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ASSESSMENT OF ROLE OF SOME COMPOST AND THEIR RESIDUAL EFFECTS ON PLANTS GROWN IN SANDY AND/OR CALCAREOUS SOIL

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ABSTRACT

This work aims to study the role of two composts made of plant residues and added to calcareous soil from Noubaria to clay soil from Kom Osheem; on wheat yields and nutrient status of grains and straw as well as to study their residual effects on the growth of maize, which was grown after wheat.

A pot experiment was carried out in earthenware pots filled with 7 kg of the tested soils; at Soils, Water and Environment Research Inst. (SWERI) - Agric. Res. Center (ARC). It was included two soil types; two sources of composted plant residues(C) of wheat straw or banana residues (zero, 5 and 10 ton/fed) as well as NPK mineral fertilizers (M) (zero ,75% and 100% RD).Some treatments of solo , mixed of (C) with (M) as well as no-fertilization (control) were suggested to achieve this study. Wheat (*Triticum aestirum*) was planted in winter season, till maturity. In the following summer season maize (*Zea mays* L) was sown, without any new additions, for 70 days only.

The obtained results indicated that:

- Weights of grains and straw of wheat as well as dry weight of whole maize plants were positively responded to manure applications with no–significant differences between the effects of the two used composts in case of wheat and very slight differences in case of maize plants. These responses, to manure applications, were higher in clay soil than that in calcareous one, *viz* calcareous soil needed to more compost application than clay soil. Application of 10 ton compost /fed associated with 75% RD of NPK mineral fertilizers (10C+75%M) gave the highest weights.
- N, P, K, Fe, Mn and Zn uptake by wheat components and whole maize plants revealed the same trends mentioned above.

INTRODUCTION

Continuous maintenance of soil fertility is very essential in achieving high crop yield all over the time. There is a need to apply fertilizers to maintain soil fertility. The use of mineral fertilizers has been found to be more convenient than the use of organic fertilizers. It however often leads to a decrease in soil organic matter content; an increase in soil acidity level and soil nutrient imbalance and it also results in soil physical degradation. Therefore, a reduced dependence on chemical fertilizer has been advocated to avoid the problems arise from continuous and gushing applications of it.

There are many benefits for addition of organic manures to soil. Whereas, nutrients contained in organic manures are released more slowly and are stored for a longer time in the soil, thereby ensuring a long residual effect and supporting better root development, leading to higher crop yields. They improve the soil fertility status by activating the soil microbial biomass. Application of organic manures sustains cropping system through better nutrient-recycling. They play a direct role in plant growth as a source of all necessary macro and micronutrients in available forms. Organic manures decompose to give humus, which plays an important role in the chemical behaviors of several metals in soils through the flavonic and humic acids contents, which have the ability to retain the metals in complex and chelate in available forms**.** Organic manures also improve the water holding capacity of the soil; improve the soil structure and the soil aeration (Belay *et al.*, 2001, Abou El-Magd *et al.*, 2006 and Bayu *et al.*, 2006).

In Egypt, rice straw is one of the main agricultural wastes which estimate with about 3.5 million tons/ annually. Farmers go to burning it; because they haven't abilities or practical experiences or facilitations to exploit it well, which cause foggy atmosphere that colors the city with grayish black smoke and can usually be seen after the sunset or at night causing a lot of ecological and healthy problems. Also, the amount of banana wastes reached to one million tons/year and causing great ecological and economical problems facing the Egyptian banana farms.

Thus, bio-conversion of agricultural crop residues, e.g., rice straw and banana wastes; to organic compost will play an important role in saving of ecological-friendly and nutrients-rich manures as well as helping in decreasing the enormous consumption of chemical fertilizers. Mainly, various amounts of crop residues positively affect on soil properties and crop yields. Increased amounts of crop residues added to the soil increased soil organic matter content, microbial activity, nutrient availability, water infiltration and storage, and crop yields (Prasad and Power, 1991).

There are many scientists researched the benefits of manuring soil with composted plant residues on improving nutrient-status of plants and stated that addition of different composts to soils led to increase yields of different crops as well as increasing their contents of N, P, K, Fe, Mn and Zn (Abdel Wahab, 1999) on wheat and El-Sayed *et al.*, (2005) on faba bean and maize.

This trial is undertaken to study the direct effect of composted rice straw or banana residues on wheat yield and nutrients status of both grains and straw, as well as their residual effects on the growth of maize crop grown after wheat, in clay and calcareous soils.

MATERIALS AND METHODS

Two soil samples were taken from the surface layer (0-30 cm) of both sandy and calcareous soils. An experiment was carried out in earthenware pots with capacity of 7 kg soil; at Soils, Water and Environment Research Inst. (SWERI) - Agric. Res. Center, (ARC).The first sample was taken from El-Noubaria Res. Station farm (Alexandria Governorate); the other was taken from Kom- Osheim Res. Station farm (El- Fayoum Governorate). Soil samples were air dried, crushed and prepared for physical and chemical analyses according to Page *et al.* (1982). Four hundred kilograms of each of rice and banana plant residues were aerobic composted according to the method described by Abou El-Fadle (1970**)**. Chemical analysis of composts was determined according to Brunner and Wasmer (1978). Data in Table (1) showed the chemical analyses of the used soils and composts.

Table (1): Analyses of the used soils and composts

Soils Characteristics		
Characters	Locations of Soil	
	El-Noubaria	Kom- Osheim
Some chemical properties		
pH (1: 2.5 , soil: water susp.)	8.55	8.45
EC, paste (dS/m)	7.36	4.48
$CaCO_3$ %	16.3	6.28
O.M %	0.45	0.60
Particle size distribution		
Sand %	58.46	15.99
Silt %	16.50	26.56
Clay %	25.04	57.45
Soil Texture	Sandy Loam	Clay
Avail. elements (mg K g^{-1}soil)		
N	110	127
P	5.29	4.15
K	246	325
Fe	3.46	8.45
Mn	2.04	5.30
Zn	1.33	1.87

Characteristics of Composts of plant residues										
Types of composts	pH (1:10) (susp.)	O.M (%)	O.C (%)	C/N ratio	Total Nutrients					
					N	P	K	Fe	Mn	Zn
					(mg.Kg^{-1})					
Rice straw	6.70	64.16	37.30	20.05	1.86	0.58	0.99	660	104	75
Banana residues	7.30	55.38	32.20	18.08	1.78	0.59	1.06	750	151	85

Six treatments were used in this experiment, they were:
1. No-fertilization, control treatment (control).
2. 100% recommended doses (RD) of NPK mineral fertilizers with zero compost (100%M).
3. 5 tons compost with zero mineral fertilizer (5C).
4. 10 tons organic fertilizer with zero mineral fertilizer (10 C).
5. 5 tons organic fertilizer with 75 % RD of NPK (5C+75%M).
6. 10 tons organic fertilizer with 75 % RD of NPK (10C+75%M).

These treatments were applied in each soil type and for each compost type. Recommended fertilization dose for wheat were 300Kg/fed ammonium nitrate (33.5% N) and 100 kg/fed Potassium sulfates (48% K_2O), which were added into soil in two split equal soil doses at 21and 42 days after planting. While, compost and recommended dose of 200 kg superphosphate (15.5% P_2O_5) were added 10 days before planting during seed bed preparation.

Each treatment was replicated 3 times in complete randomized factorial design. All pots were sown with 15 grains of wheat/pot (*Tritcum aestivum*) variety Giza 169 on the 15th of November 2008, and then thinned to 10 seedlings /pot 15 days after complete emergency. The irrigation with tap water was done up to water field capacity for each soil, which was completed when needed by weight. On tenth of May 2009, harvest was done when dryness (yellow colored) was covered with spikes and leaves of wheat plants (complete maturity). Plants were separated to grains and straw, air dried, weighed, oven dried (at70^{o}C), weighed and prepared to chemical analyses. On the 20th of May 2009, to achieve the residual effect of these applications , 4 grains of maize (*Zea mays* L) cultivar Hageen 2 were sown in each pot without any new additions, then thinned to 2 seedlings/pot 15 days after sowing .Irrigation was done to reach field capacity; if needed; with tap water. Maize plants were cut after bloom stage (70 days of planting).Shoots of each pot were weighed, ovens dried (at 70^{o}C), weighed and prepared to chemical analyses.

The obtained data were statistically analyzed according to the methods described by Sndecor and Coechran (1971) using computer M. Stat. program.

RESULTS AND DISCUSSION

Effect of composts - NPK mineral fertilizers on wheat
Wheat Yield components:

Data of wheat yield components are shown in Table (2). Both of wheat grain and straw yields (g/pot) of wheat increased significantly in clay soil than in calcareous soil. Whereas, grain weight (g/pot) ranged from 3.20 to 7.67(with mean value=5.64) and from 4.80 to 8.57(with mean value = 6.47) and straw weights (g/pot) ranged from 15.3 to 33.3(with mean=24.85) and from 20.7 to 36.3 (with mean value =28.88) for calcareous and clay soil, respectively**.** This trend means that, more compost addition is much needed for calcareous soil than clay soil, due to the availability increase of nutrients in clay soil than in calcareous one, (Modaihsh *et al.*, 2005).

Means of yield components were 6.06 and 6.04 for grains and 27.18 and 26.57 (g/pot) for straw as affected in soil received rice straw compost and banana residues compost, respectively, but with insignificant differences among their effects.

With respect to the effect of treatments on grain and straw yields, it was found that they increased with increasing the rate of compost application or NPK mineral fertilizers either both were added in solo or in a mixture form. Thus, the treatment of (10C+75M) gave the highest values of yield components. Whereas, percentage of increases when soil treated with (10C+75M) were 100%, 65%, 39%, 28% and 9% for grain yield and were 90%, 50%, 29%, 12% and 16% for straw yield as percentage from the corresponding values of Ctrl , (100%M), (5C), (10C), (5C+75%M) and (10C+75%M), respectively.

This means that addition of composts can be share in reducing the used amounts of chemical fertilizers in soil. Therefore, the hazards resulted from using huge amounts of chemical fertilizers in soil can be avoided and costs of crop production can be reduced.

These results were confirmed by different studies on the effect of organic and mineral fertilization on the growth of different crops, such as those of Basyouny *et al.* (2003), Basyouny *et al.* (2004) on maize, Abo- El-Soud *et al.* (2006) on maize and Youssef (2006) on maize and wheat. They reported, in general, that the use of different composts or manures in combination with suitable rate of mineral fertilizers differs according to the growing crops, since they had significant positive effects on yields and nutrients content of many growing plants.

Table (2): Wheat yield components (g/pot) as affected by fertilization of the tested soils with different composts and NPK mineral fertilizers

Treatments (T)	Wheat Yields Components							
	Grain Yield (g/pot)				Straw Yield (g/pot)			
	Soil Type (S)							
	Calcareous		Clay		Calcareous		Clay	
	Compost Types (C)							
	Rice	Banana	Rice	Banana	Rice	Banana	Rice	Banana
Ctrl.	3.20	3.20	4.80	4.80	15.30	15.30	20.70	20.70
100M	4.67	4.67	5.10	5.00	21.00	21.70	24.30	24.00
5C	5.20	5.40	6.23	6.23	25.70	24.70	28.30	27.30
10 C	5.75	5.97	6.87	6.53	27.30	26.70	34.30	33.30
5C+75M	7.20	7.10	7.73	7.43	28.30	27.70	31.30	30.70
10 C+75M	7.67	7.63	8.30	8.57	33.30	31.00	36.30	35.70
L.S.D(5%)	Soil (S) : 0.06 Compost Type (C) : ns Treatments (T) : 0.16				Soil (S) : 0.48 Compost Type (C) : ns Treatments (T) : 0.71			

Nitrogen, phosphorus and potassium uptake by wheat plants*:*

Data presented in Table (3) revealed that N, P and K uptakes of wheat grains and straw were higher under treated soil with rice straw compost than under addition of banana residues compost with significant differences between their effects, except for K-uptake of straw. While, the mean values of N- uptake (mg/pot) of grains were 168 and 156, P-uptake were 36.2 and 35 and K-uptake were 46.0 and 44.8 under treated soil with rice straw and banana residues composts, respectively. The corresponding mean values of their uptake by wheat straw were 419 and 397 for N, 103 and 96 for P and 818 and 818 for K under rice straw and banana residues composts, respectively.

With respect to the effect of soil type, plants grown in clay soil gave significant increasing in N, P and K uptakes (mg/pot) of both wheat grain and straw than that grown in calcareous soil. Whereas, their mean uptakes (mg/pot) for wheat grains grown in clay soil were 188, 39.4 and 48.6 and in calcareous soil were 136, 31.8 and 42.2 for N, P and K, respectively. As for their mean uptake (mg/pot) by straw, they were 516, 107 and 852 for plants grown in clay soil and 299 (N), 91 (P) and 784 (K) for those grown in calcareous soil.

Table (3): Nutrients uptake by wheat components (grains and straw) as affected by fertilization of the used soils with different composts and NPK mineral fertilizers

Wheat components	Soil Type(S)	Treatments (T)	Nutrients uptake											
			Macro-nutrients (mg/pot)						Micro-nutrients (µg/pot)					
			N		P		K		Fe		Mn		Zn	
			Composts Type(C)											
			R.S*	B.R**	R.S*	B.R**	R.S*	B.R**	R.S*	B.R**	R.S*	B.R**	R.S*	B.R**
Grains	Calcareous soil	Ctrl.	61	61	12.8	12.8	16.2	16.2	104	104	19	19	11	11
		100%M	102	103	24.2	23.3	31.7	31.3	187	187	34	34	18	18
		5C	120	123	27.3	27.9	34.8	35.6	250	229	44	44	24	17
		10 C	143	146	36.1	35.2	41.8	41.6	301	298	58	63	29	29
		5C+75%M	192	173	40.3	41.4	63.4	57.5	342	355	71	65	33	32
		10 C+75%M	205	200	51.4	48.1	69.8	66.4	387	391	85	81	45	41
	Clay Soil	Ctrl.	106	106	20.8	20.8	31.9	31.9	238	238	41	41	22	22
		100%M	157	135	30.0	28.5	36.1	35.3	268	263	49	48	25	25
		5C	181	165	40.1	35.1	44.2	44.3	310	313	69	67	34	31
		10 C	197	188	43.5	41.1	50.8	48.3	423	408	80	73	41	36
		5C+75%M	230	211	51.2	47.6	61.3	59.0	470	399	86	82	41	38
		10 C+75%M	263	267	56.1	58.2	68.9	71.1	560	510	101	102	52	51
LSD (5%):			N		P		K		Fe		Mn		Zn	
Soil (S)			2		0.4		0.5		4		1		2	
Compost Type (C)			2		0.4		0.5		4		1		2	
Treatments (T)			4		1.4		1.3		17		2		2	
Straw	Calcareous soil	Ctrl.	97	97	32	32	415	415	79	79	41	41	16	16
		100%M	227	227	76	67	609	667	122	122	56	61	25	26
		5C	303	273	74	71	770	731	186	144	82	77	29	29
		10 C	350	320	97	86	908	881	191	175	97	91	33	33
		5C+75%M	387	353	130	112	924	885	208	189	89	86	34	34
		10 C+75%M	493	463	170	144	1154	1064	250	228	119	104	42	39
	Clay Soil	Ctrl.	243	243	51	52	447	454	139	141	61	62	12	22
		100%M	370	363	75	74	634	706	150	148	83	87	26	27
		5C	517	483	98	96	831	820	231	200	116	110	33	31
		10 C	670	630	143	133	1053	1089	280	273	151	136	45	41
		5C+75%M	610	593	138	121	940	930	294	274	133	130	35	36
		10 C+75%M	753	720	147	160	1151	1165	261	225	160	155	47	44
LSD (5%):			N		P		K		Fe		Mn		Zn	
Soil (S)			1		8		26		8		2		1	
Compost Type (C)			2		7		ns		8		3		1	
Treatments (T)			3		4		49		11		4		4	

***** *R.S = Rice straw compost* ****** *B.R= Banana Residues compost*

Generally and in comparison with the control treatment, N, P and K uptakes of both wheat grains and straw increased significantly with fertilizing by NPK- mineral fertilizers or with compost either they added alone or in combinations. On the other hand, their uptake increased significantly with increasing the addition rate of any used fertilization treatment. Also, the highest N, P and K-uptakes of grains or straw were achieved with the treatment of (10C+75M) as compared with any other tested treatment. The previous trends are shown in Tables (3 and4).

Table (4): Mean values of nutrient uptake of wheat grains and straw as affected by the different fertilization treatments

Treatments (T)	Grains			Straw			Grains			Straw		
	Macro-nutrients (mg/pot)						Micro-nutrients (µg/pot)					
	N	P	K	N	P	K	Fe	Mn	Zn	Fe	Mn	Zn
Ctrl.	84	16.8	24.0	169	30	16	169	30	16	110	51	17
100%M	124	26.5	33.6	226	41	22	226	41	22	136	72	26
5C	147	32.6	39.7	276	56	27	276	56	27	190	96	31
10 C	169	39.0	45.6	358	69	38	358	69	38	230	119	38
5C+75%M	202	45.1	60.3	392	76	36	392	76	36	241	110	35
10 C+75%M	234	53.5	69.1	462	92	47	462	92	47	241	135	43
LSD (5%):	4	1.4	1.3	17	2	2	3	4	49	11	4	4

These results are in agreement with those obtained by the studies of Mekail *et al.* (2000); Abdel-Wahab (1999) and Modaihsh *et al.* (2005) on wheat. Whereas they found that increasing the application rate (1.5 to 3%) of the selected composts resulted in increases in the N, p and K- uptakes of plants. El-Sayed *et al.* (2005) revealed that compost addition caused significant positive effect on P and K-uptake by plants of faba- bean and maize for both growing seasons. El-Sebaey (2006) found that the addition of composted manure (50 kg N /fed) + inoculation gave higher values of N, p and K-uptake by wheat plants than that of full does (100 kg N/fed) derived from either inorganic N- fertilizer or organic manure. Also, Taha (2007) found that the highest N, P and K- uptake by maize and wheat plants were obtained in the treatment of 50% recommended NPK + 66.67% compost.

Iron, manganese and zinc uptake of wheat plants:

The response of Fe, Mn and Zn- uptake by wheat grains and straw of plants to the different experimental treatments followed the same trends of macro nutrients mentioned above.

Whereas, they increased significantly due to rice straw compos application than that due to the addition of banana residues compost. While the mean values of Fe-uptake (µg/pot) of grains were 320 and 307, Mn-uptakes were 62 and 61 and Zn-uptakes were 31 and 29 under soil treated with rice straw and banana residues composts, respectively. The corresponding mean values of their uptakes of wheat straw were 199 and 184 for Fe, 99 and 95 for Mn and 31 and 32 for Zn under rice straw and banana residues composts, respectively.

Wheat plants grown in clay soil gave high significant increase in Fe, Mn and Zn-uptakes (µg/pot) for grain or for straw than those grew in calcareous soil. Mean uptake (µg/pot) of grains in clay soil were 366, 70 and 35 and in calcareous soil were 261, 52 and 25 for Fe, Mn and Zn, respectively. As for their mean uptake (µg/pot) of straw, they were 218, 115 and 33 for plants grown in clay soil and 168, 79 and 30 in calcareous soil for Fe, Mn and Zn, respectively.

In comparison with the control treatment, Fe, Mn and Zn uptake of wheat grains and straw increased significantly due to fertilizing with either NPK- mineral fertilizers or with compost as they added alone or in combinations. On the other hand, their uptake increased significantly with increasing the addition rate of the tested fertilization treatments.

Also, the highest Fe, Mn and Zn-uptake of grains or straw were achieved due to the treatment of (10C+75M) as compared with any used treatment. The previous trends are shown in Tables (3 and4).

These results are in accordance with those obtained by Abdel-Wahab (1999), El-Sayed *et al.* (2005), Modaihsh *et al.* (2005), and El-Sayed *et al.* (2006) who found that the application of compost combined with the recommended does of mineral fertilizers caused substantial increases in the uptake of micronutrients by maize and wheat plants.

Residual effects of on the successive maize crop:

Maize dry weight:

Dry weight of maize plants (age of 70 days after planting) Tables (5& 6) as affected by the residual effects of experimental treatments are presented in Table (5). It was found that maize dry weights had slightly and significantly increased due to the applied rice straw compost (31 g/pot as mean) than that achieved by the use of banana compost (30 g/pot as mean). As indicated in previous discussion; there wasn't significant difference between their effects on wheat yield as first crop, thus can be concluded that the decomposition rate of composts became more in the following growing season and then became more effective on the successive maize crop.

The effect of compost addition to soil was more obviously in clay soil than in calcareous soil. Whereas, dry weight of maize plants (g/pot) increased significantly in clay soil (mean dry Wt. = 37.3 g/pot) than in calcareous soil (mean dry Wt. = 23.6 g/pot). Increasing the amounts of composts added to calcareous soil than those added to clay soil, is necessary to increase its productivity.

With respect to the residual effect of compost applied treatments on maize dry weight, it was increased with increasing the rate of application of either compost or NPK mineral fertilizers even they were added in solo or in mixture forms. Thus, the treatment of (10C+75M) gave the highest residual effects than those of other treatments as shown from mean values of maize dry weights in Table(6).

These results are confirmed with that obtained by Awad *et al.* (2000) who revealed that dry matter yield of maize plants was increased by the addition of organic wastes combined with sulphur. Basyouny *et al.* (2003), Abo- El-Soud *et al.* (2006) and Youssef (2006) reported that
the use of compost at a rate of 20 m^3/fed in combination with a high rate of nitrogen fertilizer (kg N fed^{-1}), differs as the growing crops, had significantly affected the dry matter content in positive trend.

Nutrients uptake of maize plants:

With respect of the residual effect of the applied composts and fertilization treatments on N, P, K, Fe, Mn and Zn-uptake by maize plants (age of 70 days from planting), the same trends discussed previously in wheat was achieved in maize plants as shown in Table(6).

Table (5): Residual effects of different composts and NPK mineral fertilizers on dry weight and nutrients uptake by maize plants (70 days age) grown in the used soils

Residual Effects		Soil types (S)	Plant dry weights (g/pot)	Nutrients uptake					
				Macro-nutrients (mg/pot)			Micro-nutrients (µg/pot)		
Compost (C)	Treatments (T)			N	P	K	Fe	Mn	Zn
Rice Straw Compost	Ctrl.	Calcareous	15.5	8.1	23	290	81	52	6
	100%M		19.0	19.4	34	385	230	63	10
	5C		24.9	27.4	49	573	321	129	22
	10 C		26.8	29.5	62	738	384	158	35
	5C+75%M		26.3	30.5	87	914	450	136	24
	10 C+75%M		28.3	34.0	96	1003	460	178	41
	Ctrl.	Clay	27.3	21.6	47	356	206	167	18
	100%M		33.0	35.6	59	528	330	191	26
	5C		33.3	50.0	73	700	363	239	41
	10 C		38.3	61.7	96	842	495	314	68
	5C+75%M		45.0	81.0	130	1170	473	314	56
	10 C+75%M		49.7	94.4	174	903	827	383	93
Banana Residues Compost	Ctrl.	Calcareous	15.5	9.2	24	314	87	52	7
	100%M		19.5	19.9	35	396	230	109	11
	5C		25.2	25.6	50	579	350	116	22
	10 C		26.3	29.0	58	680	296	148	36
	5C+75%M		25.7	29.3	49	929	385	120	24
	10 C+75%M		28.3	32.1	96	1040	468	151	39
	Ctrl.	Clay	27.3	20.5	33	328	205	168	18
	100%M		32.0	34.2	60	512	320	185	26
	5C		31.0	46.5	65	682	329	220	41
	10 C		37.3	59.8	86	859	398	299	68
	5C+75%M		44.3	79.8	133	1170	444	310	56
	10 C+75%M		48.7	87.6	170	1264	785	359	93

Table (6): Mean values of dry weights (g/pot) and nutrients-uptake of maize plants as affected by the residual effects of different fertilization treatments

Residual Effects	Plant dry weight (g/pot)	Nutrients uptake (µg/pot)					
		(mg/pot)			(µg/pot)		
		N	P	K	Fe	Mn	Zn
Treatments(T)							
Ctrl.	21.9	14.9	32	322	145	110	12
100%M	25.9	27.3	47	455	278	137	18
5C	28.6	37.4	59	634	341	176	33
10 C	32.2	45.0	76	780	393	230	52
5C+75%M	35.3	55.2	107	1046	438	220	42
10 C+75%M	38.8	62.0	134	1053	635	268	68
Compost (C)							
Rice Straw	31.0	41.1	78	700	385	194	38
Banana	30.0	39.5	74	729	358	186	37
Soil Type(S)							
Clay	37.3	56.1	94	776	431	262	52
calcareous	23.6	24.5	58	653	311	186	23
LSD (5%):							
(S)	0.4	0.8	3	82	21	6	1
(C)	0.4	0.8	3	ns	21	6	1
(T)	0.3	1.3	5	116	11	7	1

Whereas, the residual effect of rice straw compost caused significant increases in all studied nutrients except for K-uptake, in nutrients uptake of maize plants than with banana compost. On the other hand, the residual effect of (10C+75M) was the highest amongst the other treatments. Also, these trends were more pronounced in clay soil than in calcareous soil. These results run along with that obtained by El-Sayed *et al.* (2006) who found that the application of compost combined with the recommended does of mineral fertilizers caused substantial increases in the uptake of Fe, Mn and Zn of maize and wheat plants.

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تقييم دور بعض المكمورات وتأثيرها المتبقى على نمو النباتات النامية فى تربة طينية أو رملية

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يهدف هذا البحث إلى دراسة تأثير نوعين من المكمورات العضوية المصنعة من قش الأرز أو من مخلفات نباتات الموز على كمية ونوعية القمح المنزرع فى أراضى جيرية وأراضى طينية وكذلك دراسة التأثير المتبقى لهذه المكمورات على نمو الذرة (عمر 70 يوم) كمحصول تالى للقمح.ولتحقيق هذه الدراسة أجريت تجربة اصص تحت ظروف الصوبة بمعهد بحوث الأراضى والمياه والبيئة ، وكانت المعاملات المستعملة فى هذا البحث هذان النوعان من المكمورات العضوية المصنعة من قش الأرز أو من مخلفات نباتات الموز بمعدلات صفر أو 5 أو 10 طن كمبوست / فدان بجانب ثلاثة معدلات من الجرعة الموصى بها من الأسمدة المعدنية الأزوتية والبوتاسية والفوسفاتية هى (صفر% أو 75% أو 100%) ، وقد اضيفت هذه المعدلات (العضوية أوالمعدنية) لأراضى جيرية و أراضى طينية إما فى صورة منفردة أو فى صورة مختلطة.

ويمكن تلخيص أهم النتائج المتحصل عليها :-

- تأثر ايجابيا كل من محصول حبوب القمح والوزن الجاف لكل من قش القمح ونبات الذرة الكاملة بعد مرحلة الإزهار (عمر 70 يوم) بالإضافات التجريبية وبفروق معنوية مقارنة بالكنترول ، ولم تكن هناك فروق معنوية بين تأثير نوعى الكمبوست على مكونات محصول القمح (الحبوب والقش).
- اعطت المعاملة (10 طن كمبوست / فدان + 75% اسمدة معدنية) أعلى إنتاجية محصولية للحبوب والقش فى القمح وأعلى أوزان جافة لنباتات الذرة التالية له.
- تشابه سلوك إمتصاص عناصر النتروجين والبوتاسيوم والفوسفور والحديد والمنجنيز والزنك فى كل من المكونات المحصولية للقمح ونباتات الذرة الكلية مع نفس الإتجاهات المتحصل عليها بالنسبة للحبوب والقش والنباتات الكاملة للذرة فى تأثرها بالمعاملات التجريبية.
- كانت التأثيرات السابقة أكثر وضوحا فى الأراضى الطينية عنها الأراضى الجيرية مما يعنى أن الأراضى الجيرية بحاجة إلى إضافات أكثر من الأسمدة العضوية.

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