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تأثيراستعمال بعض مخلفات المصانع على خواص التربة وإنتاجية النبات

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الملخص العربي

أجريت تجربة حقلية في منطقة جنوب القنطرة شرق بسيناء الشمالية تحت ظروف أراضى رملية من خلال زراعة العروة الشتوية لمحصول البطاطس في موسم ٢٠٠٩/٢٠١٠ بهدف دراسة تأثير إضافة مخلفات عضوية مثل الفيناس ومخلفات حلج القطن وخلطهما معا بنسبة ١:١ وزنا بمعدلات إضافة صفر، ٥، ٧,٥، ١٠ طن /فدان وتأثير ذلك على بعض خواص التربة وكذلك على نمو ومحصول الدرنات وجودة البطاطس.

أظهرت النتائج انخفاض الكثافة الظاهرية للتربة في حين ازداد كل من المسامية الكلية ،التوصيل الهيدروليكي ،الماء الميسر،محتوى التربة من المادة العضوية.

أيضا وجد ان هناك تأثير موجب على تكوين حبيبات التربة المجمعة يتعلق بنوع ومعدل المخلفات العضوية ينعكس ذلك على تحسين التربة وزيادة إنتاجية الاراضى الرملية.

وجد ان محصول البطاطس يزداد مع زيادة معدل الخلط بين الفيناس ومخلفات حلج القطن وتم الحصول على اعلى محصول عند استخدام ١٠ طن للفدان بالمقاونة بالمعاملة بدون اضافة. وكان متوسط قيم محصول البطاطس ١١.٨٢ ،١٢.٣٢، ١٢.٧٨، ١٣.٠٤ طن للفدان عند استخدام الفيناس بمعدلات صف،٥،٧.٥ ، ١٠ طن للفدان على الترتيب. فى حين كانت ١١.٨٢ ،١٢.٤٥، ١٢.٨٢، ١٤.١٩ طن للفدان عند استخدام مخلفات حلج القطن بينما كانت ١١.٨٢،١٣.٧٢ ، ١٤.٩٣، ١٥.٦٨ طن للفدان عند استخدام مخلوط الفيناس + مخلفات حلج القطن بنفس السمعدلات السابقة.

وتشير نتائج التحليل الاحصائى إن هناك تأثير معنوي لنوع ومعدل الاضافة على كل الصفات المدروسة للتربة ومحصول وجودة البطاطس.

وتدل النتائج انة من الممكن استخدام الفيناس و مخلفات حلج القطن كمصدر للمواد المحسنة لخواص التربة وانتاجيتها.

APPLICATION OF DIFFERENT INDUSTRIAL WASTES AND ITS IMPACTS ON SOIL PROPERTIES AND PLANT PRODUCTIVITY

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ABSTRACT: ***Field experiment was conducted on a sandy soil located at El- Quntara East, North Sinai , during winter growing season of 2009- 2010. The aim of the study was evaluate the effect of applying types organic wastes on soil properties and productivity .The organic wastes are Vinasse (BV), Cotton gin trash (CGCC) and mixture of vinasse + cotton gin(BC) at a 1: 1` rate weight/weight. Four rates of there organic wastes were applied to study their effect 0,5,7.5 and 10 ton/Fed on some soil properties , plant growth, Tuber yield and quality of potatoes.***

The obtained data revealed that soil bulk density was decreased , while total soil porosity, macroporsity, saturated hydraulic conductivity, soil available water as well as the organic matter contents of the soils were increased . Also; they indicated the positive effect of the added organic wastes on soil aggregates regardless the type or rate of the used organic wastes.

Improving such properties is mandatory for the purpose of reclaiming and increasing productivity of sandy soils was observed.

The obtained data showed that Tuber yield of potatoes increased with increasing mixture of vinasse+cotton gin rates up to 10 ton/Fed .the average yields were 11.82,12.32,12.78 and 13.04 ton/Fed for vinasse addition rates 0, 5, 7.5 and10 ton/Fed., respectively or 11.82 12.45,12.82 and 14.19 ton/ Fed. for cotton gin .,while, they reached 11.82, 13.72 ,14.93 and 15.68 ton/Fed. for mixture of vinasse+cotton gin.

The results and statistical analysis, generally, indicated significant beneficial effects of the application of different rates on all studied soil properties and tuber yield and tuber quality. This indicates that increments in organic matter due to additions of these wastes may partially explain improvements in these properties of sandy soil.

So, we can said that vinasse and cotton gin trash can considered effective in improving soil properties and productivity.

Key words : ***Vinasse, cotton gin cruched, bulk density, hydraulic conductivity, water stable aggregates and tuber yield of potatoes.***

INTRODUCTION

Organic by products originating from industrial processes represent an important source of nutrients, especially for organic farming. In this respect, beet Vinasse (B V),a final by product of sugar industry , is a product of great agricultural interest , because of its high content of organic matter ,N and K concentrations(Madejon *et .al.,* 2001).

Sugar-beet is characterized by short growing season, consumes less water than cane (about two- thirds) and it may also grows under a wide variety of soil and climatic conditions (Abou-shieshaa 2001).

Vinasse as an industrial waste is being a problem for getting disposed from sugar industries. It represents the residues from molasses fermentation. The sugar and integrated industries company in hawamdyia produces more than 2.000 m^3d^{-1} of Vinasse. The large amount of Vinasse can harm the environment, causing salinization and river Nile pollution. Therefore it was though useful to try over coming the created problem using it in agriculture lands .

Disposal of industrial wastes and by-products is an increasing concern for most industries. Disposal of Vinasse has become a problem in sugar cane-growing countries where the distilling industry has recently expanded. Vinasse contains many useful elements and can be profitably recycled to improve soil properties and increase crop yield while alleviating environmental pollution pande, *et.al*., 1995).Worldwide, the interest in using sugarcane by-products is growing ,largely owing to the decreases in production cost and environmental liabilities.

The distillation of beet molasses for production of alcohol generates a dark brown effluent with high organic matter (OM) known as Vinasse. Vinasses are currently concentrated for later use (animal feeding, potassium salts). The resulting concentrated Vinasse is a dense liquid with high O.M . However, its contents of organic matter OM(35%), N (3%) and K (3%) make it a potential fertilizer, although with some limitations due to its salinity, high density (1.3 g cm^3) and low P content (P_2O_5,0.012 %) (Francisco, *et.al*., 2002). Despite the nutrients contained in the Vinasse, under dry land conditions this by-product may negatively affect soil structure ,nutrient uptake ,and crop yield and quality (Tejada and Gonzalez, 2005 and Tejada, *et.al*., 2006 a).on the other hand, Abou yuossf *et. al.,* (2007) found that the addition of Vinasse to sandy soil increased the productivity of sugar root and wheat yield. Also, Vinasse application increased the uptake of nitrogen, phosphorus and potassium. The residual available N, P, and organic matter in soil after harvesting generally increased with increasing rate of Vinasse application.

Cotton gin waste is a term used to describe the by-products of the cotton ginning process and includes leaves, stems, hulls, and some lint (Jackson *et.al*., 2005).

Lui, *et. al*., (2007) found that the soils amended with cotton gin trash had higher soil water content, lower bulk density, higher humic matter content, higher porosity and higher levees mineralizable N than soil with other fertility amendments. Cotton gin tars are an organic waste product readily available in Arkansas. Composted gin trash can increase the water and nutrient-holding (CEC=200 meq/100gm) properties of media and has a pH of 5.5 to 6.0 .High soluble salts can be a concern, but this can be reduced quickly through leaching with water .Several studies have shown reduction of plan growth when the media contains >50%gin trash (Robbins and Evans, 2010).

Wanas and Omran(2006), Tejada, *et.al*., (2006b) and Tejada and Gonzalez (2007) found that the application of cotton gin crushed compost improved the soil physical (structural stability, bulk density), hydro-physical and chemical (exchangeable sodium percentage) properties. Also, Abou yuossef and El-Eweddy(2010) reported that the application of cotton gin trash improved of some properties of sandy soils and yield of corn grain .Also they found that the values of EC, bulk density, penetration resistance, and hydraulic conductivity were decreased with increasing the application rates of cotton gin trash, while, the organic carbon, maximum water holding capacity and corn grain yield were increased.

The objective of this field study was to evaluate the effect of using three organic wastes (BV, CGCC and BC compost obtained by mixing of CGCC and BV at 1:1 rate weight /weight) as used as soil amendment at different rates on some physical , chemical soil properties and potatoes productivity.

MATERIALS AND METHODS

Site description and experimental design

The experiment was conducted at south of El-Quantara East districts North Sinai, during 2009/2010 season. Soil analysis of the experimental site and analysis of the used Vinasse and cotton gin trash are summarized in Table (1-a and 1-b) .

Vinasse was obtained from sugar and integrated industries Company (Howamdyia),Giza Governorate ,while cotton gin trash. Was obtained from crushed cotton company(Tanta) El- Grubua Governorate Egypt The study was organized in a completely randomized blocks design using three organic wastes Vinasse (BV), cotton gin crushed (CGCC) and mixing (BV+CGCC) at a 1:1 rate weight/ weight . four rates (0,5,7.5 and 10 ton/fed),for each waste with three replicates of each rate were applied. Total plots of the field experiment were 30 plots with on area 3.5 *3.5m2 for each plot.

Table (1-a): Some chemical and physical characteristics of the studied soil .

Soil depth	pH 1:2.5	EC dS/m	O.M %	Bulk density	Particle size distribution		
					sand %	Silt	Clay

cm				g/cm3		%	%
0 - 20	7.76	1.38	0.17	1.72	90.63	5.96	3.41

Table (1-b): Characteristics of organic wastes used .

characteristics	Unit	values	
		vinasse	cotton gin 1:5
pH		4.36	7.12
EC	dS/m	13.77	1.48
O.C	%	27.5	52.6
Total N	%	3.66	167
Total P	%	0.12	0.79
…..K	%	8.32	1.36
….sugars	%	61.00	-
Ash	%	27.31	7.22
lignin's	%	-	16.3
Bulk density	g/cm3	-	0.59

The potatoes *Solanum tuberosum L*. Variety Alpha were planted on 20 th October 2009/2010. All plots were fertilized as commonly practiced. Super phosphate (15.5%P_2O_5) was added before planting, as basal dose Nitrogen fertilizer was added at three equal doses as ammonium nitrate (33.5 %) N , also, potassium sulphate (48%K_2O) rates were divided into two equal doses and applied with the 2nd and 3nd additions of N.

Yield data was obtained after 130 days planting ,the tuber yields of plants per/fed den were den divided into, marketable and unmarketable yield .In the present study some of characters after harvest were measured such as dry matter percent was calculated as mentioned by Hassanabadi and Hassanpanah (2003) and specific gravity was determined using the method described by Dinesh *et.al*., (2005):

Specific gravity = a / a – b

where a is weight in air and b is weigh in water

Soil sampling analysis:

After harvest, undisturbed soil samples (0 – 20 cm depth) each were taken from to determine some soil properties. Soil bulk density was determined by core method and total porosity was calculated using the values of soil bulk density and particle density, i.e. 2.65 g /cm^3 by to (Majumdar and Singh, 2000). Macro porosity was calculated from as follows:

$F_{(a)} = u\ (1 - \sigma\ )$

where $F_{(a)}$ = macro porosity (%)
u = total porosity (%)
σ = degree of saturation (%) , that is the volume of water present in the soil at 0. 1 bars relative to the volume of soil pores .

To calculate soil available water, soil moisture content, on dry weight basis was determined at 0.01 and 15 bars (representing the field capacity and permanent wilting point ,respectively).Water stable aggregates were determined according to (Black,1965).Saturated hydraulic conductivity (Ks) for the undisturbed soil samples was determined according to (klute, 1986).Organic matter was determined following the modified walkley and Black method,(Jakcson 1969).

The results were statistically analyzed using the technique of analysis of variance (ANOVA) and the least significant difference ,LSD between the treatments means were according to Gomez&Gomez (1984).

RESULTS AND DISCUSSION

Soil Organic Carbon

Addition of the organic wastes, by different rates significantly increased soil organic carbon, OC (Table 2) .The highest increase in O.C % reached 288 and 335 % its especially evident for the treatments of high different rates of CGCC and BC, respectively , followed by (258 %) for the BC treatments 258 % at 7.5 ton/Fed rate. .However the lowest increase was from four with 5 ton/fed of BV treatment. These results are in agreement with those obtained by Bulluck *et.al*., (2002) and Tejada (2010).

Table (2): Effects of addition of organic wastes on organic carbon content and hydraulic conductivity of Sandy soil.

Treatments	applied levels ton/Fed	organic carbon %	increase %	hydraulic conductivity cm/sec	decrease %
Control	0	0.296	100	20.13	100
B .V	5	0.418	41	20.01	0.6
	7.5	0.471	58	19.83	1.5
	10	0.487	64	19.73	1.9
CGCC	5	0.644	117	17.66	12
	7.5	0.923	211	17.43	13
	10	1.149	288	14.41	28
B .C 1:1	5	0.766	158	15.61	22
	7.5	1.062	258	13.61	32
	10	1.289	335	13.08	35
	Wastes	0.044	-	0.61	-

L.S.D 5 %:	Rates	0.051	-	0.71	-
	WastesXRates	0.081	-	1.21	-

Hydraulic Conductivity

Incorporations of organic wastes significantly reduce the hydraulic conductivity (Ks) of sandy soil which is the main problem of such kind of soils. The magnitude of decrease depends on the rate of application as revealed in Table 2. Among the wastes of highest decrease in Ks values over the control was with using BC (35% and32 %) , followed closely by CGCC (28%) .This behavior may due to the continuity connection of soil pores from soil till the bollom. However there was no virtually difference between the control and BV amended soils .The calculated L.S.D(Table2) shows of the effect of organic wastes type, rates and two interaction on soil hydraulic conductivity .The control treatment showed relatively high hydraulic conductivity (significant changes) comparing with the two specified types, rates and interaction . These realties are in agreement with those obtained by Wanas and Omran (2006) who clearly showed the effect of cotton compost application on deceasing hydraulic conductivity of sandy soil.

Bulk density and porosity

At each application rate, organic waste seduce soil bulk density (Table3). Relative to the control, soil bulk density of the amended soil were significant lower 6% , 12% and 23 % for the high rates of BV,CGCC and BC treatments respectively.

Table (3): Effects of addition of organic wastes on bulk and macro porosity of sandy soil.

Treatments	applied level ton/Fed	Bulk density g /cm3	macro porosity %
Control	0	1.78	26.92
B .V	5	1.74	27.12
	7.5	1.72	27.37
	10	1.67	28.1
CGCC	5	1.74	24.84
	7.5	1.70	25.44
	10	1.57	28.11
B .C 1:1	5	1.62	26.81
	7.5	1.48	30.02
	10	1.37	29.63
L.S.D	Wastes	0.04	n.s

5 %:	Rates	0.05	2.15
	Wastes X Rates	0.07	n.s

The consequence of the decreased soil bulk density on increase in total porosity corresponded (Fig. 1) . Relative improvement in total porosity over the control, ranged as 4.5% , 5% and 18 % for the 5 ton/Fed. application rate and 7%, 9% and 35 % for the 7.5 ton/Fed . rate and 13% ,14% and 37 % for the 10 ton/Fed. rate. The increase in total porosity is due mainly to an increase in the percentage of the macro pores (Table 3). No significant effect was found application type treatments, while the application rates caused significant improvements in macro porosity. These results are in agreement with those obtained by Mbagwu (1989) who found that additions of the wastes at both 5 and 10 % decreased soil bulk density but increased total porosity and macro porosity

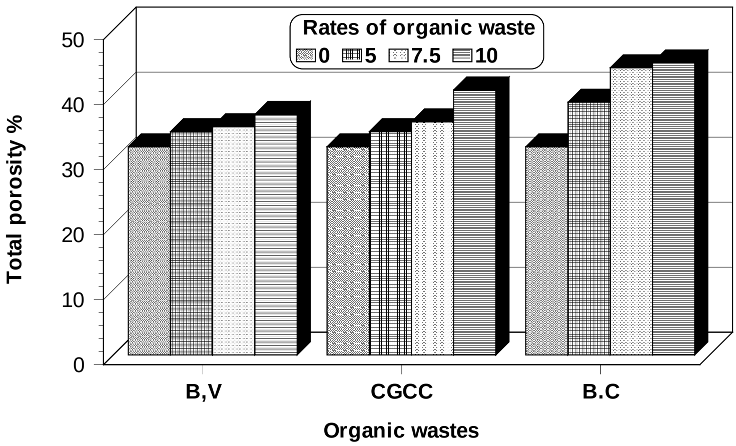

Fig. (1): Total porosity as influenced by type and rate of organic waste amendments.

Water stable aggregates.

Water stable aggregates gives an indication for soil structure and pore size distribution. The positive effect of the added organic wastes on soil aggregates regardless the type or rates of the used organic wastes, Was clean, Table 4 .

Data show that the total aggregates having diameter > 0.25 mm increased when organic wastes applied at the expense of that have diameter < 0.25 mm compared with the control treatment. This means that the used organic wastes were able to create a new conditions differ than that predominant in sandy soil.

Table (4): Water stable aggregates of sandy soil as affected by type and rate of wastes.

Treatments	applied level ton/Fed	total aggregates >0.25mm	control %	total aggregates <0.25mm	control %
Control	0	19.09	100	80.01	100
B .V	5	22.33	116.97	77.67	95.99
	7.5	24.55	128.6	75.45	93.25
	10	26.08	136.61	73.93	91.36
CGCC	5	22.6	118.38	77.4	95.66
	7.5	24.78	129.8	75.22	92.96
	10	26.68	139.75	73.32	90.61
B .C 1:1	5	24.07	129.08	75.93	93.84
	7.5	28.01	146.72	71.99	88.97
	10	25.5	149.29	71.5	88.36
L.S.D 5 %:	Wastes	n.s		0.73	
	Rates	1.02		0.84	
	Wastes XRates	n.s		n.s	

The aggregate size distribution is presented in Table (5) and (Fig. 2) . The figure generally reveals that the added organic wastes occurred a great modification in the pattern of aggregates distribution either between the three used organic wastes or when compared with the control The highest percentage of increase reaches 98.02 % in the treatment of high addition rates of BC for the aggregates having diameter of < 2mm, while it reaches 23.26% for lowly rates of BV. The same treatment achieves the highest percentage by values of 34.45% , 34%, 30.63% and 30.28% for the aggregates having diameters of 2 – 1 and 1 – 0.5 mm under 10 and 7.5 ton/ Fed for BC , respectively .

Concerning the aggregates with diameter of 0.5 – 0.25 mm, the values were deceased by application of organic wastes as compared with the control. The results and statistical analysis indicate significant effects of addition of organic wastes on all studied aggregate sizes.

Rizzi *et.al*., (2004) reported that compost can help the formation of a larger number of water stable aggregates through links , wastes at different

rate between smaller particles , strong enough to with sand the dispersing action of water.

Table (5): Wet aggregate size distortion of sandy soil treated with organic .

Treatments	Applied level	Aggregates size distortion			
	Ton/Fed	<2.0mm	2-1 mm	1-0.5mm	0.5-0.25mm
Control	0	2.02	19.85	20.37	37.91
B .V	5	2.49	22.06	21.11	25.42
	7.5	2.8	21.41	22.06	23.4
	10	2.86	23.39	23.00	18.01
CGCC	5	3.00	22.32	22.29	21.08
	7.5	3.01	23.65	23.40	20.19
	10	3.56	25.48	25.42	16.00
B .C 1:1	5	3.07	22.42	22.36	23.00
	7.5	3.79	26.60	26.54	13.72
	10	4.00	26.69	26.61	10.00
L.S.D 5 %:	Wastes	n.s	0.86	0.94	0.33
	Rates	0.43	1.00	1.09	0.38
WastestX Rates		n.s	1.73	n.s	0.66

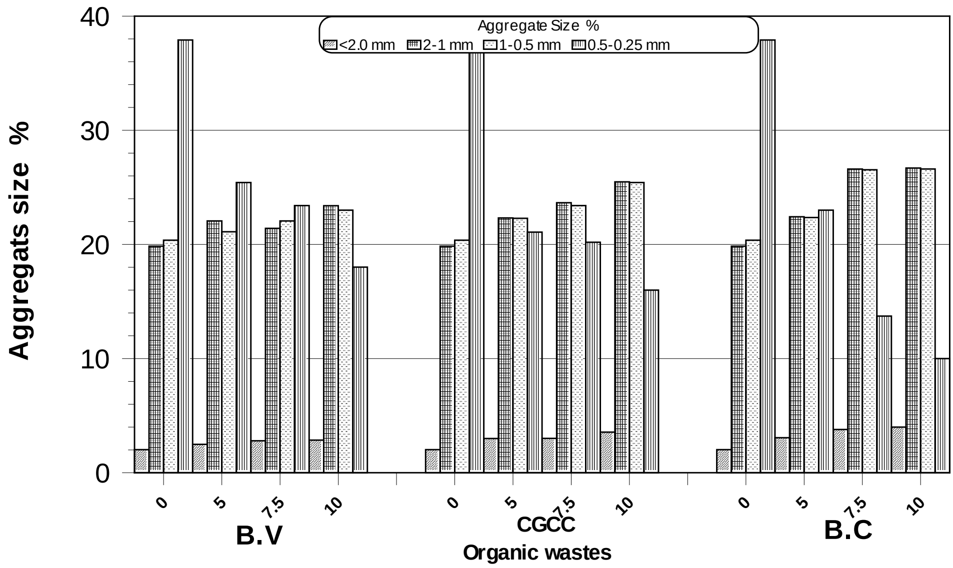

Fig. (2): Wet aggregate size distortion of sandy soil treated with organic wastes at different rate

Soil available water

Addition of the organic wastes at any rate significantly increased soil water retention (Table 6). At 0.1 bars (regarded as the field capacity), the improvements 0f water retention over the control are in the order BC > CGCC > BV. The small difference between the types of organic wastes may be due to that soil available water is tending to be affected by the rate of application more than the type at 15 bars .This is some what agreed with the results obtained by Mbagwu (1989) who found similar effects for applied organic wastes on some physical properties .

Table (6): Effects of additions of organic wastes on available moisture percentage in sandy soil.

Treatments	Applied level ton/Fed	Field capacity	Wilting paint	Available water capacity
		weight % by		
Control	0	4.61	1.89	2.72
B .V	5	5.47	2.05	3.42
	7.5	5.92	2.12	3.8
	10	6.23	2.17	4.06
CGCC	5	6.3	1.96	4.34
	7.5	7.17	2.47	4.7
	10	7.88	2.66	5.22
B .C 1:1	5	6.8	2.36	4.44
	7.5	8.1	2.35	5.75
	10	9.06	2.65	6.41
L.S.D 5 %:	Wastes	0.27	0.15	-
	Rates	0.32	0.17	-
	Wastes X rates	0.32	0.3	-

The lowest improvement in total available water capacity over the control is found in the BV amended soils at all application rates (Fig 3) , the 10 and 7.5 ton/ Fed application rates, of BC result more than 100 % improvement in total available water.

Tuber yields of potatoes

As shown in Table (7), the results illustrate that the application of organic wastes was significant effect on total tuber yield as well as on marketable yield of potatoes .The highest total tuber yield received 15.68 and14.93 ton/

Fed under treatment. The percentage of increase reached 32.65% and26.31% over control for BC rates of 10 and7.5 ton/ Fed, respectively .

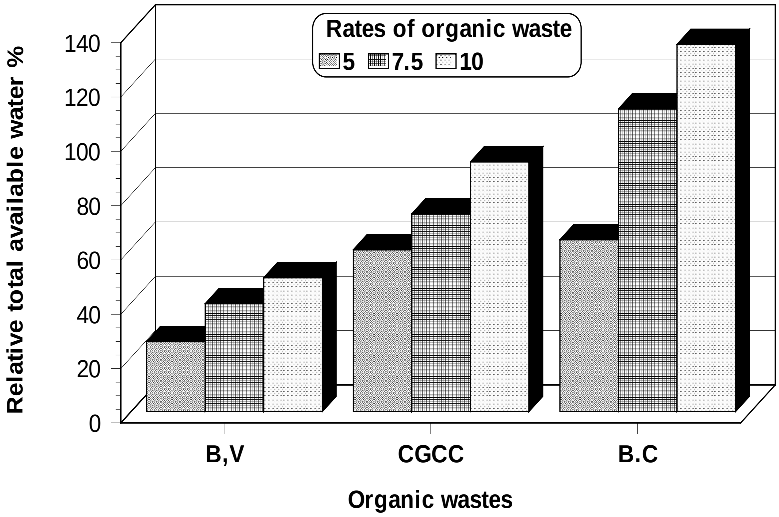

Fig. (3): Effect of type and rate of organic wastes on total available water in sandy soil.

Table (7): Effects of addition of organic wastes on tuber yield and tuber quality of potatoes .

Treatments	applied level ton/Fed	Tuber yield (ton/Fed)			tuber quality	
		Total tuber yield ton/Fe	Marketable ton/Fed	unmarketable ton/Fed	D.M %	Specific gravity
Control	0	11.82	10.23	1.59	17.72	1.081
	5	12.32	10.99	1.33	18.02	1.080
	7.5	12.78	11.48	1.30	19.47	1.072
B .V	10	13.04	11.78	1.26	20.88	1.075
	5	12.45	11.13	1.32	20.12	1.079
	7.5	12.82	12.51	1.31	21.13	1.080
CGCC	10	14.19	12.92	1.27	22.oo	1.083
	5	13.72	12.43	1.29	20.23	1.078
B .C	7.5	14.93	13.72	1.21	22.13	1.086
1:1	10	15.68	14.49	1.19	22.48	1.088
	wastes	0.222	0.071	0.025	0.064	0.003
	Rates	0.259	0.082	0.029	0.074	0.003
L.S.D 5 %:	Wastes	0.445	0.142	n.s	0.119	1.703

	X‹Rates					

The lowest total Tuber yield is obtained in the treatment received of 12.32 ton/Fed of BV treatment rates of 5 ton/Fed. The percentage of increase over control was about 4.23%.marketable potato yield was significantly affected by organic wastes application (Table 7). The more marketable potatoes were produced form BC treated as compared to control treatment . In this respect, Youssef *et. al.,* (2001) noted that the lowest values were obtained from application of organic manure only with no significant difference between these treatments and the control .

Regarding unmarketable yield, data indicated there was were no significant differences between various treatments. However, application of BC resulted in decreases in unmarketable yield compared to control. The obtained results are in correspondence with those reported by El-Metwally (2007).

Tuber Quality

It can be noticed from data in Table (7) that the different tested treatments exerted significant effect on tuber quality of potatoes dry matter (DM %) and specific gravity.

The specific gravity is a measure of quality in potato tuber which is related to the dry matter contents in the tubers, also, of was more in potato tuber harvested from plots treated with BC at 10 ton/Fed. Higher the specific gravity the higher will be the quantity of dry matter and the greater the yield of produce. Potatoes with high specific gravity are preferred for proportion of ships and French fries, while, lowest in specific gravity are used for canning.

REFERENCES

Abou – Shieshaa, R.R. (2001). A study on mechanical topping of sugar beet under Egyptian conditions ,Misr j. Agr. Eng., 18: 584 - 596.

Abou Yuossef, M. F., A.A. Abou Hashem and A. S. El Kot (2007). Utilization of Vinasse in sandy soil to improve soil properties and yield of sugar Beet Egyptian J. of applied Sci, Val 22 (10 B): 720- 736

Abou yuossef, M.F. and E.A. El-Eweddy (2010). Use of cotton Gin trash for improving properties and productivity of sandy soils .Minufiya J.Agric. Res. Vol. 36 No .1:159 – 176.

Black, C.A. (1965). Methods of soil anlysis (part 1). American Society of Agronomy. In Madison ,Wisconsin,USA.

Bulluck, L.R., M. Brosius, G.K. Evanylo and J.B. Ristaino (2002). Organic and synthetic fertility amendments influence soil microbial, physical and chemical properties in organic and conventional farms. Applied soil Ecology, 19: 147-160.

Dinesh, K., R. Ezekiel, B. Singh and I Ahmed (2005). Conversion table for specific gravity dry matter and starch content from under water weight of potatoes grown in North India plains .Potato J.,32 (1-2)79-84.

El-Metwally (2007). Effect of some organic fertilization sources and micronutrients application methods on productivity and quality of potato .M.Sci.Thesis, Fac.of Agric, Mansoura Univ.,Egypt.

Francisco, C., M. Engracia, L . Rafael and M.M. Jose (2002). Agricultural use of three (sugar beet) Vinasse composts: effect on selected soil chemical properties.17th WCSS, 14 12 August 2002, Thailand. No.405. land under dry

Gomez, K.A. and A.A. Gomez (1984). "Statistical procedures for Agricultural Research",2nd ed.,P. 680, John Wiely and sons.

Hassanabadi, H. and D. Hassanpanah (2003). Ireland breeding technical course report. Seed and plant Improvement Institute, Kara j ,Iran.

Jakcson, A.L. (1969). Soil chemical analysis – advanced course. Pub.by Author, Depy. of Soils, Univ. of Wisc.Madison,Wisc.,USA.

Jakson, B.E., A. N. Wright, D.M Cole and J. L. Sibley (2005). Cotton gin compost as a substrate component in container production of nursery corps. Environ .Hort. 23(3) :118 – 122 .

Klute, A. (1986). Laboratory measurement of hydraulic conductivity of saturated soil. P. 210 – 220. In Page, *et.al*. (eds). Methods of soil Analysis, Par 1.Physical and Mineralogical Methods ASoc.Agron.Inc.Medison.,Wis.USA.

Liu, B., L. Marcia, B. Gumpertz and H. Shuijin (2007). Effect pf prior tillage and soil Fertility amendments on dispersal of phytophlora capsici and infection of pepper.Eur j.plant pathol (2008).1220:273 - -287.

Madejon, E., R. Lopez, J.M. Murillo and F. Cabera (2001). Agricultural use of three (sugar- beet) Vinasse composts: Effect on crop and chemical properties of a Cambisol soil in the Guadalquivir river valley (SWS pain).Agric Ecosyst. Environ. 84: 53 – 65 .

Majumdar, S.P. and R.A. Singh (2000). Analysis of soil physical properties. Agrobi, New Delhi. India.

Mbagwu, J.S.C. (1989). Effects of organic amendments on some physical properties of a Tropical ultisol. Biological wastes 28 :1-13.

Pande, H.P., B.K. Sinha, G.B. Singh and Solomons (1995). Use of distillery waste as a fertilizer .Sugarcane: Agro-industrial Alternatives ,PP.401 -413.

Rizzi, L., G. Petruzzelli, G. Poggio and G. Vigna Guidi (2004). Soil physical changes and plant availability of Zn and pb in a treat ability test of phytostabilization. Chemosphere (57):1039-1046.

Robbins, J.A. and M.R. Evans (2010). Growing medid for container production in green house or nursery part 1 (components and Mixes).university of Arkansas, USDA. of Agriculture, and county Governments cooperating.

Tejada, M. (2010). Organic amendment based on vermicompost and compost: differences on soil properties and maize yield .waste manage .Res., 20:219-224.

Tejada, M. and J.L. Gonzalez (2007). Application of different organic wastes on soil Properties and wheat yield .Agon .J .,99:1597 – 1606.

Tejada, M. and J.L. Gozalez (2005). Beet Vinasse applied to wheat under dry land condition affects soil properties and yield . Eur.J.Agron .23:336-347.

Tejada, M., C. Garcia, J.L. Gonzalez and M.T. Hernandez (2006 a). Organic amendment based on fresh and composted beet Vinasse: influence on soil properties and wheat yield .Soil Sci.Soc.Am.J.70: 900 -908.

Tejada, M., C. Garcia, J.L. Gonzalez and M.T Hernandez (2006 b). Use of organic amendments as a strategy for saline soil remediation ;Influence on the physical, chemical and biological properties of soil .Soil Biology & biochemistry 38pp:1413-1421.

Wanas, Sh. A. and W.M. Omran (2006). Advantage of applying various compost types to different layers of sandy soil : 1- Hydro-physical properties .J. of Applied Sci .Res ,2(21) :298- 303.

Youssef, A.M., A.H.M. El-Foly, M.S. Youssef and S.A. Mohamdien (2001). Effect of using organic and chemical fertilizers in fertigation system on yield and fruit quality of tomato. Egyp. J.Hort.28:59-77.

تأثيراستعمال بعض مخلفات المصانع على خواص التربة وإنتاجية النبات

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الملخص العربي

أجريت تجربة حقلية في منطقة جنوب القنطرة شرق بسيناء الشمالية تحت ظروف أراضى رملية من خلال زراعة العروة الشتوية لمحصول البطاطس في موسم ٢٠٠٩/٢٠١٠ بهدف دراسة تأثير إضافة مخلفات عضوية مثل الفيناس ومخلفات حلج القطن وخلطهما معا بنسبة ١:١ وزنا بمعدلات إضافة صفر، ٥، ٧,٥، ١٠ طن /فدان وتأثير ذلك على بعض خواص التربة وكذلك على نمو ومحصول الدرنات وجودة البطاطس.

أظهرت النتائج انخفاض الكثافة الظاهرية للتربة في حين ازداد كل من المسامية الكلية ،التوصيل الهيدروليكي ،الماء الميسر ،محتوى التربة من المادة العضوية.

أيضا وجد ان هناك تأثير موجب على تكوين حبيبات التربة المجمعة يتعلق بنوع ومعدل المخلفات العضوية ينعكس ذلك على تحسين التربة وزيادة إنتاجية الاراضى الرملية.

وجد ان محصول البطاطس يزداد مع زيادة معدل الخلط بين الفيناس ومخلفات حلج القطن وتم الحصول على اعلى محصول عند استخدام ١٠ طن للفدان بالمقاونة بالمعاملة بدون اضافة. وكان متوسط قيم محصول البطاطس ١١.٨٢ ،١٢.٣٢، ١٢.٧٨، ١٣.٠٤ طن للفدان عند استخدام الفيناس بمعدلات صف،٥،٧.٥ ،١٠ طن للفدان على الترتيب. فى حين كانت ١١.٨٢ ،١٢.٤٥، ١٢.٨٢، ١٤.١٩ طن للفدان عند استخدام مخلفات حلج القطن بينما كانت ١١.٨٢،١٣.٧٢ ،١٤.٩٣، ١٥.٦٨ طن للفدان عند استخدام مخلوط الفيناس + مخلفات حلج القطن بنفس السمعدلات السابقة.

وتشير نتائج التحليل الاحصائى إن هناك تأثير معنوي لنوع ومعدل الاضافة على كل الصفات المدروسة للتربة ومحصول وجودة البطاطس.

وتدل النتائج انة من الممكن استخدام الفيناس و مخلفات حلج القطن كمصدر للمواد المحسنة لخواص التربة وانتاجيتها.