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Impact of Irrigation Intervals, Organic Fertilizer and Foliar Application with Some Antioxidants on Summer Squash.

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ABSTRACT

Two felid experiments were conducted at the Experimental Station Farm, Faculty of Agriculture, Mansoura University, Egypt, during two summer seasons of 2014 and 2015 to study the effect of irrigation intervals (7, 10 and 15 days), organic fertilizers (Without compost – With compost), antioxidant treatments as a foliar applications (Control – Yeast - Ascorbic acid and Salicylic acid) and their interactions on chemical constituents, yield and fruit quality of summer squash (*Cucurbita pepo* L.) cv. Mabroka. Obtained results indicated that chlorophyll pigments, nitrogen, phosphorus, potassium, total soluble solids, vitamin C, nitrate, nitrite, crude protein, total carbohydrates, crude fibers, total fats, dry matter percentage, early and total fruits yield ton/fed were significantly affected by irrigation intervals, organic fertilizers with compost and foliar spraying with antioxidants treatment. Irrigation intervals every 10 days gave the highest values of measured parameters in both seasons followed by irrigation every 7 days as well as fertilization with compost 15 m^3/fed and foliar spraying with antioxidants increased all studied fruit qualities compared with untreated plants in both seasons except, nitrate, nitrite, crude fibers. Meanwhile, the interactions among treatments showed that the highest values of all previous measurements were recorded when plants irrigated every 10 days and fertilized with compost (15 m^3/fed) as well as foliar spraying with yeast extract (2g/L) except, nitrate, nitrite, crude fibers comparing to other treatments. Therefore, this treatment can be recommended to increase the quantity of the yield and improve the fruits quality and reduce the amount of irrigation water used.

Keywords: Summer squash, irrigation intervals, antioxidants, Yeast, Ascorbic acid, Salicylic acid.

INTRODUCTION

Summer squash (*Cucurbita pepo* L.) is one of the most important vegetable crops belong to family Cucurbitaceae, it is rich in amino acids, carbohydrates content and a lot of beneficial minerals to humans.

In the last years the available quantity of water to agriculture is declining worldwide because of rapid population growth in addition to the changes of climate conditions and human activities (World Bank, 2006).

The increase in water use efficiency via decreasing the amount of water applied by minimizing the number of irrigations times is the main applying to counteract the water deficiency (Kirda, 2002). Also, squash yield was significantly affected by increasing the amount of water used (Al-Omran *et al*., 2005). But, the moderate amount of irrigation was superior comparing to excessive or inappropriate irrigation for early yield of summer squash (Ertek *et al*., 2004; Ibrahim and Selim, 2007). While, Ibrahim and Selim (2010) showed that irrigation every 8 days throughout growing season resulted in highest fruit weight and total fruit yield/fed. Moreover, increasing irrigation intervals from 8 to 16 days significantly increased TSS % and dry matter %. Also, Amer, 2011; El-Dewiny, 2011 and Abd El-Mageed and Semida 2015a found that squash productivity reduced by increasing water deficits. Abd El-Hady and Doklega (2017) indicated that irrigation eggplant every 15 days gave the highest rates of carbohydrates, crude protein, crude fiber and vitamin C, but nitrate concentration was decreased.

Compost plays direct role on vegetative growth of plants and development as a source of some mineral nutrients in available forms and enhancing physical and chemical properties of soils. Furthermore, many researches have reported the useful impacts of compost as organic fertilizer which increase water holding capacity, hydraulic conductivity and changes soil pH as well as, decreasing the frequency of plant diseases (Tagoe *et al*., 2008 on soybean and Hewidy *et al.*, 2015 on broccoli). El-Zehery (2015) found that the mean values of growth and yield of pepper plant were significantly increased due to adding rice straw compost. As well as, Tsado (2015) indicated that compost manure increased growth, yield and quality of tomato plant. Doklega and Abd El-Hady (2017) show that fertilized plants with compost increased significantly vegetative growth parameters, yield and quality of broccoli.

Undoubtedly, irrigation water deficit is one of the most common a biotic stress which have a negative impact on plant growth and productivity. Water deficit increases production of reactive oxygen species, hydrogen peroxide, superoxide, singlet oxygen and hydroxyl radical in cellular organelles as peroxisomes chloroplasts and mitochondria, negatively impacting various processes such as photosynthesis, stomatal conductance and plant growth (Batra *et al*., 2014). Plant tissues damage and death will happen if water stress is long due to reactive oxygen species output will adverse the scavenging action of the antioxidant regulation (Cruz de Carvalho, 2008). One of the physiological procedures that occur when plant is subjected to water deficit stress is closure stomatal to decrease water losses through transpiration (Ache *et al*., 2010). By antioxidants under non stressful conditions; reactive oxygen species are efficiently eliminated, whilst during water deficit stress the production of Reactive oxygen species enhance more than surpass the capacity of the systems of anti-oxidative to removal them, resulting in oxidative stress. Ascorbic acid is one of the non-enzymatic antioxidant system (Hira *et al*., 2016). Applying salicylic acid as antioxidants helps summer squash plants to tolerate water deficit stress El-Dewiny (2011).

Yeast is one of the richest sources of high quality protein, especially the essential amino acids, different minerals and trace elements such as Ca, Co and Fe. Also, it is the best source of vitamins B-complex, hormones specially cytokinins. Yousif (2007) indicated that yeast extract treatments either in foliar spraying or as seed soaking led to significant increase vegetative growth parameters of potato as compared with untreated

plants. As well as, Shalaby and El-Ramady (2014) on garlic, Ibraheim (2014) on pea and Marzauk *et al.* (2014) on broad bean found that foliar spraying with yeast extract recorded the highest values of chlorophyll, dry weight/plant, N, P, K, total yield/fed and quality compared to control . Also, Zaghloul *et al.* (2015) indicated that yield of pea plants increased with foliar spray with yeast extract. Similarly, Abdel Nabi *et al*. (2017) showed that foliar spraying artichoke with yeast extract increased yield, quality and chemical constituents compared with control.

Salicylic acid acts as cofactor for some enzymes, *i.e.*, catalases and peroxidases, those catalyzed breakdown of the toxic radicals H2O2, OH and O_2. As well as, salicylic acid has an serious role in the regulation of much physiological processes such as impacts on plant growth, ions absorption and transport and membrane permeability. Jamali *et al*. (2011) mentioned that fresh weights and fruit yield of strawberry were improved by using salicylic acid. While, fruit weight/plant and yield were decreased through increasing water deficit. As well as, Simaei *et al*. (2012) found significant increment in plant growth and its component of soybean under the effect of salicylic acid treatment as a result to increasing the enzymatic activities. Also, Siamak and Kazemi-Arbat (2014) showed that salicylic acid significantly increased protein, proline and TSS in dryness stress condition of chickpea compared with untreated plants. On cucumber; salicylic acid increased chlorophyll and TSS compared to the control treatment. The interaction between salicylic acid application and water stress had insignificant impacts on fruit number/plant (Nasrabadi *et al*., 2015). Furthermore, Metwaly and El-Shatoury (2017) found that foliar application with salicylic acid increased significantly tuber yield and quality of potato compared to control.

Hira *et al*. (2016) on cucumber and Metwaly and El-Shatoury (2017) on cabbage study the impact of foliar application of antioxidant such as ascorbic acid; results exhibited that, yield and quality were improved compared to the control. As well as, insignificant differences were remarked between full irrigation or moderate water stress treatments with antioxidant such as ascorbic acid alleviated all of the recorded harmful impacts on vegetative growth, yield and quality under water deficit on faba bean plants (Kasim *et al*., 2017).

Thus, the aim of this experiment was to study the impact of irrigation intervals, compost as organic fertilizer, foliar spraying with some antioxidants and their interactions on chemical constituents, fruit yield and quality of summer squash.

MATERIALS AND METHODS

Factorial experiment in split split plot design was used with 3 replicates for each treatment. The trial has 24 treatments; three water irrigation intervals treatments (7- 10 and 15 days) started after seedlings appearing above soil surface, two organic fertilizers (without compost – with compost 15 m^3/fed) were applied during soil preparation and four foliar spraying with antioxidants (without - Yeast 2g/L - Ascorbic acid 1g/L and Salicylic acid 1g/L) were sprayed after 20 days from sowing and the others were done weekly.

Summer squash seeds were sown on 14 and 24 of April 2014 and 2015, respectively on rows, with 0.8 m width and 5 m length with 0.5 m apart between each plant and plot inclusive 3 rows. All other agricultural procedures for growing summer squash were followed the recommendation of Egyptian Ministry of Agriculture. Physical and chemical properties of the soil are presented in Table1 in both seasons.

Table 1. Physical and chemical analysis of the experimental soil during 2014 and 2015 seasons:

seasons	Mechanical analysis (%)				Texture class	OM (%)	FC	$CaCO_3$ %	EC $dS.m^{-1}$ 1:5	pH (1:2.5)	Available (ppm)		
	Coarse Sand	Fine Sand	silt	clay							N	P	K
1st	4.7	32.4	34.6	28.3	SCL	1.58	37.8	3.71	0.94	8.16	43.9	5.18	205
2nd	4.9	33.2	35.4	26.5	SCL	2.01	39.2	3.45	0.79	7.89	44.7	4.89	212

OM: Organic matter SCL: sandy clay loamy EC: Electrical conductivity FC: field capacity

The recommended doses of mineral fertilizers were: (Ammonium nitrate 33.5 N% at the level of 200 kg /fed; Ammonium sulphate 20.5 N% at the level of 50 kg /fed; calcium super phosphate 15.5% P_2O_5 at the rate of 150 kg /fed and potassium sulphate 48 % K_2O at the level of 350 kg /fed). The doses of N and K divided into four equal parts; the first addition was after 3 weeks from sowing and the others at 2 weeks later.

The chemical analyses of compost are presented in Table 2.

Table 2. Chemical analysis of rice straw compost:

seasons	%			C/N	%		ppm			PH 1:5	EC1:10 $ds-^1m$
	Organic Matter	Organic carbon	N		P	K	Fe	Mn	Zn		
1st	38.3	22.24	1.35	16.47	0.35	0.53	134	88.3	9.8	6.51	4.65
2nd	37.1	21.57	1.49	14.48	0.38	0.61	141	79.5	8.3	6.02	4.14

Data recorded:

After 40 days from planting chlorophyll a, b and total were determined as described by Goodwine (1965).

Total nitrogen, phosphorus, Potassium content in squash leaves were estimated using the method described by Jones *et al*. (1991)

At harvest time after 40 days from sowing, fruits were harvested from each plot every 2 or 3 days and total yield of fruits were determined as ton/fed. Also, the first 4 harvests were the early fruit yield (ton/fed).

At the seventh harvests, samples of 10 fruits were taken at random from each plot to determine dry matter %, chemical constituents and fruit quality parameters:

Total N, P, K content in squash fruits were determined using the method of Jones *et al*. (1991)

- Vitamin C (mg/100g) in squash fruits were determined according to the method reported in AOAC (2000).
- Total soluble solids percentage (TSS %) in squash fruits were determined by using Hand Refractometer.
- Nitrate (NO_3) and nitrite (NO_2) contents were estimated as the method described by Singh (1988).
- Crude protein percentage in squash fruits were calculated by multiplying the total N by 6.25 (AOAC 2000).
- Crude fiber percentage in squash fruits were determined according to the method described in AOAC, (2000).
- Total Fat (Ether Extract) was determined in fruits according to the method described in AOAC, (2000).
- Total carbohydrates % was determined in squash fruits according to the method described by Hedge and Hofreiter (1962).

Statistical analysis:

Data were statistically analyzed via the technique of analysis of variance (ANOVA) for the split split plot design as reported by Gomez and Gomez (1984) using means of "MSTAT-C" Computer software package.

Least significant difference (LSD) method at 5% levels of probability used to compare the means as mentioned by Snedcor and Cochran (1980).

RESULTS AND DISCUSSION

Effect of irrigation intervals:

Regarding the effect of irrigation intervals, results in Tables 3, 5, 7,9,11 and 13 show significant increases in the chlorophyll a, b and total contents, N, P and K percentage in the leaves and fruits, TSS, vitamin C, crude protein, total carbohydrates, total fats, dry matter percentage in squash fruits, early and total yields ton/fed except nitrate (NO_3-N), nitrite (NO_2-N) concentrations and crude fiber percentage were decreased when plants irrigated every 10 days followed by every 7 days compared with other irrigation intervals every 15 days in both seasons of study.

These results may be due to that irrigation every 10 days were appropriate intervals to save the water around roots which caused good conditions to plant roots to absorb the required sufficient water and the available mineral elements in addition to the ability of the experiment soil is (sandy clay loamy) as shown in Table 1 to retain the water reasonable which reflected on photosynthetic process where the atmosphere in this period is sunny and hot and consequently on vegetative growth, chemical constituent, yield and fruit quality of squash plants. In contrary irrigation every 7 days caused water increment around plant roots which decreased the capacity of roots respiration thus reduced greatly the necessary energy for the physiological processes and in turn cause reduction in growth and chemical constituents. On other side, irrigation every 15 days during the hot and dry condition caused counteracting the plant to water deficit stress which lead to increment the production of reactive oxygen species, hydrogen peroxide, superoxide, singlet oxygen and hydroxyl radical in cellular organelles as chloroplasts, peroxisomes and mitochondria those were negatively impacting various processes *e.g.* stomatal conductance, transpiration, photosynthesis and growth thus the previous parameters significantly decreased. These results are in harmony with those obtained by (Amer, 2011; El-Dewiny, 2011 and Abd El-Mageed and Semida, 2015a) on summer squash.

Effect of organic fertilizer:

Concerning the effect of organic fertilizers, data in the same Tables revealed that the parameters mentioned previously were increased significantly with compost addition compared to untreated plants (without compost) except, crude fiber in the two seasons. This improvement could be attributed to the positive effect of compost fertilizer components as shown in Table 2, where it get better soil drainage, aeration and improved the soil water retain. As well as, compost used as a soil amendment, which enhance soils water holding capacity and increases the availability of some essential micronutrients for plant roots, which important for formation of cytokinins, nucleic acid, cell wall and it facilitates sugar translocation in plants as well as influences development of cell and elongation which in turn increases chlorophyll and NPK content, yield and fruit quality. These results are on the same line with those showed by (Tsado, 2015 on tomato and Doklega and Abd El-Hady, 2017 on broccoli).

Effect of foliar application with antioxidants:

Impacts of spraying with antioxidants materials are shown in the same Tables. Data found that, the previous parameters were significantly improved compared to control treatment except, nitrate (NO_3-N), nitrite (NO_2-N) concentrations and crude fiber percentage in both seasons. These results may be attributed to the positive effects of spraying antioxidants on mentioned parameters during the water deficit. Once again, water deficit stress increases reactive oxygen species in cellular organelles *e.g.* peroxisomes, chloroplasts and mitochondria and consequently negatively affecting of various processes such stomatal conductance, photosynthesis, transpiration and growth. The same results indicated that, yeast extract was the best treatment due to its content of essential amino acids and cytokines which raised the chlorophyll content, chemical constituents, yield and quality. The results are in harmony with those reported by (Abdel Nabi *et al*., 2017 on artichoke and Metwaly and El-Shatoury, 2017 on cabbage).

Effect of interactions:

concerning the interactions among irrigation intervals, organic fertilizers and antioxidants, the obtained results in Tables 4, 6, 8, 10, 12 and 14 demonstrated that the combination of irrigation intervals every 10 days, compost addition at the rate of 15 m^3 / fed and spraying with 2 g/L yeast extract gave the highest values of chlorophyll content, chemical constituents, quality parameters, dry matter%, early and total yield /fed. Also, it gave the lowest acceptable levels of nitrate (NO_3-N), nitrite (NO_2-N) concentrations and crude fiber percentage in 1st and 2nd seasons. These results may be due to the positive effect of the appropriate irrigation times and the role of compost in improving soil properties and the positive impact of yeast on plant growth improvement as mention previously.

Table 3. Chlorophyll a, chlorophyll b and chlorophylls a+b content in squash leaves as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	Chlorophyll a (mg/g FW)		Chlorophyll b (mg/g FW)		Chlorophylls a+b (mg/g FW)	
	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:						
7 Days	0.528	0.534	0.355	0.355	0.883	0.889
10 Days	0.586	0.545	0.394	0.377	0.980	0.922
15 days	0.464	0.449	0.317	0.318	0.780	0.767
LSD at 5%	0.003	0.009	0.007	0.002	0.007	0.009
B- Organic fertilization:						
Without	0.487	0.477	0.319	0.336	0.806	0.813
Compost	0.564	0.541	0.392	0.365	0.956	0.906
F. test	*	*	*	*	*	*
C- Foliar application treatments:						
Without	0.427	0.502	0.293	0.328	0.720	0.829
Yeast extract	0.609	0.532	0.410	0.374	1.019	0.906
Ascorbic acid	0.564	0.507	0.375	0.358	0.939	0.864
Salicylic acid	0.504	0.498	0.343	0.342	0.847	0.839
LSD at 5%	0.005	0.009	0.008	0.003	0.010	0.013
D- Interactions (F. test):						
A × B	*	NS	*	*	*	NS
A × C	*	NS	*	NS	*	NS
B × C	*	*	*	NS	*	*
A × B × C	*	*	*	NS	*	*

Table 4. Chlorophyll a, chlorophyll b and chlorophylls a+b content in squash leaves as affected by the interactions among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments / Characters			Chlorophyll a (mg/g FW)		Chlorophyll b (mg/g FW)		Chlorophylls a+b (mg/g FW)	
			2014	2015	2014	2015	2014	2015
7 Days	Without	Without	0.393	0.441	0.258	0.318	0.650	0.760
		Yeast extract	0.562	0.530	0.360	0.365	0.922	0.896
		Ascorbic acid	0.525	0.480	0.345	0.347	0.869	0.827
		Salicylic acid	0.478	0.526	0.307	0.331	0.785	0.857
	Compost	Without	0.451	0.693	0.325	0.347	0.776	1.040
		Yeast extract	0.663	0.553	0.438	0.397	1.100	0.950
		Ascorbic acid	0.618	0.533	0.440	0.376	1.058	0.909
		Salicylic acid	0.532	0.513	0.369	0.362	0.902	0.875
10 Days	Without	Without	0.437	0.482	0.291	0.338	0.728	0.820
		Yeast extract	0.619	0.538	0.408	0.386	1.027	0.924
		Ascorbic acid	0.579	0.518	0.378	0.369	0.957	0.887
		Salicylic acid	0.516	0.501	0.336	0.352	0.852	0.853
	Compost	Without	0.516	0.552	0.366	0.369	0.881	0.921
		Yeast extract	0.726	0.610	0.510	0.416	1.236	1.026
		Ascorbic acid	0.684	0.592	0.422	0.402	1.105	0.995
		Salicylic acid	0.613	0.570	0.439	0.384	1.052	0.954
15 days	Without	Without	0.350	0.402	0.228	0.286	0.579	0.688
		Yeast extract	0.497	0.456	0.327	0.327	0.824	0.783
		Ascorbic acid	0.476	0.437	0.310	0.311	0.786	0.748
		Salicylic acid	0.416	0.419	0.276	0.299	0.692	0.717
	Compost	Without	0.412	0.440	0.290	0.308	0.703	0.748
		Yeast extract	0.587	0.501	0.415	0.354	1.002	0.855
		Ascorbic acid	0.504	0.480	0.357	0.341	0.861	0.821
		Salicylic acid	0.468	0.457	0.329	0.323	0.797	0.781
LSD at 5%			0.011	0.017	0.019	NS	0.025	0.036

Table 5. Nitrogen (N), phosphorus (P) and potassium (K) percentages in squash leaves as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	N % (in leaves)		P % (in leaves)		K % (in leaves)	
	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:						
7 Days	2.629	2.394	0.396	0.376	3.034	2.723
10 Days	2.723	2.846	0.449	0.447	3.426	3.244
15 days	2.375	2.295	0.357	0.367	2.728	2.514
LSD at 5%	0.033	0.040	0.004	0.002	0.028	0.018
B- Organic fertilization:						
Without	2.358	2.399	0.367	0.379	2.820	2.680
Compost	2.793	2.624	0.434	0.414	3.305	2.973
F. test	*	*	*	*	*	*
C- Foliar application treatments:						
Without	2.085	2.354	0.354	0.381	2.467	2.681
Yeast extract	3.027	2.672	0.445	0.413	3.575	2.977
Ascorbic acid	2.742	2.563	0.416	0.402	3.285	2.876
Salicylic acid	2.449	2.457	0.386	0.390	2.923	2.773
LSD at 5%	0.037	0.030	0.004	0.002	0.030	0.025
D- Interactions (F. test):						
A × B	*	NS	*	*	*	*
A × C	*	NS	*	NS	*	NS
B × C	*	NS	*	NS	*	NS
A × B × C	*	NS	*	NS	*	NS

Table 6. Nitrogen (N), phosphorus (P) and potassium (K) percentages in squash leaves as affected by the interaction among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments	Characters		N % (in leaves)		P % (in leaves)		K % (in leaves)	
			2014	2015	2014	2015	2014	2015
7 Days	Without	Without	1.993	2.147	0.328	0.343	2.333	2.440
		Yeast extract	2.827	2.350	0.407	0.373	3.277	2.730
		Ascorbic acid	2.573	2.353	0.368	0.362	2.993	2.667
		Salicylic acid	2.373	2.240	0.341	0.350	2.653	2.563
	Compost	Without	2.157	2.340	0.366	0.378	2.553	2.740
		Yeast extract	3.360	2.690	0.489	0.411	3.850	2.977
		Ascorbic acid	3.067	2.563	0.450	0.400	3.497	2.890
		Salicylic acid	2.680	2.467	0.417	0.391	3.113	2.773
10 Days	Without	Without	1.993	2.570	0.366	0.408	2.547	2.970
		Yeast extract	2.827	2.910	0.457	0.442	3.670	3.250
		Ascorbic acid	2.573	2.783	0.432	0.430	3.447	3.130
		Salicylic acid	2.373	2.637	0.391	0.420	2.860	3.077
	Compost	Without	2.543	2.823	0.431	0.451	2.893	3.213
		Yeast extract	3.643	3.123	0.532	0.486	4.280	3.563
		Ascorbic acid	3.150	3.003	0.504	0.472	3.967	3.423
		Salicylic acid	2.680	2.917	0.476	0.462	3.743	3.323
15 days	Without	Without	1.757	2.020	0.292	0.341	2.093	2.190
		Yeast extract	2.520	2.373	0.362	0.369	2.930	2.483
		Ascorbic acid	2.363	2.237	0.342	0.357	2.680	2.383
		Salicylic acid	2.127	2.163	0.315	0.348	2.360	2.280
	Compost	Without	2.067	2.223	0.342	0.364	2.383	2.530
		Yeast extract	2.983	2.583	0.424	0.398	3.443	2.860
		Ascorbic acid	2.727	2.437	0.400	0.388	3.127	2.763
		Salicylic acid	2.460	2.320	0.377	0.372	2.810	2.623
LSD at 5%			0.091	NS	0.009	NS	0.122	NS

Table 7. Nitrogen (N), phosphorus (P) and potassium (K) percentages in squash fruits as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	N % (in fruit)		P % (in fruit)		K % (in fruit)	
	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:						
7 Days	2.149	1.962	0.340	0.322	1.614	1.525
10 Days	2.385	2.338	0.383	0.383	1.811	1.824
15 days	1.914	1.849	0.313	0.336	1.445	1.376
LSD at 5%	0.064	0.055	0.003	0.004	0.024	0.031
B- Organic fertilization:						
Without	1.993	1.949	0.322	0.340	1.507	1.499
Compost	2.305	2.151	0.369	0.355	1.739	1.651
F. test	*	*	*	*	*	*
C- Foliar application treatments:						
Without	1.726	1.908	0.294	0.356	1.323	1.444
Yeast extract	2.522	2.203	0.380	0.355	1.917	1.721
Ascorbic acid	2.337	2.096	0.367	0.345	1.720	1.626
Salicylic acid	2.012	1.992	0.340	0.333	1.533	1.509
LSD at 5%	0.023	0.021	0.005	0.007	0.033	0.021
D- Interactions (F. test):						
A × B	*	*	*	NS	*	*
A × C	*	NS	*	NS	*	*
B × C	*	NS	*	NS	*	*
A × B × C	*	NS	*	NS	NS	NS

Table 8. Nitrogen (N), phosphorus (P) and potassium (K) percentages in squash fruits as affected by the interactions among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments	Characters		N % (in fruit)		P % (in fruit)		K % (in fruit)	
			2014	2015	2014	2015	2014	2015
7 Days	Without	Without	1.613	1.743	0.281	0.295	1.237	1.303
		Yeast extract	2.290	2.017	0.346	0.324	1.760	1.617
		Ascorbic acid	2.240	1.887	0.331	0.317	1.637	1.490
		Salicylic acid	1.937	1.757	0.302	0.304	1.453	1.373
	Compost	Without	1.777	1.913	0.310	0.324	1.390	1.477
		Yeast extract	2.743	2.240	0.407	0.351	2.033	1.733
		Ascorbic acid	2.483	2.103	0.385	0.337	1.827	1.660
		Salicylic acid	2.107	2.037	0.355	0.324	1.577	1.543
10 Days	Without	Without	1.787	2.070	0.311	0.350	1.340	1.557
		Yeast extract	2.580	2.370	0.385	0.382	1.990	1.883
		Ascorbic acid	2.417	2.287	0.373	0.370	1.763	1.790
		Salicylic acid	2.083	2.180	0.359	0.358	1.603	1.663
	Compost	Without	2.103	2.290	0.369	0.389	1.607	1.763
		Yeast extract	3.030	2.597	0.451	0.414	2.293	2.087
		Ascorbic acid	2.740	2.523	0.429	0.407	2.073	1.983
		Salicylic acid	2.337	2.390	0.391	0.398	1.817	1.867
15 days	Without	Without	1.367	1.653	0.201	0.465	1.087	1.203
		Yeast extract	2.057	1.920	0.338	0.313	1.570	1.470
		Ascorbic acid	1.900	1.787	0.322	0.306	1.387	1.353
		Salicylic acid	1.643	1.713	0.311	0.294	1.260	1.280
	Compost	Without	1.707	1.780	0.291	0.312	1.280	1.363
		Yeast extract	2.430	2.077	0.355	0.346	1.853	1.533
		Ascorbic acid	2.240	1.987	0.363	0.332	1.633	1.477
		Salicylic acid	1.967	1.877	0.323	0.322	1.490	1.327
LSD at 5%			0.057	NS	0.012	NS	NS	NS

Table 9. Total soluble solids (TSS) percentage, vitamin C content, nitrate (NO_3-N) and nitrite (NO_2-N) concentrations in squash fruits as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	TSS (%)		Vitamin C (mg/100 g)		NO_3-N (ppm)		NO_2-N (ppm)	
	2014	2015	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:								
7 Days	4.24	4.45	17.62	14.84	24.42	29.85	0.489	0.948
10 Days	4.54	4.92	19.98	16.57	22.30	26.89	0.444	0.863
15 days	3.85	4.31	16.20	13.72	21.27	26.12	0.412	0.778
LSD at 5%	0.04	0.02	0.54	0.44	0.38	0.25	0.024	0.10
B- Organic fertilization:								
Without	3.94	4.37	16.81	14.25	21.86	27.18	0.429	0.806
Compost	4.48	4.76	19.05	15.83	23.47	28.06	0.467	0.921
F. test	*	*	*	*	*	*	*	*
C- Foliar application treatments:								
Without	3.84	4.46	16.10	13.55	26.42	28.67	0.524	0.918
Yeast extract	4.54	4.66	19.70	14.92	18.73	26.46	0.368	0.777
Ascorbic acid	4.35	4.61	18.63	17.93	21.23	27.31	0.426	0.853
Salicylic acid	4.11	4.52	17.31	13.78	24.28	28.03	0.475	0.905
LSD at 5%	0.03	0.02	0.36	0.29	0.41	0.35	0.012	0.08
D- Interactions (F. test):								
A × B	*	*	NS	NS	*	*	NS	NS
A × C	*	*	NS	NS	NS	NS	NS	NS
B × C	*	*	NS	NS	*	NS	NS	NS
A × B × C	*	NS	NS	NS	NS	NS	NS	NS

Table 10. Total soluble solids (TSS) percentage, vitamin C content, nitrate (NO_3-N) and nitrite (NO_2-N) concentrations in squash fruits as affected by the interactions among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments / Characters			TSS (%)		Vitamin C (mg/100 g)		NO_3-N (ppm)		NO_2-N (ppm)	
			2014	2015	2014	2015	2014	2015	2014	2015
7 Days	Without	Without	3.73	4.14	14.83	12.80	26.56	30.20	0.523	0.690
		Yeast extract	4.15	4.32	18.16	13.46	20.16	28.03	0.387	0.870
		Ascorbic acid	4.06	4.23	17.76	16.86	21.66	28.96	0.477	0.920
		Salicylic acid	3.83	4.18	16.06	12.73	24.80	29.53	0.490	0.997
	Compost	Without	4.01	4.59	16.43	14.23	29.16	31.66	0.597	1.107
		Yeast extract	4.95	4.78	21.46	15.50	21.66	29.33	0.430	0.933
		Ascorbic acid	4.74	4.74	18.70	18.90	24.10	30.16	0.477	0.990
		Salicylic acid	4.45	4.66	17.56	14.23	27.26	30.90	0.530	1.080
10 Days	Without	Without	3.93	4.71	16.86	14.30	25.23	27.66	0.510	0.890
		Yeast extract	4.64	4.92	20.20	16.13	17.66	25.36	0.327	0.727
		Ascorbic acid	4.46	4.83	19.40	18.90	20.16	26.23	0.417	0.787
		Salicylic acid	4.14	4.76	17.80	14.16	22.50	26.80	0.453	0.820
	Compost	Without	4.11	4.92	19.20	15.80	27.76	28.40	0.543	1.040
		Yeast extract	5.42	5.15	23.20	16.90	18.73	26.10	0.377	0.790
		Ascorbic acid	4.97	5.10	22.36	20.66	21.66	26.86	0.440	0.863
		Salicylic acid	4.61	5.01	20.86	15.73	24.73	27.73	0.487	0.990
15 days	Without	Without	3.40	3.98	13.90	11.26	24.13	26.80	0.457	0.837
		Yeast extract	3.76	4.18	16.36	13.06	16.76	24.66	0.327	0.630
		Ascorbic acid	3.65	4.13	15.70	15.20	20.03	25.60	0.357	0.713
		Salicylic acid	3.55	4.04	14.76	12.16	22.70	26.33	0.427	0.790
	Compost	Without	3.87	4.41	15.36	12.90	25.70	27.33	0.517	0.943
		Yeast extract	4.33	4.64	18.80	14.46	17.43	25.26	0.363	0.713
		Ascorbic acid	4.21	4.62	17.90	17.06	19.76	26.06	0.387	0.843
		Salicylic acid	4.08	4.48	16.83	13.66	23.70	26.90	0.463	0.753
LSD at 5%			0.07	NS	NS	NS	NS	NS	NS	NS

Table 11. Crude protein, total carbohydrates, crude fibers and total fats percentages in squash fruits as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	Crude protein (%)		Total Carbohydrates (%)		Crude fibers (%)		Total fats (%)	
	2014	2015	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:								
7 Days	12.35	11.28	14.92	15.76	6.84	7.44	0.732	1.035
10 Days	13.71	13.44	16.38	16.98	6.11	6.73	0.976	1.320
15 days	11.00	10.63	13.30	14.93	7.24	7.91	0.683	0.900
LSD at 5%	0.36	0.31	0.23	0.10	0.09	0.03	0.070	0.039
B- Organic fertilization:								
Without	11.46	11.20	14.55	15.56	6.91	7.75	0.701	1.007
Compost	13.25	12.37	15.18	16.21	6.55	6.97	0.893	1.163
F. test	*	*	*	*	*	*	*	*
C- Foliar application treatments:								
Without	9.92	10.97	14.16	15.47	6.93	7.58	0.666	0.948
Yeast extract	14.50	12.67	15.47	16.32	6.52	7.14	0.947	1.222
Ascorbic acid	13.43	12.05	15.11	16.02	6.66	7.29	0.811	1.137
Salicylic acid	11.57	11.45	14.71	15.75	6.80	7.44	0.764	1.034
LSD at 5%	0.13	0.12	0.26	0.07	0.04	0.05	0.070	0.028
D- Interactions (F. test):								
A × B	*	*	NS	*	*	*	NS	*
A × C	*	NS	NS	NS	NS	NS	NS	NS
B × C	*	NS	NS	NS	NS	NS	NS	NS
A × B × C	*	NS	NS	NS	NS	NS	NS	NS

Table 12. Crude protein, total carbohydrates, crude fibers and total fats percentages in squash fruits as affected by the interactions among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments	Characters		Crude Protein (%)		Total carbohydrates (%)		Crude fibers (%)		Total fats (%)	
			2014	2015	2014	2015	2014	2015	2014	2015
7 Days	Without	Without	9.28	10.03	14.09	15.03	7.21	8.06	0.533	0.837
		Yeast extract	13.17	11.60	15.30	15.93	6.73	7.63	0.807	1.127
		Ascorbic acid	12.88	10.85	14.92	15.55	6.92	7.77	0.707	1.013
		Salicylic acid	11.14	10.10	14.50	15.32	7.03	7.92	0.613	0.917
	Compost	Without	10.21	11.00	13.86	15.66	6.78	7.23	0.713	0.973
		Yeast extract	15.77	12.88	15.95	16.48	6.56	6.85	1.007	1.227
		Ascorbic acid	14.28	12.09	15.56	16.18	6.64	6.98	0.650	1.150
		Salicylic acid	12.11	11.71	15.15	15.93	6.82	7.09	0.823	1.037
10 Days	Without	Without	10.27	11.90	15.37	16.19	6.53	7.35	0.730	1.083
		Yeast extract	14.83	13.63	16.58	16.99	6.08	6.93	0.977	1.350
		Ascorbic acid	13.89	13.15	16.19	16.73	6.25	7.05	0.913	1.267
		Salicylic acid	11.98	12.53	15.75	16.44	6.37	7.21	0.820	1.163
	Compost	Without	12.09	13.17	16.21	16.91	6.13	6.55	0.950	1.280
		Yeast extract	17.42	14.93	17.35	17.82	5.71	6.10	1.223	1.553
		Ascorbic acid	15.76	14.51	16.97	17.53	5.82	6.26	1.133	1.487
		Salicylic acid	13.43	13.74	16.61	17.22	5.98	6.41	1.060	1.377
15 days	Without	Without	7.86	9.50	12.43	14.21	7.68	8.52	0.440	0.697
		Yeast extract	11.82	11.04	13.46	15.11	7.21	8.05	0.713	0.967
		Ascorbic acid	10.92	10.27	13.18	14.78	7.37	8.23	0.627	0.877
		Salicylic acid	9.45	9.85	12.81	14.51	7.51	8.35	0.537	0.793
	Compost	Without	9.81	10.23	13.04	14.81	7.26	7.77	0.630	0.817
		Yeast extract	13.97	11.94	14.18	15.63	6.85	7.30	0.953	1.110
		Ascorbic acid	12.88	11.42	13.84	15.34	6.96	7.47	0.837	1.027
		Salicylic acid	11.31	10.79	13.44	15.07	7.09	7.63	0.730	0.917
LSD at 5%			0.32	NS	NS	NS	NS	NS	NS	NS

Table 13. Dry matter percentage in squash fruits, early and total yields/fed as affected by irrigation intervals, organic fertilization and foliar application treatments as well as their interactions during 2014 and 2015 seasons.

Characters / Treatments	Dry matter (%)		Early yield (t/fed)		Total yield (t/fed)	
	2014	2015	2014	2015	2014	2015
A- Irrigation intervals:						
7 Days	12.72	12.26	2.850	3.233	8.204	8.758
10 Days	13.00	12.50	3.038	3.725	8.467	9.304
15 days	12.13	11.77	1.658	2.275	5.950	6.446
LSD at 5%	0.07	0.04	0.145	0.150	0.143	0.151
B- Organic fertilization:						
Without	12.25	11.96	2.358	2.803	7.394	7.822
Compost	12.99	12.39	2.672	3.353	7.686	8.517
F. test	*	*	*	*	*	*
C- Foliar application treatments:						
Without	12.28	11.86	2.322	2.828	7.006	7.717
Yeast extract	12.96	12.50	2.839	3.361	8.250	8.839
Ascorbic acid	12.73	12.28	2.589	3.117	7.567	8.194
Salicylic acid	12.51	12.06	2.311	3.006	7.339	7.928
LSD at 5%	0.06	0.04	0.123	0.125	0.127	0.135
D- Interactions (F. test):						
A × B	*	*	*	*	*	*
A × C	NS	NS	NS	NS	*	*
B × C	NS	NS	NS	NS	*	*
A × B × C	*	*	*	*	*	*

Table 14. Dry matter percentage in squash fruits, early and total yields/fed as affected by the interaction among irrigation intervals, organic fertilization and foliar application treatments during 2014 and 2015 seasons.

Treatments	Characters		Dry matter (%)		Early yield (t/fed)		Total yield (t/fed)	
			2014	2015	2014	2015	2014	2015
7 Days	Without	Without	11.92	11.71	2.300	2.800	7.333	8.033
		Yeast extract	12.65	12.34	3.000	3.200	8.867	8.733
		Ascorbic acid	12.36	12.14	2.800	3.100	8.033	8.367
		Salicylic acid	12.17	11.92	2.500	3.033	7.900	8.300
	Compost	Without	12.74	12.17	2.833	3.167	7.867	8.433
		Yeast extract	13.57	12.84	3.433	3.900	9.100	10.233
		Ascorbic acid	13.35	12.58	3.200	3.400	8.400	9.167
		Salicylic acid	13.03	12.36	2.733	3.267	8.133	8.800
10 Days	Without	Without	12.29	11.98	2.667	3.033	7.533	8.467
		Yeast extract	12.91	12.61	3.067	3.667	9.200	9.267
		Ascorbic acid	12.71	12.39	2.833	3.400	8.300	8.833
		Salicylic acid	12.49	12.19	2.767	3.333	8.033	8.600
	Compost	Without	13.07	12.38	3.200	3.867	8.067	9.067
		Yeast extract	13.73	13.04	3.667	4.333	9.500	10.933
		Ascorbic acid	13.49	12.82	3.233	4.133	8.833	9.967
		Salicylic acid	13.30	12.59	2.867	4.033	8.267	9.300
15 days	Without	Without	11.56	11.26	1.367	1.833	5.467	6.033
		Yeast extract	12.17	11.90	1.900	2.200	6.500	6.900
		Ascorbic acid	11.99	11.67	1.700	2.033	5.800	6.267
		Salicylic acid	11.78	11.45	1.400	2.000	5.767	6.067
	Compost	Without	12.07	11.65	1.567	2.267	5.767	6.267
		Yeast extract	12.71	12.30	1.967	2.867	6.333	6.967
		Ascorbic acid	12.51	12.08	1.767	2.633	6.033	6.567
		Salicylic acid	12.28	11.86	1.600	2.367	5.933	6.500
LSD at 5%			0.14	0.17	0.302	0.305	0.311	0.380

CONCLUSION

Irrigation squash plants cultivated in summer seasons every 10 days with compost addition at the rate of 15 m^3/fed as organic fertilizer beside spraying plants with yeast extract weekly at the rate of 2g/L gave the highest yield, quality and saving water used in irrigation under Dakhlia condition. Egypt.

REFERENCES

Abd El-Hady, M. A. and Samar M. A. Doklega (2017). Response of two eggplant cultivars to irrigation intervals and foliar application with some antitranspirants. J. Plant Production, Mansoura Univ., Vol. 8 (12): 1395- 1401.

Abd El-Mageed, T.A. and W.M. Semida, (2015a). Effect of deficit irrigation and growing seasons on plant water status, fruit yield and water use efficiency of squash under saline soil. Scientia Horticulturae 186, 89–100.

Abdel Nabi, H.MA. ; Samar M.A. Doklega and A.F.S. Qwaider (2017). Effect of Organic, Bio Fertilization and Foliar Spraying Treatments on Artichoke. J. Plant Production, Mansoura Univ., Vol. 8(5): 559 – 567.

Ache, P., Bauer, H., Kollist, H., Al-Rasheid, K.A., Lautner, S., Hartung, W. and R. Hedrich (2010). Stomatal action directly feeds back on leaf turgor: new insights into the regulation of the plant water status from non-invasive pressure probe measurements. The Plant Journal. 62, 1072–1082.

Al-Omran, A.M., Sheta, A.S., Falatah, A.M. and A.R. Al-Harbi (2005). Effect of drip irrigation on squash (*Cucurbita pepo* L.) yield and water-use efficiency in sandy calcareous soils amended with clay deposits. Agric. Water Manage. 73, 43–55.

Amer, K.H. (2011) Effect of irrigation method and quantity on squash yield and quality. Agric. Water Manage. 98, 1197–1206.

AOAC (2000). Association of Official Analytical Chemists.17th ED. Of AOAC International Published by AOAC International Maryland, USA, 1250pp.

Batra, N.G., Sharma, V. and N. Kumari (2014). Drought-induced changes in chlorophyll fluorescence, photosynthetic pigments, and thylakoid membrane proteins of Vigna radiate. J. of Plant Interactions. 1, 712–721.

Cruz de Carvalho, M.H., (2008). Drought stress and reactive oxygen species: production, scavenging and signaling. Plant Signaling & Behavior 3, 156–165.

Doklega, Samar M.A. and M.A. Abd El-Hady (2017). Impact of organic, mineral and bio-fertilization on broccoli. J. Plant Production, Mansoura Univ., Vol. 8(9):945 - 951

El-Dewiny, C.Y. (2011). Water and fertilizer use efficiency by squash grown understress on sandy soil treated with acrylamide hydrogels. J. Appl. Sci. Res. 7, 1828–1833.

El-Zehery, R. E. E. (2015). The effect of some transactions on the productivity and quality of pepper crop and storability. MSc. Thesis, Fac. Agric. Mansoura Univ.

Ertek, A., Sensoy, S., Kucukyumuk, C. and I. Gedik (2004). Irrigation frequency and amount affect yield components of summer squash (*Cucurbita pepo* L.). Agric. Water Manage. 67, 63–76.

Gomez, K.N. and A.A. Gomez (1984). Statistical Procedures for Agricultural Research. John Wiley and Sons, New York, 2nd ed., 68 P.

Goodwine, T. W. (1965). Quantitative Analysis of The Chloroplast Pigments. Academic Press, London and New York.

Hedge, I. E. and B. T. Hofreiter (1962).“Carboydrate Chemistry. (Eds Whistler R.L. and Be Miller, J.N.). Academic Press, New York.

Hewidy, M.; A. Traversa; M. Kheder; F. Ceglie and C. Cocozza (2015). Short-term effects of different organic amendments on soil properties, broccoli growth and yield. Compost Sci. and Utilization, 23(3):207–215.

Hira, N.; N. A. Akram and M. Ashraf (2016). Impact of ascorbic acid on growth and some physiological attributes of cucumber (*Cucumis sativus* L.) plants under water-deficit conditions. Pak. J. Bot., 48(3): 877-883.

Ibraheim, Sabreen Kh.A. (2014). Effect of foliar spray with some biostimulants on growth, yield and seeds quality of pea plants grown in sandy soil. J. of App. Sci. Res., 10(5): 400-407.

Ibrahim, E.A. and E. M. Selim (2010). Effect of irrigation intervals and antitranspirant (Kaolin) on summer squash (*Cucurbita pepo* L.) growth, yield, quality and economics. J. Soil Sci. and Agric. Engineering, Mansoura Univ., Vol.1 (8): 883 – 894.

Ibrahim, E.A. and E.M. Selim (2007). Effect of irrigation intervals and nitrogen fertilizer rates on summer squash (*Cucurbita pepo* L.) growth, yield, nutritional status and water use efficiency. J. Agric. Sci. Mansoura Univ., 32 (12): 10333-10345.

Jamali, B.; S. Eshghi and E. Tafazoli (2011). Vegetative and reproductive growth of strawberry plants cv. Pajaro affected salicylic acid and nickel. J. Agric. Sci. Technol. 13:895-904.

Jones, J.; B. J. B. Wolf and H. A. Mills (1991). Plant Analysis Handbook: A Practical Sampling, Preparation, Analysis, and Interpretative Guide. Micro-Macro Publishing, Athens, Ga.

Kasim, Wedad A.; A. Afaf Nessem and Azza Gaber (2017). Alleviation of drought stress in *Vicia faba* by seed priming with ascorbic acid or extracts of garlic and carrot. The 7th Inter. Conf.”Plant & Microbial Biotech. & their Role in the Development of the Society”, .45 -59.

Kirda, C. (2002). Deficit Irrigation Scheduling Based on Plant Growth Stages Showing Water Stress Tolerance. Deficit Irrigation Practices. FAO Corp. Doc. Rep. 22, pp. 3–10 (Rome).

Marzauk, Neama, M.; M.R. Shafeek; Y.I. Helmy; A.A. Ahmed and Magda, A.F. Shalaby (2014). Effect of vitamin E and yeast extract foliar application on growth, pod yield and both green pod and seed yield of broad bean (*Vicia faba* L.). Middle East J. of App. Sci., 4(1): 61-67.

Metwaly, E.E and R.S. El-Shatoury (2017). Impact of Foliar Application with Salicylic Acid on Growth and Yield of Potato (*Solanum Tuberosum* L.) under Different Irrigation Water Quantity. J. Plant Production, Mansoura Univ., Vol. 8 (10): 969 -977.

Metwaly, E.E and R.S.El-Shatoury (2017). An Attempt to Alleviation of Irrigation Water Deficit Stress in Cabbage (*Brassica oleracea* var. capitata L.) by Exogenous Foliar Application with some Antioxidant. J. Plant Production, Mansoura Univ., Vol. 8 (12): 1315 – 1322.

Nasrabadi, H.N.; H. Nemati; M. Kafi and H. Arouei (2015). Effect of foliar application with salicylic acid on two Iranian melons (*Cucumis melo* L.) under water deficit. Afr. J. Agric. Res. 10(33): 3305 – 3309

Shalaby, T.A. and H. El-Ramady (2014). Effect of foliar application of bio-stimulants on growth, yield, components, and storability of garlic (*Allium sativum* L.). Australian J. of Crop Sci., 8(2): 271-275.

Siamak, F. and H. Kazemi-Arbat (2014). Effects of salicylic and ascorbic acid applications on growth, yield, water use efficiency and some physiological traits of chickpea under reduced irrigation. Legume Research, 38 (1) 2015: 66-71.

Simaei, M., R.A. Khavari-Nejad and F. Bernard (2012). Exogenous application of salicylic acid and nitric oxide on the ionic contents and enzymatic activities in NaCl-stressed soybean plants. American Journal of Plant Sciences, 3: 1495-1503.

Singh, J. P. (1988). A rapid method for dertermination of nitrate in soil and plant extracts. Plant and soil, 110: 137-139.

Snedecor, G. W. and W. G. Cochran (1980). Statistical Methods, 7th Ed., Ames, IA: The Iowa State University Press.

Tagoe, S. O.; T. Horiuchi and T. Maisui (2008). Effects of carbonized and dried chicken manures on the growth yield and N content of soybean. Plant and Soil, 306 (1): 211 – 220.

Tsado, E. K. (2015). The best source of compost for tomato production: a study of tomato production in niger state, Nigeria. Global J. Agric. Res., 3 (4): 23-33.

World Bank, (2006). Directions in Development. Reengaging in Agricultural Water Management: Challenges and Options. The International Bank for Reconstruction and Development.The World Bank, Washington, DC, pp.p218.

Youssef, M. E. (2007). Effect of some agricultural treatments on the growth, productivity, quality and storage ability of potato. Ph. D. thesis Fac. Agric. Zagaz. Univ., Egypt.

Zaghloul, R.A.; H.E. Abou- Aly; Rasha M. El-Meihy and M.T. El- Saadony (2015). Improvement of growth and yield of pea plants using integrated fertilization management. J. of Agric. Res., 3(4):135-143.

تأثير فترات الرى و التسميد العضوى والرش ببعض مضادات الاكسدة علي الكوسة

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قسم الخضر والزينة ـ كلية الزراعة – جامعة المنصورة.

أجريت تجربتان حقليتان بمزرعة كلية الزراعة جامعة المنصورة فى الموسمين الصيفيين لعامى 2014 - 2015 لدراسة تأثير فترات رى (كل7 -10- 15 يوم) والتسميد العضوى (بدون كمبوست – كمبوست 15 م^3 / الفدان) واربع معاملات للرش الورقى بمضادات الاكسدة (بدون – الخميره 2جرام/ لتر – اسكوربيك اسد 1جرام/لتر – سالسيلك اسيد 1 جرام/لتر) على المكونات الكيميائية والمحصول وصفات الجودة لنبات الكوسة صنف مبروكه. اظهرت النتائج ان ري نباتات الكوسه كل 10 ايام اعطى زيادة معنوية لكل من الكلوروفيل و النتروجين والفوسفور والبوتاسيوم فى الاوراق والثمار وافضل محصول مبكر وكلي واعلى صفات جوده يليها النباتات التى تم ريها كل 7 ايام. كما ادي تسميد النباتات بالكمبوست بمعدل 15 م^3 / الفدان وكذلك الرش بمضادات الاكسده الى زيادة معنوية فى جميع الصفات المدروسه ما عدا النترات والنيتريت ومحتوى النبات من الالياف. وادي التفاعل بين معاملة النباتات بالرى كل 10 ايام مع التسميد العضوى بالكمبوست بمعدل 15 م^3 /الفدان والرش بمستخلص الخميره بمعدل 2 جرام/ لتر الى زياده فى محتوى النبات من الكلوروفيل والمكونات الكيميائية و المحصول المبكر والكلي وصفات الجوده مقارنة بباقي المعاملات لذلك يمكن ان يوصي بإستخدام تلك المعاملة لتحسين انتاجية الكوسه وجودتها وتقليل كمية مياة الرى المستخدمة.