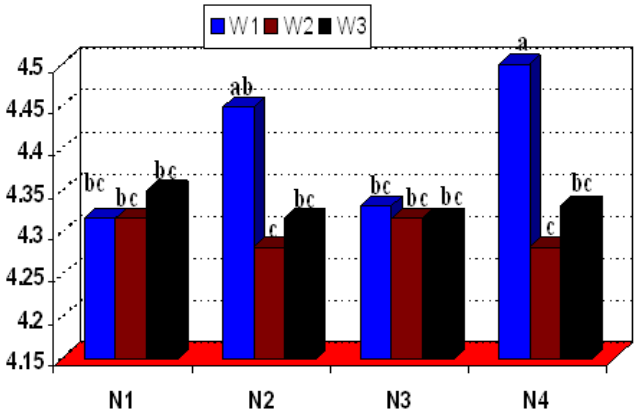

Figure 24. The interaction of different levels of water and nitrogen on tomato PH

DISCUSSION

The results of study showed that the effect of different amounts of nitrogen, water and their mutual influence on the performance of tomato been observed. Statistical analysis by Duncan test the treatment effect of nitrogen on tomato yield increase was significant at the one percent level. Also, comparison averages factor the effects of water product performance shows that this treatment significant effect the increased performance is not interactions mentioned treatments. The survey indicated that the a significant effect on the level of one percent increase in tomato yield was observed. Results of nitrogen, water treatments and their interactions on weight of tomato fruit are significant. With statistical analysis of different levels of this nutrient had significant effects on weight gain tomato fruit. Comparison of treatment effects of different irrigation levels on fruit weight showed that by increasing the amount of water needed by plants have a significant effect on fruit weight. The results of the effect of

nitrogen, water consumption and their interaction effects on the efficiency of water use on Tomato. According to results statistical analysis, the main effects of nitrogen factor in level of one percent and the interaction of two factors applied in level of 5% water use efficiency was significant**.** Based on results of study Isfand (Tohmpson & Doerge, 1995) under low soil moisture, nitrogen application not only a positive effect on corn yield and water use efficiency no longer have adverse effects. But in conditions of high humidity soil nitrogen fertilizer application, water use efficiency is significantly increased. The results of the effect of nitrogen and water treatment in their interactions on the vitamin C content of tomatoes. Also, according to results of statistical experience the main factor of irrigation water, interactions nitrogen and water the amount of vitamin C in tomato fruits in level of 1% was significant or 225 kg of nitrogen per hectare resulted in a significant reduction in the amount of vitamin c in fruit. However, the main effects nitrogen factor on vitamin C in fruit is not significant. But investigate the interactions between nitrogen and water consumption showed that in the 75 and 100% of water and irrigation, increased nitrogen significant effect on vitamin C not yet at the level of 125% of 150 or 225 kg N resulted in a significant reduction in the amount of vitamin c in bear fruit.

The results of the effect of different amounts of nitrogen and water and the interaction of chlorophyll in the leaves showed that averages the main effects of nitrogen factor the chlorophyll in leaves show the application of this nutrient increases the amount of chlorophyll in the leaves, and this effect was significant at the one percent level. The interaction between the two treatments on chlorophyll content with statistical analysis revealed that chlorophyll has not had any significant effect on the rise.

Also, the results of the effect of different amounts of nitrogen and water, and their mutual influence on the level of dissolved solids in the tomato extract showed that comparison of the main effects of nitrogen factor on the amount of dissolved solids in the tomato extract showed that the average use of treatments has been finally into a significant percentage. The survey comparison of the impact factor of different levels of water on the TSS suggest that use of these treatments at 5% level was significant as well as statistical analysis of the interaction between the two treatments on TSS tomato extract in a significant difference shows.

The results of the effect of water and nitrogen on tomato PH showed that effect the above-mentioned treatments the survey it shows to increase the amount of irrigation water In level of 5% had no significant effect on PH tomatoes, but increase the amount of nitrogen to the soil and even interaction add tomato nitrogen and irrigation water PH no significant effect.

The results of the effect of different amounts of nitrogen, water and their mutual influence on the acidity of tomatoes indicated that but the comparison of the original invoice effects of nitrogen on tomato fruit acidity showed that nitrogen application increased fruit acidity and this increase was a significant difference at 5%. Comparison averages nitrogen levels of water the acidity of the tomato fruit it shows this treatment significant effect on the increase in the acidity of the tomato fruit not mentioned treatments interactions with statistical analysis implies that any significant effect on the increase is not in the acidity of the tomato fruit. Results of the impact of nitrogen, water and the interaction between them the amount of nitrate in tomato juice of the amount of nitrate in tomato juice. Also another factor that nitrogen levels were affected and different levels of consumption in the soil significant differences in level of one percent an increase in nitrate in juice shows of different levels of water use based on water demand and water demand or interactive effects of different levels of nitrogen effects will not be significant.

CONCLUSION

The results of the adverse impacts of nitrogen on nitrate concentration in soil, water and the interaction between them showed that results statistical analysis the main effects of nitrogen and irrigation water was significant. The amount of nitrate 0-30 cm deep in the soil at 1% and their interactions on plant response was significant at the 5% level. The results of the impact of different levels of nitrogen, water and corresponding effect of nitrogen on tomato leaves them on the basis of the results of the statistical analysis. The main effect factors of nitrogen on tomato leaf nitrogen content was significant at the one percent level. The main effects of nitrogen on tomato leaves the irrigation water as well as the interaction between nitrogen and water on plant response above is not significant.

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