EFFECT OF SOIL SALINITY WITH OR WITHOUT COMPOSTON SOME CHEMICAL SOIL PROPERTIES ALONG WITH POTATO PRODUCTIVITY AND QUALITY.

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ABSTRACT

Two field experiments were conducted at Gilbana village, North Sinai Governorate, Egypt, during winter 2013/2014 and 2014/2015 successive seasons, to study effects of soil salinity (10.58, 7.31 and 5.49 dSm^{-1}) with or without compost applied at a rate 5 ($tonfed^{-1}$) on some chemical soil properties along with potato (Solanum tuberosum L c.v. Spunta) productivity and quality.

Results indicated that decreases for soil pH and EC (dSm^{-1}) but increase for available N, P, K, Fe, Mn and Zn in soil with low salinity and these treated with compost. Results also showed high tuber potato yield weight fed^{-1}) as well as carbohydrate (%), starch (%) and protein for soil salinity and these soils treated with compost. The N, P K, Fe, Mn and Zn concentration increases in tuber potato for low soil salinity.

According the applied of compost under different level of salinity soil seemed to improve some chemical properties of soil as well as soil fertility along with productivity and quality of potato (Solanum tuberosum L) c.v. Spunta. Still research continues.

Keywords: Potato Sponta; Saline soil, compost, chemical soil properties.

INTRODUCTION

Soil salinity is one of the major problems of agriculture throughout the world. Accordingly , large areas of arable lands are substantially or partially unproductive. There is evidence that irrigation systems and type of irrigation water have contributed to a large extent in converting arable lands to saline ones, (Ashraf and McNeilly 2004). Salt stress may be lead to inactivation of enzyme activity in both soil and growth plants. Among many enzymes nitrate reeducates activity the influence as nitrate activity in growth plants potato (Ghosh et al. 2000). The high decreases in tuber yield and carbohydrate contents in potato were frequently attributed to higher salt stress (Subhash et al. 2012). Excessive salt rate can adversely influence the physical, chemical, and biological properties of soils, mainly in arid and semi-arid world regions. Therefore, salt-affected soils must be reclaimed to maintain satisfactory fertility for increasing food production (Mariangela and Francesco 2015).

Organic materials are used to improve the negative stresses effects on plants mainly due to decreasing soil salinity stress as well as improving soil structure and water holding capacity in the root zone (Hassanpanah and Jafar, 2012). Besides compost use would reduce the demand for mineral fertilizers and benefit agriculture mainly through its content of organic matter, plant nutrients, promoting plant growth and inhibiting root pathogens/soil-borne plant diseases (Perner et al., 2006). The highest mean values obtained for N, P and K % concentration in tuber were 2.570, 0.344, 3.57 and 2.41, 0.343, 3.71% with application of 15 ton/fed compost plus 50% recommended dose of mineral N during both studied seasons, respectively. The maximum mean values of tuber yield were 9.87 and 10.74 ton/fed with the such treatment,(Mohamed et al 2014). Bakry et al., (2009) found that the applied organic manures encouraged proliferation of soil microorganisms, increased microbial populations as well as activity of microbial enzymes i.e. dehydrogenase, urease and nitrogenase. Abdel-Ghani and Bakry (2005) reported that addition of organic manure had a significant effect on growth characters and tuber yield of growth potato plants when compared with application of the same level of nitrogen applied inorganic nitrogen fertilizers. Later on, El-Quseni et al (2010) pointed out that the total carbohydrate (%) decreased with increasing salinity level due to depression of photosynthetic activates resulting in CO_2 fixation.

Potato (Salanum tuberasum L.) is one of the most important vegetable crops cultivated in Egypt for local consumption and exportation. Increasing the quality of potato for exportation is the main aim of potato growers (Medhat and Mohamed, 2011). In Egypt, potato (*Solamun tuberosum* L.) is cultivated in summer, fall and winter seasons. The tremendous agricultural production has deposited toxic chemicals in water and food, especially in fresh vegetables; As a result, there is a demand for chemical free foods products, (Sayed et al., 2014).

The aim of the present study is to investigate the effect of different levels of soil salinity with or without compost on some chemical properties and potato productivity under newly reclaimed saline soil conditions.

MATERIALS AND METHODS

A field Experimental was conducted at Gilbana village, North Sinai Governorate, Egypt, during winter 2013/2014 and 2014/2015 successive seasons to study the effect of soil salinity on some soil physical and chemical properties and potato (Solanum turberosum) productivity and quality.

The main physical and chemical properties of the soil as well as content of some macro-micronutrients were determined before sowing according to the methods described by Jackson (1967), Cottenie et al (1982) and Page et al (1982); the obtained data were presented in Table (1).

Table (1): Some physical and chemical properties of the soil used.

Sand (%)		**Silt (%)**	**Clay (%)**	**Texture**		**O.M (%)**		**$CaCO_3$ (%)**
78.93		7.34	13.73	Loamy sand		4.9		7.35
pH (1:2.5) (Soil :water suspension)	EC (dS/m) in soil past	Soluble Cations (mmolc L^{-1})				Soluble Anions (mmolc L^{-1})		
		Ca^{+2}	Mg^{+2}	Na^{+}	K^{+}	HCO^{-}_{3}	Cl^{-}	SO^{-2}_{4}
8.03	10.58	12.67	20.94	71.34	0.85	9.48	62.17	34.15
8.00	7.32	8.92	17.52	45.87	0.89	7.92	29. 94	35.54
8.01	5.49	12.63	15.99	25.40	0.88	6.85	19.63	28.42
Available macronutrients (mg kg^{-1})			Available micronutrients (mg kg^{-1})					
N	P	K	Fe			Mn	Zn	
37.22	3.48	198	2.44			1.39	0.71	
39.42	3.65	199	2.57			1.44	0.76	
40.01	3.68	203	2.62			1.48	0.79	

Soil salinity levels as (dSm^{-1}) were 10.58 (S1), 7.32 (S2) and 5.49 (S3) respectively. The area of each experimental pilot unit was 5 X 10 m divided into rows with 75cm spacing. Seedlings of potato (Solanum tuberosum L) c.v. Spunta were cultivated in before within rows 75 cm apart, with 35 cm of cultivation distances within the row. One root potato was sown per hole with 10 cm depth. Seedling was at 18/9/2013 for the first and 18/9/2014 for second seasons respectively. All tillage soil processes were carried out before planting. The treatments were divided into soils treated with compost at a rate 5 ton /fed applied before 25 days from planting and soils untreated with compost. Chemical composition of the used compost is shown in Table (2).

Table (2). Some chemical properties of the used compost.

Moisture (%)	**pH (1:2.5)**	**EC (dSm^{-1}) (1:5)**	**C/N**	**N**	**P**	**K**	**Fe**	**Mn**	**Zn**
			(%)				**DTPA –extractable ($mgkg^{-1}$)**		
25- 30	7.40	3.97	22.59	1.92	0.86	2.14	324.00	189.65	65.83

The compost analysis was done according to the standard methods as described by (Brunner and Wasmer, 1978).

Super phosphate (15.5 % P_2O_5) was applied at a rate of 200 kg fed^{-1} during soil tillage. Urea fertilizer was applied at a rate of 100 kg $Nfed^{-1}$ in three equal doses after 21, 45 and 60 days from planting respectively. Potassium sulphate (48 % K_2O) was applied at a rate of 75 kg K_2O/fed in two equal doses after 21 and 45 days from planting. Harvest was 28 January 2014 and 2015, respectively. Irrigation with El-Salam canal water (1:1) Nile water mixed agriculture drainage water. Immediately following seedling, the soil of plots was irrigated with water and excess water was surface-flowed to the drain ditches. This was performed in order to get rid of a large part of the soluble salts which are usually present in the surface few centimeters of soil. This is a common practice done by farmers, in the area in order to alleviate salinity hazards of the studied soil.

Soil analysis:

After harvesting, the soil sample was collected from surface (0-30cm) air dried, passed through a 2 mm sieve and mixed thoroughly before analysis, carried out as performed according to the methods described by Cottenie *et al* (1982) and Page *et al* (1982). Available K, Fe, Mn and Zn were extracted by ammonium bicarbonate-DTPA (Soltanpour and Schwab, 1977) and measured using ICP spectrometery.

Plant analysis:

Plant tissues (tubers) were analyzed for the content of total N, P, K, Fe, Mn and Zn. Samples were dried at 70° till constant weight, digested using a mixture of concentrated sulfuric (H_2SO_4) and perchloric (HClO) acids (3:1) as described by Chapman and Pratt (1961). Nitrogen was determined by micro Kheldahl method; P was determined in the H_2SO_4/HClO mixture by the molybdate stannous chloride method and K was measured by flame photometer. Finally, Fe, Mn and Zn were measured by the atomic absorption apparatus. These determinations were carried according tomethods of Cottenie et al (1982).

Starch and carbohydrate were determined as described by A.O.A.C. (2000).

Obtained results were subjected to statistical analysis according to Snedecor and Cochran (1980) and the treatments were compared by using the least significant difference (L.S.D. at 0.05 level of probability).

RESULTS AND DISCUSSION

Soil properties as affected by compost with or without under different levels of salinity soil.

Soil pH:

Soil pH is one most important parameter which reflects the overall changes in soil chemical properties. It is obvious from Table (3) that the initial soil state of soil exhibited in general, high pH values for surface soil (0-30cm). It is also found that soil pH tended slightly to moderately alkaline conditions, where the pH values were always around 8.03 to 7.93. These finding are in agreement with those reported by Wahdan et al (1999). On the other hand, treatment with compost during potato production in the two studied seasons led to slight decrease soil pH the lowest value of soil pH being 8.03 in first season; however, there was no clear effect for the soil without compost on pH values of the studied soils. Application of compost alone reduced the soil pH compared to control without compost. Hence, any soil management strategy and production of organic acids (amino acid, glycine, cystein and humic acid) during mineralization (amminization and ammonification) of organic materials by heterotrophs and nitrification by autotrophs would have caused this decrease in soil pH (Sarwar et al. 2010). Pane et al. (2015) reported that applied compost significantly increased soil enzymatic activities including dehydrogenase (DH) activity. This finding is expected to be due to biological activity in particular organic acid producing. These results have caused a positive effect on increasing the hydrogen moles which react in the root zone to form hydrocarbon acid leading to decrease soil pH. These results are in agreement with results of Shaban and Omar (2006). Recanting, El-Maaz et al (2014) added that soil pH values decreased in all soil treated with compost due to the production of CO_2 and organic acids by soil microorganisms acting and other chemical transformation of the added organic matter.

Table (3). Some soil chemical properties of soil the studied after potato harvest.

Soil salinity	pH (1:2.5)		EC (dSm^{-1})		N ($mgkg^{-1}$)		P ($mgkg^{-1}$)		K ($mgkg^{-1}$)	
	With compost									
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
10.60 (S1)	8.02	8.00	6.97	5.88	40.15	42.18	3.52	3.68	203.00	208.00
7.32 (S2)	7.98	7.96	5.24	4.19	44.63	44.93	3.89	3.96	215.00	216.00
5.49(S3)	7.95	7.93	3.94	3.20	46.17	46.85	4.05	4.73	223.00	224.00
Mean	--	---	5.38	4.42	43.65	44.65	3.82	4.12	214.00	216.00
Without compost										
10.60 (S1)	8.03	8.02	8.37	7.88	39.14	39.86	3.48	3.55	200.00	205.00
7.32 (S2)	8.01	8.00	6.94	6.27	40.52	40.88	3.56	3.69	207.00	209.00
5.49(S3)	8.00	7.99	4.38	3.98	42.19	42.38	3.68	3.85	209.00	213.00
Mean	---	---	6.56	6.04	40.62	41.04	3.57	3.70	205.33	209.00
LSD.5% compost	---	---	ns	ns	ns	ns	ns	ns	1.63	ns
LSD.5% salinity	---	--	ns	ns	ns	ns	ns	ns	ns	ns
Interaction	---	--	**	**	**	**	**	ns	**	*

Soil salinity: Electrical conductivity (EC).

The effects of soil salinity with or without compost under potato growing conditions during two studied seasons on soil salinity are presented in Table (3). Electrical conductivity is a soil parameter that indicates indirectly the total concentration of soluble salts and is a direct measurement of salinity. A trend of general decrease in EC of soil was observed after potato crop harvest by application of sole compost than without compost. The interaction between different soil salinities and compost application was significant during both studied seasons. Also, that during the two studied seasons decreases in EC soil values were measured after potatoes tuber harvest compared with initial soil, decreases may be attributed to leaching of soluble salts by irrigation water. This is illustrated by the lowest EC values observed in the second season which corresponds to the highest amount of total irrigation water during potato growing season that seemed to be effective in removing salts accumulated in the root zone. These results are in agreement with Ashour (2014) who showed that application of compost led to decrease of EC soil. These findings are in agreement with those reported by Tandon (2000) who suggested that physical properties (hydraulic conductivity, bulk density and total porosity) of salt affected soil were greatly improved when compost who applied. The decomposition of compost seemed to release acids and active microorganisms which react with the sparingly soluble salts already present into soil either converting them into soluble salts or at least increasing their solubility. Such suggestion was confined by Mariangela and Francesco (2015) who found that applied compost to saline soil decreased EC and bulk density soil but increased of total porosity than control.

It is worth to mention that for able effect of applied compost is more related to substantial modification of soil physical properties, especially soil structure as well as soil aggregation and drainable pores lending to removal for salt.

Available Macronutrients content in the studied soil.

Data in Table (3) showed that the amounts of some available macronutrients i.e. N, P and K ($mgkg^{-1}$) in the studied soil as affected with soil salinity with or without compost during the two studied growing seasons. Results showed increase of N, P and K content in soil by decreasing soil salinity with or without compost. The highest mean values of available N, P and K contents in soil after second season were 44.65, 4.12 and 216.00 $mgkg^{-1}$ respectively for soil treated with compost. Singh et al (2002) reported that continuous use of chemical fertilizers and compost improved potassium status in the soil. The interactions between soil salinity and compost on both N and K contents in soil were significant with decreasing soil salinity, available P content in soil being not significantly affected in second season, increase may being possibility resulted from the effect of farming and added compost on the soil content available N, P and K and organic matter. These results are in agreement by Nasef et al (2009) indicate that values of available N, P and K increased with addition of compost under saline soil codations. The decomposition of applied compost resulted in reduction of soil pH as various acids (amino acids, such as glycine and cystein as well as humic acid) or acid forming compounds and active microorganisms. These findings are in agreement with those reported by Brady and Weil, (2005).

Available of micronutrients contents in soil.

Effect of different soil salinity with or without compost on available micronutrients contents in soil in the studied is presented in Table (4). Changes in Fe, Mn and Zn contents were dependent upon the soil of salinity, the increases being decreased with soil salinity with or without compost; the interaction between soil salinity and compost addition for Fe was not significant with Mn and Zn being significantly affected in both seasons. The highest mean values of the two studied seasons were 2.73, 1.57 and 0.81 mg kg^{-1} for Fe, Mn and Zn content in soil treated with compost respectively. The availability of most micronutrients depends on the decrease of pH of the soil solution as well as the nature of binding sites on organic and inorganic particle surfaces; in saline soils, the solubility of micronutrients is particularly low in soils often thawing deficiencies in these elements (Page et al., 1990). This may be due to the beneficial role of soil organic substances on physico-chemical properties of soil such inducing chelating agents during organic substances decomposition. These results are in agreement with those of El-Shinnawi et al (2009) and Hammad et al (2010) indicating that increase of available micronutrients in soil may be resulted from the effects of farming processes and added compost .

In fact the contents of the studied available micronutrients, in general, lay within the sufficient limits of Fe, Mn and Zn, (FAO, 1992). The distribution pattern of available Fe, Mn and Zn, (mg/kg soil), may be due to increases for soil organic matter in surface layers, as reported by (El-Sheikh 2003).

Table (4). Available micronutrients contents in micronutrients soil the studied after potato harvest

Soil salinity	Micronutrients (mg kg^{-1})					
	With compost					
	Fe		Mn		Zn	
	1st	2nd	1st	2nd	1st	2nd
10.58 (S1)	2.48	2.56	1.44	1.45	0.75	0.77
7.32 (S2)	2.78	2.83	1.48	1.70	0.79	0.82
5.49(S3)	2.82	2.89	1.52	1.83	0.83	0.86
Mean	2.69	2.76	1.48	1.66	0.79	0.82
Without compost						
10.58 (S1)	2.41	2.43	1.40	1.47	0.73	0.75
7.32 (S2)	2.69	2.74	1.44	1.49	0.77	0.79
5.49(S3)	2.73	2.76	1.46	1.53	0.80	0.82
Mean	2.61	2.64	1.43	1.50	0.77	0.79
LSD.5% compost	ns	ns	ns	ns	ns	ns
LSD.5% salinity	ns	ns	ns	0.06	ns	ns
Interaction	ns	ns	*	**	**	**

The increase in soil available micronutrients i.e Fe, Mn and Zn as a result of refuse compost application could be attributed to increased microbial activity in soil as well as increased organic matter containing soil of micronutrients.

Yield and Yield component:

Data concerning the effect of different soil salinity levels and application of compost on potato growth characters are presented in Table (5). It is clear that all growth parameters i.e. tuber yield/plant ; tuber yield (ton/fed); protein content (%) carbohydrate (%) and starch (%) content for potato plants were significantly decreased with soil salinity in both studied seasons except carbohydrate (%) and Starch (%) differences being not significant in the first season. The mechanisms of salinity effect on plant growth were reported by Said-AlAhl and Mahmoud (2010) who attributed the effect of salinity to the following points: (a) the distribution of salts within the plant cells may result in tuber reduction and growth retardations, as well as root and stomatal resistance to water flow, (b) the balance between root and shoot hormones changes considerably under saline conditions, (c) salinity changes the structure of chloroplasts and mitochondria , such changes may interfere with normal metabolism and growth, (d) salinity increases respiration and reduces photosynthesis products available for growth. The applications of compost significantly increased tuber yield /plant in both seasons, the responses the tuber yield / fed was significant in the first season. The effect of compost on protein (%), carbohydrate (%) and starch (%) content in tuber plants was not significant in both studied seasons. Favorable effect of compost under different soil salinity may be due to improving soil biological and chemical properties. Yield component tuber decreased with increasing soil salinity in both seasons without compost than with compost. On the other hand the carbohydrate (%) and starch (%) in tubers increased with decreasing soil salinity level.

Table (5). Yield and yield component of studied as affected with soil salinity with or without compost.

Soil salinity	Tuber yield/plant (g)		Tuber yield /fed (ton/fed)		Protein (%)		Carbohydrate (%)		Starch (%)	
	With compost									
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
With compost										
10.58 (S1)	940.80	866.41	10.58	10.93	11.38	11.50	77.32	78.96	64.58	64.95
7.32 (S2)	1244.80	1256.84	11.36	11.88	13.13	13.14	79.88	80.63	67.49	68.22
5.49(S3)	1429.21	1656.10	13.67	14.11	14.75	14.94	82.14	82.55	70.52	71.30
Mean	1204.94	1259.78	11.87	12.31	13.09	13.19	79.78	80.71	67.53	68.16
Without compost										
10.58 (S1)	737.70	759.37	9.85	10.25	10.94	11.06	75.92	76.10	62.85	62.97
7.32 (S2)	867.59	907.63	10.64	10.99	11.38	11.44	78.42	78.20	65.28	65.87
5.49(S3)	1186.77	1193.50	12.36	12.97	12.13	12.25	79.39	80.14	68.52	69.25
Mean	930.69	953.50	10.95	11.40	11.48	11.58	77.91	78.15	65.55	66.03
LSD.5% compost	64.59	76.18	0.01	ns	ns	ns	ns	ns	ns	ns
LSD.5% salinity	18.21	51.67	1.78	2.28	1.71	1.54	ns	2.72	ns	2.16
Interaction	**	**	ns	ns	ns	ns	ns	ns	ns	ns

These results are in agreement by Subhash et al. (2001) showed that total dry matter production decreased with increasing salt. The yield reduction may be attributed to the reduction of the tuber weight per plant, weight tuber yield /fed, protein (%), carbohydrate (%) and starch (%) resulting in a lower yield of salt-treated plants.

These results may be attributed to application of compost led to an increase of absorption elements and thus increases the macronutrient content and uptake in potato. The reduction in total carbohydrate content in tuber potato may be due to the reduction in photosynthesis rate and increasing photorespiration under high saline soil levels.

Macronutrients concentration in tubers:

Data presented in Table (6) revealed that nitrogen, phosphorus and potassium percentages decreased in tuber of potato plants with increasing soil salinity. The statically analysis showed that effects of applied compost on N concentration in tubers was positive and significant in both seasons, while the P and K concentration in tuber were not significantly affected for the studied the first season. Also, the effect of soil salinity on N and P concentrations in tubers of potato plants was significantly influenced by decreases in such soil salinity in both seasons, while, the K concentration in tuber potato being not significantly affected in the first studied season.

The effect of interactions between soil salinity and compost application on N content of tubers was significant effect in both studied season while, P concentration being not significantly in the first studied season. Interactions between soil salinity and compost application on K concentration in tubers was not significantly affected in both studied seasons.

Table (6).Macronutrients concentration (%) in tubers of potato plants.

Soil salinity	Macronutrients (%)					
	With compost					
	N		P		K	
	1st	2nd	1st	2nd	1st	2nd
10.58 (S1)	1.82	1.84	0.22	0.26	2.79	2.81
7.32 (S2)	2.10	2.15	0.32	0.35	2.94	2.96
5.49(S3)	2.36	2.39	0.36	0.41	2.97	2.98
Mean	2.09	2.16	0.30	0.34	2.90	2.92
Without compost						
10.58 (S1)	1.75	1.77	0.20	0.25	2.55	2.58
7.32 (S2)	1.82	1.83	0.26	0.28	2.63	2.67
5.49(S3)	1.94	1.96	0.32	0.34	2.77	2.82
Mean	1.84	1.85	0.26	0.29	2.65	2.69
LSD.5% compost	0.124	0.052	ns	2.137	ns	0.044
LSD.5% salinity	0.026	0.033	0.043	0.027	ns	0.071
Interaction	**	**	ns	*	ns	ns

The hazard of high soil salinity led to decreases in nitrogen (%) possibly attributed to the retardation of cell division and elongation as result of disturbance in nitrogen metabolism beside synthesis, which might be affected by chlorophyll reduction. Decreases in phosphorus percentage, however, might be due to slight rising of soil pH which lowers the availability of phosphorus. The soil phosphorus increased after adding compost to the soil. Possibly attributed to improved soil characters and increased organic mater containing different nutrients and decrease of soil salinity. Potassium percentage obtained reduction might be referred to the existence of some of interaction between Na and K that might be responsible for the diminished K concentration under saline condition, El-Quesni et al (2010). Addition of compost was reported the exhibited pH value and macronutrients, including N, P and K which was increased with the with used tomato residues, (Pane et al .2015). Later on, Daryush et al (2012) showed that salinity significantly decreased all macronutrient contents in plants.

Micronutrients concentration in tubers potato.

Effect of different salinity levels with or without on micronutrients are presented in Table (7) showing that salinity significantly affected Fe and Mn concentrations in the studied tuber in the first season, Zn being significantly in both seasons responses being dependant on the representing soil salinity. On the other hand, the effect of compost application on the concentrations of all studied in tubers potato plants was not significant affect in both studied seasons. The interactions between soil salinity and compost application on Fe, Mn and Zn concentrations in tubers potato plants were not significant in both seasons. The solubility of micronutrients under salinity condition is relatively low, plants grown on such soil being often suffering from deficiencies in these elements. Soil salinity may reduce micronutrients uptake due to some salt of competition by salt cations at the root surface (Marschner and Romheld 1994).

Table (7).Micronutrients concentration in tubers of potato plants.

Soil salinity	Micronutrients (mgkg^{-1})					
	With compost					
	Fe		**Mn**		**Zn**	
	1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**
10.58 (S1)	55.98	56.27	16.85	17.00	37.63	37.96
7.32 (S2)	58.32	58.83	18.35	18.95	40.14	40.61
5.49(S3)	60.18	60.96	19.45	20.10	43.65	43.58
Mean	58.16	58.69	18.22	18.68	40.47	40.72
Without compost						
10.58 (S1)	52.98	53.19	14.95	15.24	35.17	35.46
7.32 (S2)	57.20	57.66	17.36	18.00	38.63	38.95
5.49(S3)	59.32	59.72	18.33	19.84	40.17	40.55
Mean	56.50	56.86	16.88	17.69	37.99	38.32
LSD.5% compost	ns	ns	ns	ns	ns	ns
LSD.5% salinity	2.081	ns	1.569	ns	1.802	1.830
Interaction	ns	ns	ns	ns	ns	ns

The positive effect of compost on increasing micronutrients concentrations in the studied tubers may be attributed to contained enzymes like amylase, lipase and cellulose, which continue to breakdown organic matter in the soil and release the nutrients in available from near rhizosphere and finally absorbed by the plant roots. These results are similar those of Chaoui et al (2003) and Ashour (2015).

CONCLUSIONS

Generally, it could be concluded the compost addition soil salinity as it improved soil chemical properties and produced the higher tuber yield and quality with decreases in soil salinity combined with such compost application.

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تاثير ملوحة الأرض فى وجود او عدم وجود الكمبوست على بعض الصفات الكميائية للتربة وانتاجية وجودة البطاطس.

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****قسم لأراضى – كلية الزراعة جامعة طنطا**

اجريت تجربتان حقلية بقرية جلبانة – شمال سيناء – مصر ، اثناء الموسم الشتوى ٢٠١٣/ ٢٠١٤ ، ٢٠١٤ /٢٠١٥ م لدراسة تاثير مستويات مختلفة من ملوحة التربة فى وجود او عدم الكمبوست بمعدل ٥ طن لفدان على بعض صفات الكميائية لتربة وانتاجية وجودة الطاطس صنف spunta .

اظهرت النتائج : انخفاض درجة حموضة التربة وملوحة التربة وزيادة العناصر الكبرى الميسرة نتروجين - فوسفور – بوتاسيوم والعناصر الصغرى الميسرة فى التربة حديد- منجنيز و زنك خاصة فى التربة المعاملة بالكمبوست وانخفاض مستوى الملوحة.

لوحظ زياده انتاجية محصول درنات البطاطس لفدان والكربوهيدارت والنشا والبروتين نتيجة انخفاض مستوى الملوحة لتربة والمضاف لها الكمبوست.

وجد ان انخفاض مستوى ملوحة التربة سواء فى وجود او عدم وجود الكمبوست ادى الى زيادة تركيز العناصر الكبرى نتروجين- فوسفور – بوتاسيوم والعناصر الصغرى حديد- منجنيز و زنك فى درنات البطاطس. التوصية :

من النتائج المتحصل عليها وجد ان اضافة الكمبوست تحت مستوى منخفض من الملوحة ادى الى تحسين صفات التربة الكميائية وخصوبة التربة واعطت افضل انتاجية لدرانات الطاطس للفدان. ومازال البحث مستمر فى الدراسة.