## 4-RESULTS AND DISCUSSION

There are many purposes should be achieved in this study. They are the effect of different organic sources and their rates either with mineral fertilizer at a percent of recommended doze or without on soil chemical, soil nutrients and nutrients concentration of plant wheat. The study includes three factors. They are organic sources, their rates and mineral fertilizer rates. The analyses of variance reveal the effect of individual, diinteraction and tri-interaction effects. The previous discussion will deal with individual and di-interaction effect. While it is in van to discuss tri-interaction in all measured parameters because they are non-significant effects

## 4.1. Effect of treatments on some soil properties:

Data of soil pH, EC and OM content are shown in Table (2) and depict in Figs.(1-3). Enrich poudrette (EPD) resulted relatively lower pH values than other organic sources in the three experiments. It resulted higher OM content than others in the two field experiments. Similar results were reported by Havlin et al (1990) and Sikora and yakovchenko (1996). Enrich town refuse (ETR) resulted higher EC values in both field experiments while enrich poudrette resulted in the pot one. The highest rate of organic sources or mineral fertilizer was the lower pH values but the highest OM content. Similar results were obtained by Gregorich et al (1997). While the highest EC values were recorded at zero rate of both organic sources and mineral fertilizer.

Table (2a): Effect of used organic sources and their rates on soil pH, EC and organic matter content of the three experiments.

Organic	Rate		Pot exp.		janing (	Field exp.I	I.	(X	Field exp.II	П
Sources	Ton/	Ηd	EC	OM	hН	EC	OM	Hd	EC	ОМ
	Fed		dS/m	%		dS/m	%		dS/m	%
EFW	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.57	3.04	91.0	7.70	3.15	0.46	7.61	1.79	0.91
	10	7.53	2.56	0.34	7.62	2.98	0.62	7.47	1.67	0.95
	20	7.50	2.23	0.53	7.66	2.87	0.85	7.34	1.62	1.04
	Mean	7.59	2.78	0.27	7.72	3.12	0.58	7.57	1.74	0.89
EPD	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	S	7.55	3.32	0.36	7.61	2.93	0.63	7.42	1.65	0.94
	10	7.48	2.38	0.44	7.53	2.75	98.0	7.36	1.46	1.06
	20	7.23	2.35	0.93	7.23	2.39	96.0	7.13	1.46	1.24
	Mean	7.51	2.84	0.45	7.56	2.89	0.71	7.44	1.62	0.97
ETR	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	S	7.72	3.15	0.48	7.76	3.29	0.51	7.67	1.84	0.78
	10	7.70	2.44	0.94	7.64	3.10	0.58	7.53	1.72	0.95
	20	7.61	2.26	1.00	7.69	2.93	0.71	7.50	1.70	1.00
	Mean	7.70	2.79	0.62	7.74	3.20	0.55	7.64	1.79	0.85
LSD at 5%										
OS			ns	0.02		90.0	0.02		0.02	0.01
OS x Rate			ns	0.04		0.13	0.04		0.10	0.07

OS = organic source EFW = enrich farm waste,

ETR = enrich town refuse EPD = enrich poudrette,

#### 4-RESULTS AND DISCUSSION

There are many purposes should be achieved in this study. They are the effect of different organic sources and their rates either with mineral fertilizer at a percent of recommended doze or without on soil chemical, soil nutrients and nutrients concentration of plant wheat. The study includes three factors. They are organic sources, their rates and mineral fertilizer rates. The analyses of variance reveal the effect of individual, diinteraction and tri-interaction effects. The previous discussion will deal with individual and di-interaction effect. While it is in van to discuss tri-interaction in all measured parameters because they are non-significant effects

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Data of soil pH, EC and OM content are shown in Table (2) and depict in Figs.(1-3). Enrich poudrette (EPD) resulted relatively lower pH values than other organic sources in the three experiments. It resulted higher OM content than others in the two field experiments. Similar results were reported by Havlin et al (1990) and Sikora and yakovchenko (1996). Enrich town refuse (ETR) resulted higher EC values in both field experiments while enrich poudrette resulted in the pot one. The highest rate of organic sources or mineral fertilizer was the lower pH values but the highest OM content. Similar results were obtained by Gregorich et al (1997). While the highest EC values were recorded at zero rate of both organic sources and mineral fertilizer.

Table (2a): Effect of used organic sources and their rates on soil pH, EC and organic matter content of the three experiments.

Organic	Rate		Pot exp.		4	Field exp.I	-	Ŧ	Field exp.II	Ш
Sources	Ton/	bΗ	EC	OM	Hd	EC	OM	Hd	EC	OM
	Fed		dS/m	%		dS/m	%		dS/m	%
EFW	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.57	3.04	91.0	7.70	3.15	0.46	7.61	1.79	0.91
	10	7.53	2.56	0.34	7.62	2.98	0.62	7.47	1.67	0.95
	20	7.50	2.23	0.53	99.7	2.87	0.85	7.34	1.62	1.04
	Mean	7.59	2.78	0.27	7.72	3.12	0.58	7.57	1.74	0.89
EPD	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	S	7.55	3.32	0.36	7.61	2.93	0.63	7.42	1.65	0.94
	01	7.48	2.38	0.44	7.53	2.75	98.0	7.36	1.46	1.06
	20	7.23	2.35	0.93	7.23	2.39	96.0	7.13	1.46	1.24
	Mean	7.51	2.84	0.45	7.56	2.89	0.71	7.44	1.62	0.97
ETR	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.72	3.15	0.48	7.76	3.29	0.51	7.67	1.84	0.78
	01	7.70	2.44	0.94	7.64	3.10	0.58	7.53	1.72	0.95
	20	7.61	2.26	1.00	69.7	2.93	0.71	7.50	1.70	1 00
	Mean	7.70	2.79	0.62	7.74	3.20	0.55	7.64	1.79	0.85
LSD at 5%										
OS			Su	0.02		90.0	0.02		0.03	0.01
OS x Rate			SU	0.04		0.13	0.04		010	0.04

OS = organic source EFW = enrich farm waste,

ETR = enrich town refuse EPD = enrich poudrette,

0.01

0.02

0.02

0.06

Table (2a): Effect of used organic sources and their rates on soil pH, EC and organic matter content of the three experiments.

Sources T EFW	/ " "						1.	•		
	)IIO	μd	EC	МО	Ηd	EC	ОМ	Hd	EC	OM
	Fed		dS/m	%		dS/m	%		dS/m	%
7	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.57	3.04	91.0	7.70	3.15	0.46	7.61	1.79	0.91
	10	7.53	2.56	0.34	7.62	2.98	0.62	7.47	1.67	0.95
, 4	20	7.50	2.23	0.53	99'.	2.87	0.85	7.34	1.62	1.04
	Mean	7.59	2.78	0.27	7.72	3.12	0.58	7.57	1.74	0.89
EPD	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.55	3.32	0.36	7.61	2.93	0.63	7.42	1.65	0.94
	01	7.48	2.38	0.44	7.53	2.75	98.0	7.36	1.46	1.06
-	20	7.23	2.35	0.93	7.23	2.39	96.0	7.13	1.46	1.24
	Mean	7.51	2.84	0.45	7.56	2.89	0.71	7.44	1.62	0.97
ETR	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.72	3.15	0.48	7.76	3.29	0.51	7.67	1.84	0.78
_	01	7.70	2.44	0.94	7.64	3.10	0.58	7.53	1.72	0.95
6	20	7.61	2.26	1.00	69.7	2.93	0.71	7.50	1.70	1.00
BBD	Mean	7.70 -	2.79	0.62	7.74	3.20	0.55	7.64	1.79	0.85
LSD at 5%										
SO			ns	0.02		90.0	0.02		0.02	0.01
OS x Rate			ns	0.04		0.13	0.04		0.10	0.04
OS = organic source	es.									
EFW = enrich farm waste.	n was	te.	EPD:	= enric	= enrich noudrette		FTR = en	rich town	n refine	
BATTER IN		,	1	CIIIIC	ii poudie		I K — en	– enrich town refuse	n reruse	

1

0.01

0.02

0.02

Table (2a): Effect of used organic sources and their rates on soil pH, EC and organic matter content of the three experiments.

Organic	Rate		Pot exp.			Field exp.	_	[T	Rield evn II	-
Sources	Ton/	Hd	EC	OM	Ha	EC		Hu	E.C.	MO
	Fed		dS/m	%	_	dS/m	%	<u>.</u>	dS/m	8
EFW	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1 89	0.65
	2	7.57	3.04	0.16	7.70	3.15	0.46	7.61	1.79	0.91
	10	7.53	2.56	0.34	7.62	2.98	0.62	7.47	1.67	0.95
	20	7.50	2.23	0.53	2.66	2.87	0.85	7.34	1.62	1.04
	Mean	7.59	2.78	0.27	7.72	3.12	0.58	7.57	1 74	0 80
EPD	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1 89	0.65
	5	7.55	3.32	0.36	7.61	2.93	0.63	7.42	1.65	0.94
	10	7.48	2.38	0.44	7.53	2.75	98.0	7.36	1.46	1 06
	20	7.23	2.35	0.93	7.23	2.39	96.0	7.13	1.46	1.25
	Mean	7.51	2.84	0.45	7.56	2.89	0.71	7.44	1 62	0.97
ETR	0	7.76	3.30	0.05	7.88	3.48	0.39	7.85	1.89	0.65
	2	7.72	3.15	0.48	7.76	3.29	0.51	7.67	1.84	0.78
	01	7.70	2.44	0.94	7.64	3.10	0.58	7.53	1.72	0.95
	20	7.61	2.26	1.00	69.7	2.93	0.71	7.50	1.70	1.00
	Mean	7.70	2.79	0.62	7.74	3.20	0.55	7.64	1 79	0.85
LSD at 5%										
SO			ns	0.02		90.0	0.02		0.02	0.01
OS x Rate			ns	0.04		0.13	0.04		0.10	0.0

OS = organic source EFW = enrich farm waste,

EPD = enrich poudrette, ETR = enrich town refuse

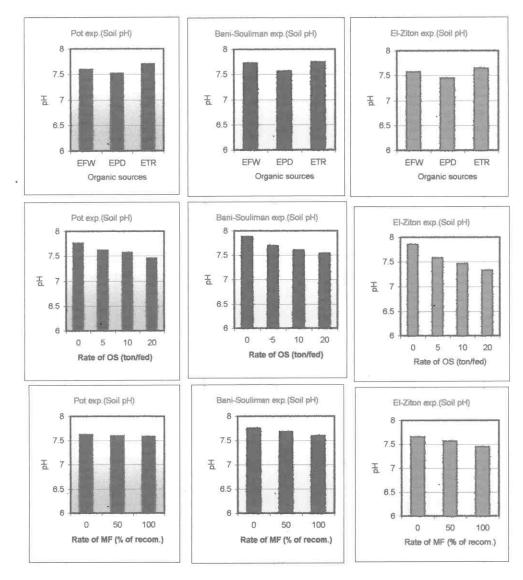


Fig.( 1 ): Effect of organic sources, rate of organic sources and fertilizer rate on soil pH, after harvest.

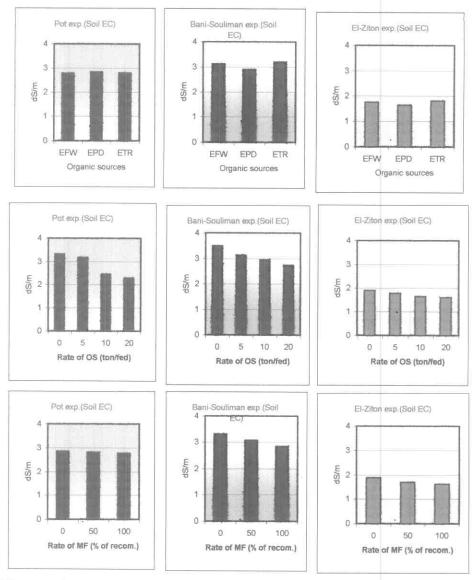


Fig.( 2 ): Effect of organic sources, rate of organic sources and fertilizer rate on soil EC (dS/m), after harvest.

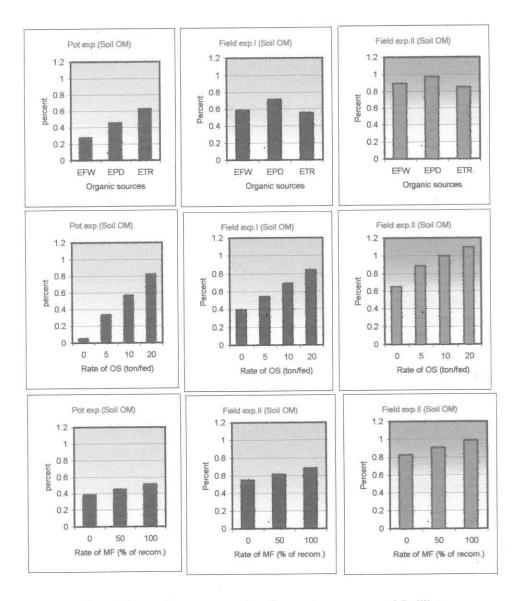


Fig.( 3 ): Effect of organic sources, rate of organic sources and fertilizer rate on soil organic matter content (OM)(%), after harvest.

increased EC values and OM content in the three experiments. Relatively increasing has been happened for pH when using this di-interaction in all experiments.

4.2. Effect of treatments on soil nutrients:

Data of total nitrogen (μg.g<sup>-1</sup>) and available nutrients (P, K, Fe, Zn and Mn (μg.g<sup>-1</sup>)) of soils cultivated with wheat plants in pot exp. (sandy clay loam), field exp.I (sandy loam) and field exp.II (clay loam) under the individual and di-interaction effects of different organic sources (enrich farm waste (EFW), enrich poudrette (EPD) and enrich town refuse (ETR)), their rates (0, 5, 10, 15 ton/fed) and mineral fertilizer rates (0, 50 and 100%) at 70 and 150 days after cultivation are shown in Tables (3-5) and depicted in figs (4 - 9).

#### 4.2.1. Total nitrogen:

Data of organic sources (Tables 3-5) showed significant effect on total nitrogen at 70 and 150 days after cultivation with enrich poudertte priority in the three experiments. The values of soil total nitrogen successively increased with increasing either the organic source rate or mineral fertilizer rate, where the highest rate was the highest value of total nitrogen. Similar results were obtained by Ahmed et al (1992), Hassan (1999) and Taha (2000). Data in table (6) revealed the relative increments of total nitrogen compared with initial. They showed that the highest individual effects of organic sources, their rates and mineral fertilizer rates on total soil nitrogen were most pronounced in field exp.II at 70 days, while the lowest effects were in pot exp. at 150 days. Fig. (4) depicted that the values of total nitrogen are higher at 70 days than 150 days.

Organic sources with their rates significantly increased soil total nitrogen at 70 days after planting in field exp.II and at 150 days in the three experiments, while they were non significant effect at 70 days in both pot exp. and field exp.I. Enrich poudrette at 20 ton/fed was the best effect on soil total nitrogen. Similar results were obtained by Hadas and Portony (1994).

Table (6): The relative increments in soil total nitrogen values at 70 and 150 days compared with their initial

content (%).

	Pot e	xp.	Field	exp.I	Field e	xp.II
Treatments	70	150	70	150	70	150
	Orga	nic sou	rces (C	OS)	Outk Grant	marin in
EFW	34	6	51	13	64	29
EPD	43	27	57	37	69	52
ETR	36	18	45	4	63	51
	Mine	eral fer	tilizer 1	rate (MF	")	m hell
0%	22	5	42	9	62	38
50%	39	16	52	22	66	47
100%	46	29	57	28	68	50
	Orga	nic sou	rce rate	S	n. veter	nt it
0 ton/fed	17	0	11	0	30	0
5 ton/fed	30	14	48	13 0	67	47
10 ton/fed	42	30	59	30	70	53
20 ton/fed	50	37	63	41	73	57

Relative increments = ((value - initial) ÷ value) × 100

Di-interaction effects of organic sources with mineral fertilizer rates were insignificant on soil total nitrogen at 70 and 150 days in the three experiments. Di-interaction of organic sources rate with mineral fertilizer rate significantly increased total soil nitrogen in the pot exp. at 70 and field exp.II at 70 and 150 days.

### 4.2.2. Available phosphorus:

Organic sources, in generally, increased available phosphorus at 70 and 150 days in the three experiments. Enrich poudertte as an organic source resulted the highest amount of available phosphorus. The values of available phosphorus values successively were increased with increasing either the organic source rate or mineral fertilizer rate, where the highest rate of either resulted in the highest value, (Table 3-5 and fig. 5). Similar results were obtained by Sadik et al (1987), Fresquez et al (1991), Folley et al (1995) and Tsadilas et al (1995) and Fine

and Mingelgrin (1996), who found that addition of sewage sludge increased available phosphorus.

Data in Table (7) revealed that the relative increments of available phosphorus compared with initial were higher in pot exp. at 70 than at 150 days for individual effect of organic sources, their rates and mineral fertilizer rates, as well as higher than other experimen

Generally, the combined effect of organic sources with their rates significantly increased available phosphorus at 70 and 150 days in the three experiments. Enrich poudrette at the rate of 20 ton/fed resulted the highest available phosphorus. Organic sources with mineral fertilizer rates resulted non-significant effect on available phosphorus in the three experiments except at 70 days in the pot exp. and at 150 days in the field exp.I, where the increase in available phosphorus were significant. Both rates of organic sources and mineral fertilizers significantly Table (7): The relative increments of soil available phosphorus values at 70 and 150 days compared with

phosphorus values at 70 and 150 days compared with their initial content (%).

	Pot e	exp.	Field	exp.I	Field	exp.II
Treatments	70	150	70	150	70	150
	Orga	nic sou	rces (0	OS)		
EFW	48	23	35	23	34	23
EPD	53	25	38	29	41	31
ETR	46	18	32	25	35	32
	Mine	eral fert	ilizer	rate (MF	)	
0%	44	13	29	17	29	19
50%	49	22	35	25	38	31
100%	54	29	40	32	42	34
	Orga	nic sour	ce rate	S		
0 ton/fed	43	3	1	0	12	0
5 ton/fed	43	20	34	25	34	32
10 ton/fed	54	28	43	35	42	38
20 ton/fed	57	31	49	42	48	42

increased available phosphorus at 70 and 150 days in the three experiments, except at 150 days in the pot exp. and the field exp.II, where the relation were insignificant. The highest rate of both organic sources and mineral fertilizers resulted the highest available phosphorus. Similar results were obtained by Abdel-Salam et al (1996).

#### 4.2.3. Available potassium:

Data presented in Tables (3-5) revealed that available potassium significantly increased with different organic sources, increasing their rates and mineral fertilizer rates at 70 and 150 days after cultivation in the three experiments. Enrich poudrette was the highest organic sources in its effect on the soil available potassium, where the used organic sources could be arranged according to their effect on potassium availability in the following ascending order; enrich farm waste < enrich town refuse < enrich poudrette. Also, the highest rate of either organic sources or mineral fertilizers resulted the highest available potassium. The available potassium depicted in fig. (6) supports this trend. Similar results were obtained by Borhamy (1998) and Malhi et al. (1992).

The relative increments of available potassium values at 70 and 150 days in the three experiments in relation to their initial content were presented in Table (8). The values at 70 days were similar to those at 150 for the three factors; organic sources, their rates and mineral fertilizer rates in both field experiments, while the values at 70 days were more than those at 150 for the three factors in the pot exp..

The combined effect of organic sources with mineral fertilizer rates significantly increased available iron at 70 and 150 days in pot exp. whereas it was insignificant in both field experiments. The values of available iron at 70 and 150 days in the pot exp. and at 150 days in the field exp.I significantly increased with combined effect of both rates of organic source and mineral fertilizer. The highest rate of organic sources with the highest

RESULTS AND DISCUSSION-----

rate of mineral fertilizer achieved the highest available iron. Similar results were obtained by Amer (1999).

Table (8): The relative increments of soil available potassium values at 70 and 150 days compared with their initial content (%).

ien mitiai com	Pot e	_	Field	exp.I	Field	exp.II
Treatments	70	150	70	150	70	150
	Orga	nic sou	rces (C	OS)		
EFW	18	1	14	15	17	18
EPD	20	7	17	20	24	26
ETR	17	5	15	18	20	19
	Mine	eral fer	tilizer	rate (MF	7)	
0%	13	0	11	13	15	17
50%	19	5	15	18	20	22
100%	22	11	19	22	25	27
	Orga	nic sou	rce rate	S		
0 ton/fed	8	0	0	0	2	0
5 ton/fed	17	2	16	21	17	22
10 ton/fed	22	11	19	24	24	28
20 ton/fed	24	18	24	28	32	37

The values of available potassium significantly increased with increasing the applied rates of any organic sources at the two sampling dates (70 and 150 days) in the three experiments. A rate of 20 ton/fed enrich poudrette resulted the highest value of available potassium. The combined effect of organic sources with mineral fertilizer rate on available potassium was non significant in the two sampling dates in the pot and the two field experiments. The highest rate of organic sources (20 ton/fed) with the highest rate of mineral fertilizer (100%) significantly achieved the highest values of available potassium at 70 and 150 days in the pot exp. and at 70 days in field exp.I.

#### 4.2.4. Available iron:

Generally, data presented in Tables (3-5) and depicted in fig. (7) revealed that the organic sources significantly affect the soil available iron at 70 and 150 days after planting in the three experiments. Enrich poudrette was the pest organic source affecting the available iron. The values of available potassium significantly increased with either organic source rates or mineral fertilizer rates, where the highest rate of either resulted the highest available iron. These results are in good agreement with those obtained by El-Ghazoli (1998), Borhamy (1998) and Amer (1999).

The relative increments of available iron (Table 9) at 150 days after planting in the pot exp. as well as at 70 and 150 days in both field experiments were similar and higher than those of the pot exp. at 70 days, for the three factors; organic sources, their rates and mineral fertilizer rates. It is noticed that the relative increment of available iron at 150 days is more than that at 70 days in the three experiments.

The combined effect between organic sources with their rates on available iron was significant at 70 and 150 days in the three experiments. In the pot exp., enrich town refuse with 20 ton/fed were significantly superior to the other rates at 70 and 150 days. The highest values of available iron were achieved with enrich poudrette at 20 ton/fed in both field experiments. Similar results were obtained by Fahmy (1995), El-Ghazoli (1998), and Taha (2000).

The combined effect of organic sources with mineral fertilizer rates significantly increased available iron at 70 and 150 days in pot exp. whereas it was insignificant in both field experiments. The values of available iron at 70 and 150 days in the pot exp. and at 150 days in the field exp.1 significantly increased with combined effect of both rates of organic source and mineral fertilizer. The highest rate of organic sources with the highest rate of mineral fertilizer achieved the highest available iron. Similar results were obtained by Amer (1999).

Table (9): The relative increments of soil available iron values at 70 and 150 days compared with their initial content (%).

	Pot e	xp.	Field	exp.I	Field	exp.II
Treatments	70	150	70	150	70	150
	Orga	nic sou	rces (0	OS)		
EFW	16	46	55	59	61	63
EPD	36	54	65	68	66	67
ETR	40	54	59	63	62	64
	Mine	eral fert	tilizer	rate (MF	)	
0%	20	45	53	58	57	60
50%	31	50	69	64	63	64
100%	43	58	66	68	67	68
	Orga	nic sour	ce rate	S		•
0 ton/fed	7	37	33	30	33	17
5 ton/fed	29	47	59	63	59	64
10 ton/fed	42	56	64	67	69	71
20 ton/fed	45	60	70	74	72	80

### 4.2.5. Available zinc:

The values of available zinc in the soil at 70 and 150 days in the three experiments are presented in the Tables (3-5) and depicted in fig. (8). These values were significantly affected by organic sources. The ascending order is enrich town refuse > enrich farm waste > enrich poudrette. The successive increasing rates of organic source or mineral fertilizer rates significantly increased available zinc in two sample dates (at 70 and 150 days) at the three experiments, where the highest rate of each gave the highest available zinc. These findings agree with those of Askar (1988), Kaqur and Kanwar (1989), Awad (1991), Cavalaro et al (1993), and Goto and Chino (1996),

The relative increments of available zinc values at 70 and 150 days in the field exp.I were similar and higher than those of the pot exp. and the field exp.II, for the three factors; organic sources, their rates and mineral fertilizer rates, (table 10). It is

noticed that the relative increments of available iron at 70 days were more similar to those at 70 days in the three experiments.

The combined effects between organic sources with their rates significantly affected on the available zinc at 70 and 150 days in the pot exp. As for field exp.I and field exp.II, the effect was significant at 150 days in the field exp.I and at 70 days in the field exp.II. The high significant value of available zinc upon using enrich poudrette resulted at a rate of 20 ton/fed at 70 and 150 days.

Table (10): The relative increments of soil available zinc values at 70 and 150 days compared with

their initial content (%)	their	· initia	l content	(%).
---------------------------	-------	----------	-----------	------

	Pot e	xp.	Field	exp.I	Field	exp.II
Treatments	70	150	70	150	70	150
	Orga	nic sou	rces (C	OS)		e i (tantan
EFW	45	30	64	67	43	49
EPD	54	44	68	70	46	49
ETR	37	22	66	70	43	46
	Mine	eral fer	tilizer	rate (MF	(7)	1/
0%	31	10	59	63	36	39
50%	48	35	67	70	39	46
100%	54	46	71	73	51	53
	Orga	nic sou	rce rate	S	177	
0 ton/fed	0	0	33	14	21	0
5 ton/fed	42	27	65	68	39	49
10 ton/fed	55	45	71	76	46	55
20 ton/fed	61	53	75	78	53	59

The interaction between the organic sources either with their rates or with mineral fertilizer rates revealed no significant effects on the available zinc in both sampling dates in the three experiments.

organic sources, their raiss and numeral biraltes a sics

### 4.2.6. Available manganese:

Data in Table (3-5) revealed that organic sources significantly affected the available managenese values in the soil at 70 and 150 days in the three experiments, where enrich poudrette represented the superior one. The successive increasing rates of organic sources or mineral fertilizer rates significantly increased available manganese in the two sampling dates at the three experiments, where the organic sources at a rate of 20 ton/fed or mineral fertilizer at a rate of 100% gave the highest available zinc, (fig. 9). These findings are harmonizing with those of Mohamed (1990), Fahmy (1995) Borhamy (1998), and Amer (1999).

Table (11): The relative increments of soil available manganese values at 70 and 150 days compared with their initial content (%).

	Pot e	ехр.	Field	l exp.I	Field	exp.II
Treatments	70	150	70	150	70	150
	Orga	anic sou	irces (	OS)		
EFW	39	28	21	27	24	29
EPD	44	37	37	42	31	39
ETR	37	25	32	39	29	35
	Mine	eral feri	tilizer	rate (MF		
0%	27	18	21	30	19	24
50%	40	28	30	37	27	33
100%	49	42	37	44	37	44
	Organ	nic sour	ce rates	S		
0 ton/fed	20	8	5	0	8	0
5 ton/fed	33	24	27	35	24	31
10 ton/fed	47	36	35	44	31	42
20 ton/fed	52	44	44	51	44	51

The relative increments of available manganese at 70 and 150 days in the pot exp. and in both field exp.I and II are shown in table (11). They were more or less similar for the three factors; organic sources, their rates and mineral fertilizer rates.

The combined effects between organic sources with their rates significantly affected on the available manganese at the two sampling dates in the three experiments. The highest significant value of available manganese upon using enrich poudrette resulted at a rate of 20 ton/fed at 70 and 150 days. The interaction between organic sources either with their rates or with mineral fertilizer rates revealed no significant effects on the available manganese in both sampling dates in the three experiments. However, there was an exception for combined effects of organic sources with mineral fertilizer rates at 150 days in the field exp.II, which affected significantly available manganese content. Also, organic sources with mineral fertilizer rates in the field exp.I at 150 days and the field exp.II at 70 days achieved significant effects. Similar results were obtained by Fahmy (1995) and Amer (1999).

# 4.3. Effect of treatments on plant dry weight and nutrients

#### at 70 days:

The values of dry weight, also, concentration and uptake of N, P, K, Fe, Zn and Mn of wheat plants grown in pot exp. (sandy clay loam) and field exp.I (sandy loam) and field exp.II (clay loam) under the individual and di-interaction effects of different organic sources (enrich farm waste, enrich poudrette and enrich town refuse), their rates (0, 5, 10, 15 ton/fed) and mineral fertilizer rates (0, 50 and 100%) at 70 days after cultivation are shown in tables (12-14) and depict in figs(10-22).

Table (3a): Effect of used organic sources and their rates on soil total N and soil available nutrients (pot exp.).

0	Kate			After 70 days	days)					After 150 days	o days		
Sources	Lon/		18.g			µg.g.			ug.g-1		2	110 a-1	
	Fed	z	Ь	X	Fe	Zn	Mn	z	Ь	×	T.	7,0	M
EFW	0	126	3.36	233.1	1.69	0.72	2.01	70	2 14	177.8	201	020	1 77
	2	145	3.52	257.3	2.20	_	2 34	113	2,51	0.770	10.7	0.00	1.73
	10	167	4.38	2704	2 24	1 76	20.2	123	7.07	2.012	7.87	1.03	1.96
	20	194	4 80	2772	2.40	200	50.0	701	2.84	5.822	3.68	1.40	2.47
	Moon	150	10.4	5.77	2.40	7.07	3.07	132	3.07	250.0	3.89	1.60	2.69
FDD	ivicali	001	4.01	729.2	2.15	1.45	2.61	112	2.67	216.7	3.31	1.15	2.21
	, ,	971	3.36	233.1	1.69	0.72	2.01	70	2.14	177.8	2.84	0.58	1 73
	0 5	7/1	4.04	266.8	2.57	1.73	2.41	144	2.77	225.9	3.84	1 36	230
	0 0	200	4.93	279.1	3.42	2.07	3.18	167	3.03	248.0	4.31	1 73	2 8 1
	07	237	5.31	295.8	3.53	2.40	3.92	161	3.13	272.9	4.74	2.04	3 36
O.F.O.	Mean	185	4.41	268.7	2.80	1.73	2.88	143	2.77	231.1	3 94	1 43	255
EIK	0	126	3.36	233.1	1.69	0.72	2.01	70	2.14	177.8	284	0 50	1 72
	2	132	3.37	248.3	2.84	1 00	737	100	7:1	0.710	10.0	0.00	1.75
	10	171	4 23	0 890	3 60	45	0.00	103	7.77	6.017	3.56	0.87	2.04
	20	200	2 5	275.7	0.0		67.7	751	2.73	242.5	4.24	1.26	2.17
	Mean	150	200	4.0.4	7.07	1./3	5.03	179	2.82	264.1	5.00	1.42	2.53
LSD at 5%	Marcall	001	2.02	7.007	3.07	1.26	2.55	127	2.52	225.3	3.91	1.03	2.12
OS		0.7	0 13	0	,	0	,	9	17 01 02				
OS x Rate		. N	0.26	, o	0.13	0.09	0.14	8.9	60.0	4.6	0.13	0.09	0.14
		CNI	07.0	7.7	0.23	0.18	0.28	17.8	SU	9.2	0.28	0.18	0.28
OS = organic sources	ources												
EFW = enrich farm waste,	arm wast	ะกร์	EPD	FPD = enrich noudrette	h noundr	otto	CTD						
			i	21112	n boar	cuc,	CIR	- enrich town retuse	town re	tuse			

Table (3b): Effect of used organic sources and mineral fertilizers on soil total N and soil available nutrients (pot exp.).

Organic	M.F		,	After 70 days	days					After 150 days	0 days		
Sources	Jo %		1.g.g1			ug.g-1			1.g.g.			11g.g.	
	æ	z	Ь	¥	Fe	Zn	Mn	z	Ь	×	Fe	Zu	Mn
EFW	0	128	3.70	247.0	1.82	1.16	2.18	96	2.42	196.5	2.88	0.84	
	20	160	4.01	259.5	2.20	1.51	2.65	Ξ	2.66	218.1	3.32	1.22	2.18
	100	188	4.26	272.0	2.44	1.68	2.98	128	2.91	235.4	3.73	1.40	_
EPD	0	151	3.90	254.2	2.33	1.37	2.38	125	2.52	211.8	3.52	1.08	_
	20	181	4.19	269.7	2.58	1.78	2.88	137	2.76	233.5	3.69	1.45	
	100	217	5.13	282.2	3.50	2.05	3.38	166	3.03	248.1	4.60	1.75	3.13
ETR	0	124	3.42	239.4	2.60	0.97	2.04	108	2.24	206.6	3.43	0.75	
	50	171	3.96	258.7	3.02	1.33	2.52	128	2.56	226.9	3.85	1.03	
	100	179	4.16	271.1	3.45	1.50	3.09	146	2.75	242.5	4.45	1.30	2.53
Mean	0	134	3.67	246.9	2.25	1.16	2.20	110	2.39	205.0	3.28	0.89	
	20	173	4.08	262.6	2.60	1.54	2.68	125	2.66	226.1	3.62	1.23	2.22
	100	194	4.52	275.1	3.13	1.74	3.15	147	2.90	242.0	4.26	1.48	2.76

EPD = enrich poudrette, ETR = enrich town refuse M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, EFW = enrich farm waste,

0.14

0.09

0.13

4.6 Ns

0.09

6.8 ns

0.14

60.0

0.13 0.22

4.9 ns

0.13

9.7 Ns

OW x MF

OS = organic sources

Table (3c): Effect the rate of used organic sources and rate of mineral Fertilizers on soil total N and soil available nutrients (pot exp.).

Rate of	MF		· ·	After 70 days	days					After 150 days	0 days		
SO	Jo %		4g.g-1			ug.g.			µg.g-1			ug.g.1	
ton/fed	æ	Z	Ь	K	Fe	Zn	Mn	Z	Ь	К	Fe	Zn	Mn
0	0	75	2.97	208.0	1.47	0.40	1.67	47	1.75	137.8	2.20	0.27	1.30
	20	148	3.41	232.3	1.53	0.77	2.03	70	2.19	191.1	2.53	09.0	1.80
	100	155	3.70	258.0	2.07	1.00	2.33	93	2.48	204.5	3.80	0.87	2.10
	Mean	126	3.6	233.1	1.69	0.72	2.01	70	2.14	177.8	2.84	0.58	1.73
S	0	119	3.44	245.3	2.03	0.99	1.99	101	2.40	208.4	3.09	0.72	1.74
	20	152	3.50	259.1	2.67	1.49	2.37	124	2.53	217.8	3.42	1.16	2.06
	100	179	3.99	268.0	2.91	1.64	2.77	140	2.82	227.2	3.71	1.38	2.50
	Mean	150	3.64	257.5	2.54	1.37	2.37	122	2.59	217.8	3.41	1.09	2.10
10	0	160	3.99	262.4	2.73	1.51	2.49	140	2.63	225.0	3.79	1.23	2.11
	20	183	4.51	276.0	2.91	1.80	3.00	140	2.90	237.0	3.98	1.47	2.38
	100	202	5.04	280.0	3.71	2.02	3.52	171	3.07	257.2	4.47	1.69	2.96
	Mean	152	4.51	272.8	3.12	1.78	3.00	150	2.87	239.7	4.08	1.46	2.48
20	0	183	4.30	271.7	2.76	1.76	2.67	152	2.79	248.7	4.03	1.36	2.44
	20	210	4.90	283.0	3.29	2.09	3.32	167	3.02	258.7	4.54	1.71	2.66
	100	241	5.34	293.7	3.83	2.31	3.99	183	3.21	279.2	5.06	2.00	3.48
	Mean	211	4.85	282.8	3.29	2.05	3.33	167	3.01	262.2	4.54	1.69	2.86

OS = organic source, ETR = enrich town refuse M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, EFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich

0.16

0.11

5.3

0.16 ns

0.11

0.15

5.6

11.2

Rate x MF

LSD at 5%

Table (4a): Effect of used organic sources and their rates on soil totla N and soil available nutrients (field exp.I).

aic so	Organic	Rate		+	After 70 days	days					After 150 days	0 days		
Fed         N         Fe         Zn         Mn         N         F         Fe         Sn         Fe         R         Fe         Fe         R         Fe         R         Fe         R         Fe         Fe         R         R	Sources	Ton/		ug.g.			ug.g-1			µg.g-1			ug.g.	
0 315 2.90 207.8 2.10 0.90 2.00 214 2.30 190.9 2.00 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Fed	z	Ь	¥	Fe	Zn	Mn	z	P	K	Fe	Zn	Mn
5         529         4.40         242.8         3.10         1.53         2.30         311         3.80         260.5         3.30           10         649         5.00         251.5         3.50         2.00         2.50         346         4.30         266.9         3.80           20         778         5.50         273.4         3.90         2.27         2.80         416         4.70         285.1         4.30           Mean         568         4.50         243.9         3.10         1.68         2.40         322         3.80         250.9         3.40           5         607         4.60         263.6         3.60         1.93         2.90         273         4.10         276.2         4.20           10         801         5.40         269.7         4.60         2.13         3.20         552         4.80         28.8         4.90           20         858         6.00         286.3         5.60         2.13         3.20         4.20         26.2         4.40         5.30         4.40         56.2         4.40           8         6.00         286.3         5.60         2.16         3.00         2.00	EFW	0	315	2.90	207.8	2.10	06.0	2.00	214	2.30	190.9	2.00	0.70	1.70
10   649   5.00   251.5   3.50   2.00   2.50   346   4.30   266.9   3.80     Mean   568   4.50   243.9   3.10   1.68   2.40   322   3.80   250.9   3.40     O		2	529	4.40	242.8	3.10	1.53	2.30	311	3.80	260.5	3.30	1.70	2.40
Mean   S68   4.50   273.4   3.90   2.27   2.80   416   4.70   285.1   4.30   4.30   4.50   243.9   3.10   1.68   2.40   322   3.80   250.9   3.40   3.15   2.90   207.8   2.10   0.90   2.00   214   2.30   190.9   2.00		10	649	5.00	251.5	3.50	2.00	2.50	346	4.30	566.9	3.80	2.40	2.70
Mean 568 4.50 243.9 3.10 1.68 2.40 322 3.80 250.9 3.40  0 315 2.90 207.8 2.10 0.90 2.00 214 2.30 190.9 2.00  10 801 5.40 269.7 4.60 2.13 3.20 552 4.80 288.8 4.90  20 858 6.00 286.3 5.60 2.56 3.80 642 5.30 306.8 6.50  Mean 645 4.70 256.9 4.00 1.88 3.00 445 4.10 265.2 4.40  0 315 2.90 207.8 2.10 0.90 2.00 214 2.30 190.9 2.00  5 478 4.10 251.9 3.50 1.60 2.60 280 3.80 269.4 3.80  10 595 4.80 261.4 3.60 2.16 3.00 293 3.90 269.4 3.80  Mean 512 4.30 248.9 3.40 1.75 2.80 293 3.90 258.6 3.80  nic sources  HDD = enrich poudrette, ETR = enrich town refuse		20	778	5.50	273.4	3.90	2.27	2.80	416	4.70	285.1	4.30	2.50	3.30
0         315_         2.90         207.8         2.10         0.90         2.00         214         2.30         190.9         2.00           5         607         4.60         263.6         3.60         1.93         2.90         373         4.10         276.2         4.20           10         801         5.40         269.7         4.60         2.13         3.20         552         4.80         288.8         4.90           20         858         6.00         286.3         5.60         2.13         3.20         552         4.80         288.8         4.90           Mean         645         4.70         256.9         4.00         1.88         3.00         445         4.10         265.2         4.40           5         478         4.10         256.9         4.00         1.88         3.00         244         4.10         265.2         4.40           10         595         4.80         261.4         3.60         2.16         3.00         3.0         269.4         3.80           661         5.40         248.9         3.40         1.75         2.80         293         3.90         258.6         3.80	1	Mean	268	4.50	243.9	3.10	1.68	2.40	322	3.80	250.9	3.40	1.80	2.60
5         607         4.60         263.6         3.60         1.93         2.90         373         4.10         276.2         4.20           10         801         5.40         269.7         4.60         2.13         3.20         552         4.80         288.8         4.90           20         858         6.00         286.3         5.60         2.56         3.80         642         5.30         306.8         6.50           Mean         645         4.70         256.9         4.00         1.88         3.00         445         4.10         265.2         4.40           5         478         4.10         256.9         4.00         1.88         3.00         214         4.10         265.2         4.40           5         478         4.10         256.9         4.00         2.00         2.00         20.0<	EPD	0	315	2.90	207.8	2.10	06.0	2.00	214	2.30	190.9	2.00	0.70	1.70
10   801   5.40   269.7   4.60   2.13   3.20   552   4.80   288.8   4.90     20		S	209	4.60	263.6	3.60	1.93	2.90	373	4.10	276.2	4.20	2.10	3.30
Mean 645 4.70 256.9 4.00 1.88 3.00 445 4.10 265.2 4.40  Mean 645 4.70 256.9 4.00 1.88 3.00 445 4.10 265.2 4.40  5 478 4.10 251.9 3.50 1.60 2.00 214 2.30 190.9 2.00  10 595 4.80 261.4 3.60 2.16 3.00 30.3 4.40 280.1 4.10  Mean 512 4.30 248.9 3.40 1.75 2.80 293 3.90 258.6 3.80  42.3 0.09 2.4 0.12 0.11 0.12 15.16 0.12 4.2 0.14  nic sources  EPD = enrich poudrette, ETR = enrich town refuse		10	801	5.40	269.7	4.60	2.13	3.20	552	4.80	288.8	4.90	2.40	3.90
Mean 645 4.70 256.9 4.00 1.88 3.00 445 4.10 265.2 4.40  0 315 2.90 207.8 2.10 0.90 2.00 214 2.30 190.9 2.00  5 478 4.10 251.9 3.50 1.60 2.60 280 3.80 269.4 3.80  10 595 4.80 261.4 3.60 2.16 3.00. 294 280.1 4.10  20 661 5.40 244.5 4.50 2.36 3.40 373 5.00 294.0 5.30  Mean 512 4.30 248.9 3.40 1.75 2.80 293 3.90 258.6 3.80  in sources  nic sources  EPD = enrich poudrette, ETR = enrich town refuse		20	858	00.9	286.3	5.60	2.56	3.80	642	5.30	306.8	6.50	2.80	4.50
0 315 2.90 207.8 2.10 0.90 2.00 214 2.30 190.9 2.00 2.00 5 478 4.10 251.9 3.50 1.60 2.60 280 3.80 269.4 3.80 20 4.80 261.4 3.60 2.16 3.00 2.30 4.40 280.1 4.10 2.00 2.00 2.30 3.40 3.73 5.00 2.94.0 5.30 2.30 4.40 280.1 4.10 2.30 2.30 3.40 3.73 5.00 2.94.0 5.30 2.30 3.40 3.73 5.00 2.94.0 5.30 2.30 3.40 3.73 5.00 2.94.0 5.30 2.30 3.40 3.73 5.00 2.94.0 5.30 3.80 3.80 3.80 3.80 3.80 3.80 3.80 3		Mean	645	4.70	256.9	4.00	1.88	3.00	445	4.10	265.2	4.40	2.00	3.30
S   478   4.10   251.9   3.50   1.60   2.60   2.80   3.80   269.4   3.80   1.00   2595   4.80   261.4   3.60   2.16   3.00   373   4.40   280.1   4.10   2.00   661   5.40   244.5   4.50   2.36   3.40   373   5.00   294.0   5.30   3.80   3	ETR	0	315	2.90	207.8	2.10	06.0	2.00	214	2.30	190.9	2.00	0.70	1.70
10 595 4.80 261.4 3.60 2.16 3.00 303 4.40 280.1 4.10  20 661 5.40 244.5 4.50 2.36 3.40 373 5.00 294.0 5.30  Mean 512 4.30 248.9 3.40 1.75 2.80 293 3.90 258.6 3.80  42.3 0.09 2.4 0.12 0.11 0.12 15.16 0.12 4.2 0.14  ns 0.18 4.8 0.24 ns 0.23 30.3 0.25 8.4 0.28  nic sources  rich farm waste,  EPD = enrich poudrette, ETR = enrich town refuse		S	478	4.10	251.9	3.50	1.60	2.60	280	3.80	269.4	3.80	1.90	3.00
20   661   5.40   244.5   4.50   2.36   3.40   373   5.00   294.0   5.30     Mean   512   4.30   248.9   3.40   1.75   2.80   293   3.90   258.6   3.80     42.3   0.09   2.4   0.12   0.11   0.12   15.16   0.12   4.2   0.14     ns   0.18   4.8   0.24   ns   0.23   30.3   0.25   8.4   0.28     nic sources   EPD = enrich poudrette,   ETR = enrich town refuse		10	595	4.80	261.4	3.60	2.16	3.00-	303	4.40	280.1	4.10	2.50	3.50
Mean 512 4.30 248.9 3.40 1.75 2.80 293 3.90 258.6 3.80 6 3.80 6 42.3 0.09 2.4 0.12 0.11 0.12 15.16 0.12 4.2 0.14 nic sources    EPD = enrich poudrette, ETR = enrich town refuse		20	199	5.40	244.5	4.50	2.36	3.40	373	5.00	294.0	5.30	2.80	4.00
6 42.3 0.09 2.4 0.12 0.11 0.12 15.16 0.12 4.2 0.14 ns 0.23 30.3 0.25 8.4 0.28 nic sources EPD = enrich poudrette, ETR = enrich town refuse		Mean	512	4.30	248.9	3.40	1.75	2.80	293	3.90	258.6	3.80	2.00	3.10
42.3 0.09 2.4 0.12 0.11 0.12 15.16 0.12 4.2 0.14 ns 0.28 as 0.18 4.8 0.24 ns 0.23 30.3 0.25 8.4 0.28 nic sources EPD = enrich poudrette, ETR = enrich town refuse	LSD at 5%	5	8	R	Ě	6								
ns 0.18 4.8 0.24 ns 0.23 30.3 0.25 8.4 0.28 nic sources EPD = enrich poudrette, ETR = enrich town refuse	OS		42.3	0.00	2.4	0.12	0.11	0.12	15.16	0.12	4.2	0.14	0.11	0.0
EPD = enrich poudrette, ETR	OS x Rate		ns	0.18	4.8	0.24	us	0.23	30.3	0.25	8.4	0.28	0.21	0.18
EPD = enrich poudrette, ETR														
EPD = enrich poudrette, ETR	OS = organi	sources					Ā							
	EFW = enric	th farm wa	ıste,	EP	D = enri	ch pouc	frette,		= enric	1 town	refuse			

0.09

0.11

0.14

0.12

15.2

ns

Table (4b): Effect of used organic sources and mineral fertilizers on soil total N and soil available nutrients (field exp.I).

Organic	Ä.			After 70 days	) days					After 150 days	O dave		
Sources	% of		1.g.g.			ug.g.			110.0-1		2	1-0 011	
	×	z	Ь	×	FP	Zn	M	2	200		5	12.5	
EFW/		404	0	┰			1117.17		I	4	Fe	Zn Zn	M
I'I W	>	484	4.10		2.60	1.40	2.20	280	3 60	2347	0000	1 40	2000
	20	572	4.50	_	3 10	1 70	2 30	227	200	7.1.0	2.70	1.40	7.30
	100	017	00	_		1.70	2.30	170	2./0	6.107	3.40	1.90	2.60
200	100	0+0	4.90	-	3.70	2.00	2.70	359	4.10	265.0	3 80	2 20	2 00
EPD	0	207	4.30	245.4	3.50	1.60	2.70	385	3 70	2 120	0000	7.70	2.20
	20	009	7 70	_	000	000		000	2.7	C.+C7	2.80	1.70	3.00
	000	000	4.70	_	4.00	1.90	3.00	458	4.10	265 1	4 40	2 00	3 30
	100	750	5.10		4 60	2 20	3 30	402	7 60	277		20.0	00.0
FTR	0	150	200	4	000	2	0.00	47.7	4.00	4.112	2.10	2.30	3.80
	>	400	2.80		3.00	1.40	2.50	260	3 30	2453	3 30	1 70	07.0
	20	508	4.30		3 30	1 80	2 80	200	000	0.00	0.00	0	7.70
	100	573	4 00			1.00	700.7	720	4.00	4.867	3.90	2.10	3.10
	001	717	4.00		4.00	7.00	3.00	321	4.30	272.2	4 30	230	2 50
Mean	0	483	4.10	239.4	3.00	1.45	2 40	308	2 50	0 110	0000	2	0.00
	20	586	450		7 50	1	1 0	200	2.70	0.447	3.30	09.1	7.70
	001		00.4		4.30	1./9	7.70	361	3.90	258.5	3.90	2.00	3 00
	100	900	4.90	261.1	4 10	207	3.00	201	00 1	01.00			000

42.3 LSD at 5% MF OS x MF

0.11 us 0.12 ns 2.4 ns € 60.0 ns ns

M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,

CAN = enrich farm waste,

EFW = enrich form refuse

0.12 ns

OS = organic sources

19

0.12

0.16

4.8 ns

0.14

17.5

0.14

0.13

0.14

2.8

0.18

ns

Rate x MF

48.8

ns

ns

ns

0.28

2.90 3.30 3.50 3.70 3.40 3.60 3.80 1.60 2.10 1.70 2.60 2.90 3.00 4.40 3.90 Z Table (4c): Effect the rate of used organic sources and mineral Fertilizers on soil total N and 1.90 2.30 1.90 2.50 2.80 2.50 2.40 0.40 1.00 2.10 3.00 0.70 Zu 18.8 4.20 4.30 4.70 5.30 5.40 2.50 2.00 3.30 3.80 3.80 3.80 4.40 4.70 6.10 After 150 days 282.0 279.4 287.5 278.6 281.9 297.0 210.8 254.8 269.2 268.9 307.2 188.2 190.9 268.7 173.7 ¥ 3.10 2.00 2.30 3.50 3.90 4.20 3.90 4.00 4.60 4.80 4.50 4.80 5.00 5.20 5.00 1.80 245 354 436 245 288 366 428 323 401 401 474 Z 2.70 3.20 2.40 2.90 2.60 2.90 2.90 3.40 2.00 M 0.50 0.90 1.30 2.40 2.10 1.80 2.00 2.20 2.20 2.40 2.60 2.39 0.00 1.69 1.80 18.g Zn 2.10 2.60 3.30 3.90 3.90 4.40 3.90 2.10 3.00 3.40 3.40 4.20 4.60 After 70 days Soil available nutrients (field exp.I). 8.661 268.9 260.9 267.4 252.5 267.4 252.8 261.5 277.4 205.2 218.7 238.4 252.1 289.3 278.0 207.8 ¥ 4.80 5.10 2.80 3.70 2.90 4.00 4.40 4.40 4.70 5.20 5.30 5.30 5.70 5.70 6.00 ۵. 859 991 315 420 315 909 537 572 538 119 774 682 621 817 595 Mean Mean Mean Mean % of MF 100 100 100 100 0 9 0 20 0 20 0 20 ~ LSD at 5% Rate of ton/fed SO 9 20 0

OS = organic source, ETR = enrich town refuse M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, EPD = enrich poudrette, EFW = enrich farm waste,

Table (5a): Effect of used organic sources and their rates on soil total N and soil available nutrients (field exp.II).

Kate Ton/		1	After 70 days	0 days					After 1	After 150 days		
		118.g			µg.g-1	-		10.0-1		2	1-0 011	
rea	1	Ь	¥	Fe	Zn	Mn	Z	b d	X	2	rg.g	
868	8	3.70	2763	3.00	1 30	2 40				re	U7	Mn
1851	-	_	3207	7.00	1.30		770	7.50	235.3	2.40	0.84	2.00
1972	0	5 30	320.0	4.70	1.70		844	4.30	336.8	5.40	1.90	2.90
2199	0	5 80	366 9		06.1	_	966	4.70	360.5	6.40	2.30	3.30
Mean 1730	10	4 90	325.0	-	2.20	+	1079	5.00	390.4	7.20	2.50	4.10
_	10	3.70	0767	01.0	1.80	7.90	885	4.20	330.8	5.40	2.00	3.10
2170	1	5.70	2310	3.00	1.30	2.40	622	2.50	235.3	2.40	0.84	2.00
2403	99	6.00	376.1	7.40	06.1	3.10	1276	5.10	354.0	5.90	2.10	3.60
2687		06.9	4315	7.00	2.00	3.20	1528	5.50	403.2	7.40	2.30	4.20
Mean 2040	1	5.50	354.0	200.7	1.00	07.4	16/1	5.80	465.6	8.20	2.60	4.80
868		3.70	2763	0.70	1.30	3.20	1306	4.70	364.5	00.9	2.00	3.60
7921		4.60	321.0	3.00	1.50	2.40	622	2.50	235.3	2.40	0.84	2.00
1929		5.60	355.2	4.00	0/.1	2.80	1423	4.90	347.1	5.40	2.10	3.20
2147		6.20	306.2	0.70	2.10	3.10	F524	5.50	368.3	08.9	2.40	3.90
1684		200	2375	02.7	2.10	4.00	1544	00.9	428.7	7.60	2.40	4.60
	7	0.00	0.100	3.20	1.80	3.10	1279	4.80	344.9	5.60	1.90	3.40
49.7		0.12	4.6	0.22	ns	0.12	43.6	0.10	4.3	Su	ž	0.10
77.3		0.24	9.3	0.44	0.22	0.23	87.2	0.20	8.7	su	ns ns	0.24
EFW = enrich farm waste,		EPD	EPD = enrich poudrette,	ıpnod y	ette,	ETR	= enrich town refuse,	town re		OS = organic sources	ganic sc	urces

Table (5b): Effect of used organic sources and mineral fertilizers on soil total N and soil available nutrients (field exp.II).

Organic	Ä.		,	Allel /0 days	days					Allel 150 days	o days		
Sources	Jo %		µg.g-1	Constitution of	N*****	ug.g.1			ug.g-1			ug.g-1	
	R	Z	Ь	K	Fe	Zn	Mn	Z	Ь	K	Fe	Zn	Mn
EFW	0	1558	4.30	304.0	4.40	1.50	2.60	753	3.70	310.7	4.70	1.80	2.80
	20	1730	5.00	323.9	5.20	1.70	2.90	916	4.20	329.3	5.40	1.90	3.00
	100	1902	5.20	349.6	5.80	2.10	3.30	886	4.50	352.4	00.9	2.10	3.40
EPD	0	1838	4.90	333.6	5.10	1.70	2.70	1132	4.20	341.6	5.40	1.70	3.00
	50	2048	5.60	353.8	5.90	1.80	3.30	1353	4.80	364.9	5.90	2.00	3.60
	100	2234	00.9	374.5	09.9	2.10	3.80	1432	5.20	387.0	6.70	2.30	430
ETR	0	1534	4.40	316.8	4.40	1.60	2.70	1152	4.20	321.8	4.80	1.70	2.90
	90	1700	5.00	335.9	5.20	1.70	3.00	1304	5.00	342.6	5.60	1.90	3.30
	100	1818	5.60	359.6	5.90	2.00	3.60	1380	5.10	370.2	6.20	2.20	4.00
Mean	0	1643	4.60	318.1	4.60	1.60	2.70	1012	4.00	324.7	5.00	1.70	2.90
	50	1826	5.20	337.9	5.40	1.70	3.00	1191	4.70	345.6	5.60	1.90	3.30
	100	1984	5.60	361.2	6.10	2.10	3.50	1266	4.90	370.0	6.30	2.20	3.90
LSD at 5%			E	1818		E	Pie	Ä					
MF		49.7	0.12	4.6	0.22	0.11	0.12	50.3	0.10	4.3	0.24	0.19	0.12
OS x MF		ns	ns	us	us	us	us	ns	ns	ns	ns	us	0.20
M.F. % of $R=$ mineral fertilizers as percent of recommended dose for wheat.	mineral	fertilizer	s as per	cent of r	ecomm	ended	dose for	r wheat.		OS	OS = organic sources	ic sour	ses
EFW = enrich farm waste,	farm was	ste,	EPI	EPD = enrich poudrette,	sh pouc	Irette,	ETR	= enrich town refuse	town r	efuse	0		

Table (5c): Effect the rate of used organic sources and mineral fertilizers on soil total N and soil available nutrients (field exp.II).

Kate of	MF			After 70 days	days					After 150 days	50 days		
So ;	% of		18.g			µg.g.			11g.g.1			1.0.0.1	
ton/red	X	z	4	X	Fe	Zn	Mn	Z	a	A	D.	0.0	3.2
0	0	178	2 20	2020	000				-	4	PE	7	IMIN
ò	> {	0/4	0.50	220.0	7.30	1.10	96.1	315	2.00	209.4	1.70	1.00	1.50
	00	107/	3.90	273.8	3.00	1.10	2.30	723	2.60	236.6	2.30	0 8 0	1 90
	100	1190	3.90	304.4	3.70	1.50	3.00	828	3.00	260.0	3.10	1.10	2 60
	Mean	868	3.70	276.3	3.00	1.30	2.40	622	2.50	235.3	2 40	0 04	200
2	0	1789	4.40	305.0	4.20	1.50	2.70	1073	4.40	324.5	4 80	1 60	2.2
	20	1902	5.00	325.0	5.00	1.60	2.80	1221	4 90	3416	2,60	2.10	2 00
	100	2092	5.40	344.0	5.50	2.10	3.20	1248	5.10	3717	6 30	2 30	2.00
	Mean	1928	4.90	324.7	4.90	1.70	2.90	11811	4.80	3450	2,50	2000	0.70
10	0	2034	5.00	3382	5 50	1 70	0000	1076	00. 4	0.010	00.0	2.00	3.20
	20	2028	6 70	2.020	200	0.70	2.30	0/71	4.70	6./66	6.30	2.10	3.20
	8 2	2020	0.70	230.3	0.40	7.00	3.10	1361	5.40	379.1	08.9	2.40	3.80
	201	7577	07.0	3/4.9	7.20	2.20	3.50	1412	5.60	395.1	7.60	2.50	4.30
0	Mean	7101	5.60	357.1	6.40	2.00	3.20	1349	5.20	377.4	06.9	2.30	3 80
70	0	2271	5.50	378.7	6.50	2.00	3.20	1384	5.00	407.0	7 10	220	4 00
	20	2338	6.40	394.4	7.30	2.20	3.90	1458	5.80	425.0	7.80	2 50	7
	100	2423	7.00	421.5	7.90	2.40	4.50	1577	00.9	452.7	8.20	2 90	5.00
	Mean	2344	6.30	398.2	7.20	2.20	3.90	1473	5.60	428.2	7.70	250	1 50

M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, OS = organic sources EFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich town refuse us ns 50.3 87.2 us 57.3 Rate x MF

<u>n</u>

0.14 ns

0.21

0.28

5.0

0.14

0.13

0.14

Rate

1

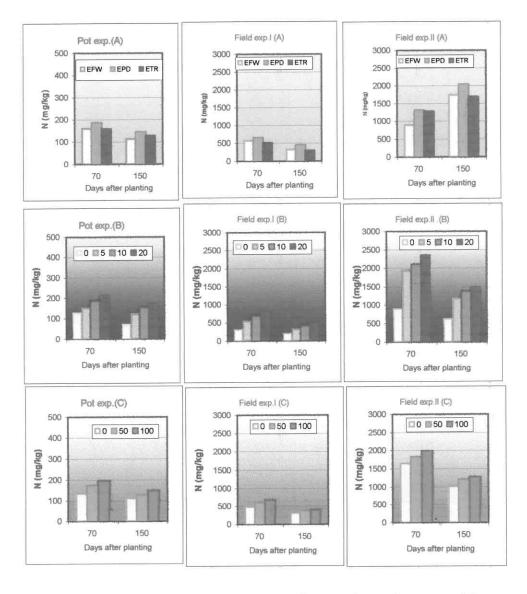


Fig.( 4 ): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on Total soil nitrogen (mg/kg).

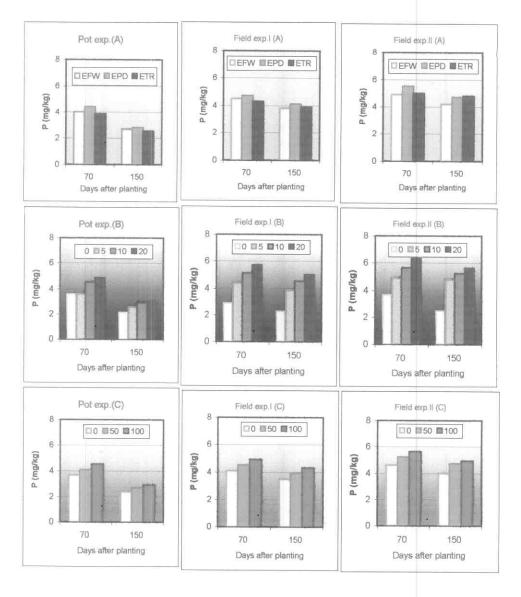


Fig.( 5 ): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on soil available phosphorus (mg/kg).

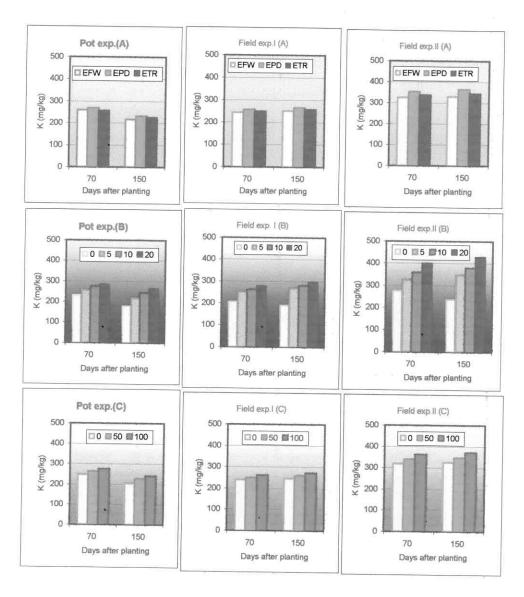


Fig.( 6 ): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on soil available potassium (mg/kg).

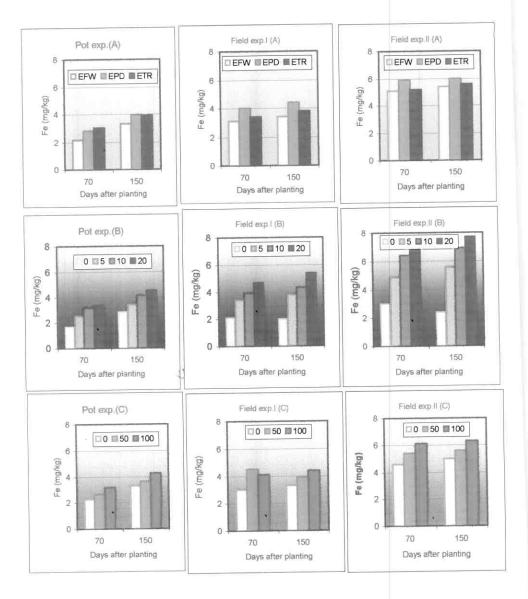


Fig.(7): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on soil available iron (mg/kg).

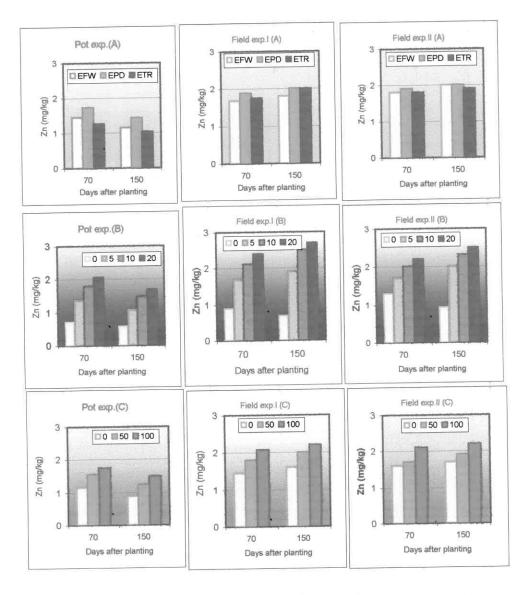


Fig.( 8 ): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on soil available zinc (mg/kg).

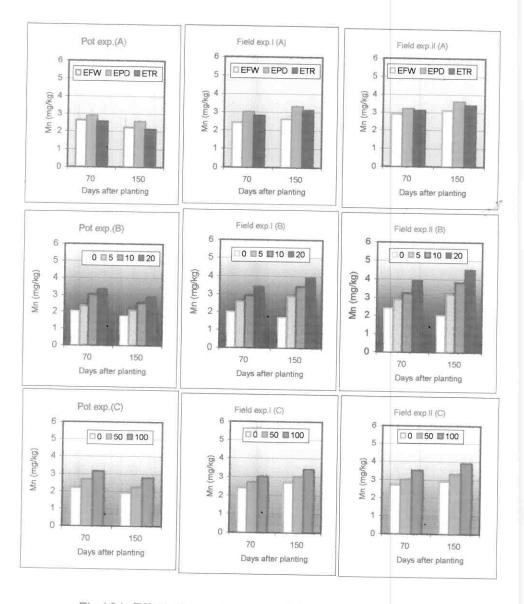


Fig.( 9 ): Effect of organic sources (A), rate of organic sources (B) and fertilizer rate (C) on soil available manganes (mg/kg).

## 4.3.1. Wheat plants dry weight (g/plant):

Data in tables (12-14) showed that the effects of organic sources, their rates and mineral fertilizer rates increased wheat dry weight in the pot exp. and the field exp.I and exp.II. The successive increasing order of dry weight in the three experiments as affected by organic sources was enrich town refuse < enrich farm waste < enrich poudrette. As for the rates, either of the organic sources or mineral fertilizers successively and significantly increased the dry weight in all the three experiments, (fig. 10). Similar results were reported by Borhamy for poudrette and El-Emam ( 1999) for farm weste and Saker et al (1992) for town refuse.

Di-interaction effect of enrich farm waste at a rate of 20 ton/fed, enrich farm waste with 100% fertilizer, and 20 ton/fed of any organic sources with 100% fertilizer rate in the pot exp. contributed to the highest values of dry weight (g/plant), while in both field exp.I and exp.II, enrich poudrette either at a rate of 20 ton/fed or with fertilizer rate at 100% as well as at a rate of 20 ton/fed of any organic sources with 100% mineral fertilizer were resulted the highest dry weight (g/plant).

# 4.3.2. Nitrogen concentration (%) and uptake (mg/plant):

The effects of organic sources, their rates and fertilizer rates significantly increased nitrogen concentration and uptake of wheat plant in the three experiments. Enrich poudrette was of the the superior effect on plant nitrogen concentration and uptake, followed by the enrich farm waste then the enrich town refuse, (Tables 12-14). The highest rate of three organic sources, as individual effect, had significantly the highest effect on increasing nitrogen concentration and uptake of wheat plants in

the three experiments, (figs. 11-12). Similar results were obtained by Saker et al (1992).

Generally, the effect of organic sources with their rates. organic sources with mineral fertilizer rates and rate of organic sources with rate of mineral fertilizers significantly increased nitrogen concentration and uptake of wheat plants in the pot exp. Also, in general, the previous di-interaction effect significantly increased nitrogen uptake of wheat plants but there was no significant effect on nitrogen concentration in both field exp.I and exp.II. Similar results were achieved by Faiyed (1994) and Hassan (1999).

## 4.3.3. Phosphorus concentration (%) and uptake

### (mg/plant):

Organic sources, their rates or mineral fertilizer rates as individually affected significantly phosphorus concentration and uptake of wheat plant in the three experiments. Enrich poudrette represented the superior organic sources affecting plant concentration and uptake, followed by enrich farm waste then enrich town refuse (Tables 12-14). The highest rate of the average values of three organic sources showed the highest effect on increasing phosphorus concentration and uptake by wheat plants in the three experiments (figs. 13-14). Similar results were obtained by Allam (1999).

Generally, phosphorus concentration in wheat plants was significantly affected by rates of organic sources and with the rates of the applied mineral fertilizers, while uptake was significantly affected by organic sources with their rates in the pot exp. In the field exp.I, di-interaction effect of organic sources with their rates, organic sources with mineral fertilizer

rates and the rates of organic sources with the rates of mineral fertilizers significantly increased phosphorus uptake of wheat plants. Phosphorus concentration had been significantly affected only under organic sources with their rates, whereas no significant could be attained with other previous di-interactions. Concerning the field exp.II, phosphorus uptake and concentration were significantly increased by all the used di-interaction effect, except for application of organic sources with fertilizer rates. This may be attributed to the role of organic sources in retaining phosphorus in non-available form up to 70 days of cultivation.

#### 4.3.4. Potassium concentration (%) and uptake (mg/plant):

The organic sources, their rates or mineral fertilizer rates as individual factors significantly increased potassium concentration and uptake of wheat plant in the three experiments. Enrich poudrette was the superior organic sources affecting plant concentration and uptake, followed by enrich farm waste, then enrich town refuse (Tables 12-14). The highest rate of the average values of the three organic sources had the highest effect on increasing potassium concentration and uptake in wheat plants in the three experiments (figs. 15-16). Similar results were by attained by Mahmoud (1996).

Generally, di-interaction effect of organic sources with their rates, organic sources with mineral fertilizer rates and rate of organic sources with rates of fertilizer significantly increased potassium uptake of wheat plants in the pot exp., field exp.I and field exp.II, but did not affect significantly potassium concentration in the three experiments, except of organic sources rates with mineral fertilizer rates in the pot exp. and field exp.II

which significantly affected the potassium concentration. Similar results were by Hassan (1999) for farm weste and Saker et al (1992) for poudrette and town refuse.

## 4.3.5.Iron concentration (μg/g) and uptake (μg/plant):

The organic sources, their rates or fertilizer rates significantly increased iron concentration and uptake of wheat plant in the three experiments, (Tables 12-14). Enrich poudrette was the organic sources of the superior effect on plant concentration and uptake, followed by enrich farm sources, then enrich town refuse in the pot exp. and field exp.I. On the other hand, enrich town refuse was the superior organic source followed by enrich poudrette, then enrich farm waste in the field exp.II. The average values of iron concentration in wheat plant under enrich poudrette in pot exp., field exp.I and field exp.II were 557, 361 & 408 µg/g respectively, whereas for uptake they were 2654, 4307 and 6450 µg/plant. Iron concentrations in the pot exp. under enrich poudrette wass higher than those of the two field experiments, but lower in iron uptake than the two field experiments. The highest rate of the average values of the three organic sources as individual effect showed the highest effect on increasing iron concentration and uptake by wheat plants in the three experiments, (fig. 17-18). Similar results were obtained by Khalifa et al (1993).

Generally, di-interaction effect of organic sources with their rates, organic sources with mineral fertilizer rates and the rates of organic sources with the rates of mineral fertilizer significantly increased iron uptake of wheat plants in the pot exp. and just the field exp.I. Also, organic sources with their rates significantly increased iron uptake in the field exp.II but iron

## 4.3.6.Zinc concentration (μg/g) and uptake (μg/plant):

Data in tables (12-14) showed that the organic sources, their rates or mineral fertilizer rates significantly increased zinc concentration and uptake of wheat plant in the three experiments. Enrich poudrette represented the superior organic source affecting plant concentration and uptake, followed by enrich farm waste, then enrich town refuse in the three experiments. There was no significant difference between enrich farm waste and enrich poudrette on zinc concentration and uptake in the pot exp. and field exp.I and concentration in the field exp.II. The highest rate of the average values of the three organic sources as well as the highest rate of mineral fertilizer exerted the highest effect on increasing zinc concentration and uptake by wheat plants in the three experiments, (figs. 19-20). Similar results were achieved by Faiyed (1994) and Borhamy (1998) for poudrette and Ahmed (1994) for farm waste.

Di-interaction of organic sources with their rates had achieved significant differences of zinc concentration and uptake in the three experiments. On the other hand, di-interaction of used organic sources with fertilizer rates showed no significant effect on zinc concentration or uptake in the three experiments. As for di-interaction of organic sources with fertilizer rates, it achieved significant differences just in zinc uptake of the pot exp. and the field exp.II.

## 4.3.7. Manganese concentration (μg/g) and uptake (μg/plant):

Data in tables (12-14) showed that organic sources, their rates or mineral fertilizer rates increased significantly the manganese concentration and uptake of wheat plant in the three experiments, except for the organic sources in the pot exp. Which did not achieve significant differences in manganese concentration and uptake. Enrich poudrette was the superior organic sources effecting on plant concentration and uptake, followed by enrich farm sources, then enrich town refuse in both field exp.I and field exp.II. The highest rate of the average values of the three organic sources as well as the highest rate of mineral fertilizer gave the highest effect on increasing manganese concentration and uptake of wheat plants in the three experiments, (figs. 21-22). Similar results were obtained by Ahmed (1994) for farm waste and Borhamy (1998) for poudrette.

The three kinds of di-interaction had achieved no significant differences on manganese concentration and uptake by wheat plant grown in the pot experiment. Similar trend was noticed in the field exp.I, except for the organic sources with their rates which resulted in significant differences on manganese uptake. As for the field exp.II, organic sources with their rates showed significant effect on concentration and uptake by wheat plants, and organic sources rates with fertilizer rates showed significant effect on uptake. Similar results were obtained by Duraisamy et al (1988) for farm waste and Mekail (1998) for poudrette with mineral fertilizer rate.

Table (12a): Effect of used organic sources and their rates on plant dry weight, concentration and uptake of wheat plant nutrients (pot exp.) after 70 days.

Organic	Rate	DW		C	Concentration	ration					Uptake	ake		
Sources	Ton/	<b>20</b>		%			1-8.84		ш	mg/plant			Ug/plant	
	peg	Plant	z	Ь	K	Fe	Zn	Mn	z	Ь	Х	Fe	Zn	Mn
EFW	0	3.31	1.87	0.17	2.42	172	18	28	65.7	5.6	83.3	620	62	94
	2	4.54	2.70	0.17	3.10	422	36	52	128.6	8.0	142.0	1992	168	636
	01	4.63	3.37	0.22	3.18	200	43	28	163.1	10.2	148.4	2360	202	569
	20	5.28	4.05	0.29	3.32	700	47	70	215.0	15.2	175.4	3715	246	374
	Mean	4.44	3.00	0.21	3.01	449	36	62	143.1	8.6	137.3	2172	170	343
EPD	0	3.31	1.87	0.17	2.42	172	18	28	65.7	5.6	83.3	620	62	94
	S	4.57	3.24	0.20	3.26	528	40	52	152.2	0.6	148.7	2714	189	240
	01	4.84	4.03	0.24	3.23	829	4	19	6.861	11.6	156.8	3323	199	297
	20	4.90	4.74	0.31	3.43	800	20	74	235.5	15.1	168.3	3959	245	369
	Mean	4.40	3.47	0.23	3.08	557	37	54	163.1	10.4	139.3	2654	174	250
ETR	0	3.31	1.87	0.17	2.42	172	18	28	65.7	5.6	83.3	620	62	94
	2	3.55	2.25	0.17	3.16	322	32	44	82.2	6.1	112.0	1182	117	159
	01	3.99	2.86	0.22	3.12	544	33	751	119.4	8.7	125.8	2213	135	208
2	20	4.87	3.56	0.27	3.27	644	41	99	178.1	13.1	160.0	3192	204	324
	Mean	3.96	2.63	0.21	2.99	421	31	47	111.3	8.4	120	1802	129	961
LSD at 5%	A		Z											
SO		0.18	0.12	0.01	0.07	34.3	3.1	Ns	8.5	0.5	6.4	183	15	ns
OS x Rate		0.35	0.25	ns	Ns	9.89	6.2	SZ	17.0	1.0	12.9	365	29	ns
DW = dry weight	ght of w	of wheat plant,		OS	= orga	OS = organic sources	ces							
EFW = enrich farm waste,	farm wa	ste,	EPD	e	= enrich poudrette.	rette.	ETR	= enric	= enrich town refuse	efiise				
					•		般様とでは			-				

Table (12b): Effect of used organic sources and mineral fertilizers rates on plant dry weight, concentration and uptake of wheat plant nutrients (pot exp.) after 70 days.

g/s         %           Plant         N         P           3.80         1.93         0.19           4.42         2.78         0.24           5.10         4.28         0.24           3.70         2.38         0.21           4.65         3.41         0.23           4.86         4.60         0.25           3.47         1.68         0.18           3.81         2.55         0.21           4.59         3.68         0.23           4.29         2.91         0.22           4.29         2.91         0.24           4.85         4.19         0.24           0.18         0.12         0.01           o.30         ns         Ns           fertilizers as percent of fertilizers as percent of ste,         enris	Organic	M.F	DW		0	Concentration	ration					IInt	ole		
FW 0 3.80 1.93 0.19 2.68 342 28 46 79.0 7.4 105.8 1449 117 5.0 4.42 2.78 0.22 3.01 458 38 51 127.1 9.8 135.6 2175 173 5.0 100 5.10 4.88 0.24 3.33 5.46 4.2 5.9 223.2 12.2 170.5 2892 219 210 5.0 4.65 3.41 0.23 3.03 5.88 4.2 31 4.2 5.9 4.3 7.9 109.5 1781 122 5.0 4.65 3.41 0.23 3.03 5.88 3.4 55 166.5 11.0 144.0 2804 166 5.1 0 3.81 2.55 0.21 2.58 0.21 2.86 1.0 144.0 2804 166 5.0 0 3.81 2.55 0.21 2.88 6.3 95.4 1118 91 1.0 0 3.81 2.55 0.21 2.98 6.3 95.4 1118 91 1.0 0 3.81 2.55 0.21 2.98 5.0 13.1 3.8 5.1 1.3 14.0 1798 121 1.0 0 3.81 2.55 0.21 2.90 1.0 0.2 3.88 5.1 1.3 14.0 1.798 1.10 1.0 0 3.68 0.29 0.29 0.29 0.29 0.29 0.29 0.29 0.29	Sources	% of	/8		1 1					a	ng/plar			a/nlan	
FW 0 3.80 1.93 0.19 2.68 342 28 46 79.0 7.4 105.8 1479 117    50 4.42 2.78 0.22 3.01 458 38 51 127.1 9.8 135.6 2175 173    50 3.70 2.38 0.21 2.86 442 31 45 94.3 7.9 109.5 1781 122    50 4.65 3.41 0.23 3.03 558 34 53 166.5 11.0 144.0 2804 166    510 4.86 4.60 0.25 3.36 671 47 65 228.6 12.2 164.3 2278 233    520 3.37 1.00 4.86 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121    520 3.381 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121    520 3.381 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121    520 3.381 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121    520 3.381 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121    520 3.41 0.23 3.28 521 38 57 173 8 10.6 151.3 2490 176    520 4.29 2.91 0.22 3.00 486 34 50 131.3 9.7 131.2 2259 153    520 4.29 2.91 0.22 3.00 486 34 50 131.3 9.7 131.2 2259 153    520 4.29 2.91 0.24 3.32 579 42 60 208.5 11.7 162.1 2920 209    621 3.66 0.18 0.12 0.01 0.57 34.3 3.09 3.59 8.5 0.5 64 183 15    622 41.9 weight of wheat plant,  COURT = mineral fertilizers as percent of recommended dose for wheat,  EPD = enrich farm waste,  EPD = enrich poudrette, ETR = enrich town refuse		×	Plant	Z	Ь	X	Fe	Zn	Mn		Ь			Zu	
SO	EFW	0	3.80	1.93	0.19	2 68	347	28	16	70.07	1 1	1050	27.	1	IVER
100   5.10   4.28   0.24   3.33   546   42   59   127.1   9.8   135.6   2175   173     2PD		20	7.42	010		,	7 .	707	2	0.67	4.	8.001	1449	/ [ ]	185
100   3.10   4.28   0.24   3.33   546   42   59   223.2   12.2   170.5   2892   219     200   3.70   2.38   0.21   2.86   442   31   45   94.3   7.9   109.5   1781   122     200   4.65   3.41   0.23   3.03   558   34   53   166.5   11.0   144.0   2804   166     200   3.47   1.68   0.18   2.74   300   2.5   39   59.8   6.3   95.4   1118   91     200   3.47   1.68   0.18   2.74   300   2.5   39   59.8   6.3   95.4   1118   91     200   3.48   0.21   2.96   442   31   46   100.4   8.3   114.0   1798   121     200   3.66   2.00   0.19   2.76   361   28   43   77.7   7.2   103.5   1449   110     200   3.66   2.01   0.22   3.00   486   34   50   131.3   9.7   131.2   2259   153     201   4.85   4.19   0.24   3.32   579   42   60   208.5   11.7   162.1   2920   209     201   202   3.00   4.85   3.3   3.09   3.59   8.5   0.5   6.4   183   15     201   202   3.00   0.19   0.24   3.32   3.09   3.59   8.5   0.5   6.4   183   15     201   202   203   203   203   203   203     201   202   203   203   203   203   203     201   202   203   203   203   203   203     201   202   203   203   203   203   203     201   202   203   203   203   203     201   202   203   203   203   203     201   202   203   203   203   203     201   202   203   203   203     202   203   203   203   203   203     203   203   203   203   203   203     203   203   203   203   203   203     203   203   203   203   203   203     203   203   203   203   203   203     203   203   203   203   203   203   203     203   203   203   203   203   203     203   203   203   203   203   203   203     203   203   203   203   203   203   203     203   203   203   203   203   203   203     203   203   203   203   203   203   203     203   203   203   203   203   203   203   203     203   203   203   203   203   203   203   203   203     203   203   203   203   203   203   203   203   203     203   203   203   203   203   203   203   203   203   203     203   203   203   203   203   203   203   203   203   203   203     203   203   203   203   203   203   203   203		2	1.1.	2.70	77.0	5.01	428	38	51	127.1	8.6	135.6	2175	173	237
FILE O 3.70		100	5.10	4.28	0.24	3.33	546	42	59	223.2	12.2	170.5	2892	219	809
SO	EPD	0	3.70	2.38	0.21	2.86	442	31	45	94.3	7.9	109.5	1781	122	174
TRR 0 3.47 1.68 0.18 2.74 300 25 39 59.8 6.3 95.4 1118 91 233 20 3.81 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121 210 3.81 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121 210 2.55 0.21 2.96 442 31 46 100.4 8.3 114.0 1798 121 210 2.55 0.21 2.96 4.29 2.91 0.22 3.00 486 34 50 131.3 9.7 131.2 2.259 153 at 5%.  MF		20	4.65	3.41	0.23	3.03	558	34	53	166.5	11.0	144 0	2804	166	256
FTR 0 3.47 1.68 0.18 2.74 300 2.5 39 59.8 6.3 95.4 1118 91 100 4.59 3.68 0.23 3.28 521 38 57 173.8 10.6 151.3 2490 176 170 100 4.59 2.91 0.22 3.00 486 34 50 131.3 9.7 17.7 7.2 103.5 1449 110 100 4.85 4.19 0.24 3.32 579 42 60 208.5 11.7 162.1 2920 209 153 at 5%.  MF		100	4.86	4.60	0.25	3.36	671	47	65	228.6	12.2	1643	2278	233	310
50   3.81   2.55   0.21   2.96   442   31   46   100.4   8.3   114.0   1798   121     100   4.59   3.68   0.23   3.28   521   38   57   173.8   10.6   151.3   2490   176     100   4.59   2.00   0.19   2.76   361   28   43   77.7   7.2   103.5   1449   110     100   4.85   4.19   0.22   3.00   486   34   50   131.3   9.7   131.2   2259   153     200   2.91   0.22   3.00   486   34   50   131.3   9.7   162.1   2920   209     200   2.91   0.24   3.32   579   42   60   208.5   11.7   162.1   2920   209    MF    At Sweight of wheat plant,   OS = organic sources   Os   14.7   Ns   ns   317   ns     At Sweight of wheat plant,   OS = organic sources   EPD = enrich form waste,   EPD = enrich form refuse   ETR = enrich town refuse     ERD = enrich form waste,   EPD = enrich poudrette,   ETR = enrich town refuse     At Solution   Os   Os   Os   Os   Os   Os   Os   O	ETR	0	3.47	1.68	0.18	2.74	300	25	39	59.8	6.3	95.4	1118	10	130
lean 0 3.66 0.23 3.28 521 38 57 173.8 10.6 151.3 2490 176 28 43 77.7 7.2 103.5 1449 110 20 4.29 2.91 0.22 3.00 486 34 50 131.3 9.7 131.2 2259 153 at 5%		20	3.81	2.55	0.21	2.96	442	31	46	100.4	000	1140	1798	121	180
lean         0         3.66         2.00         0.19         2.76         361         28         43         77.7         7.2         103.5         1449         110           50         4.29         2.91         0.24         3.32         579         42         60         208.5         11.7         162.1         2920         209           at 5%         0.18         0.24         3.32         579         42         60         208.5         11.7         162.1         2920         209           AF         0.18         0.24         3.32         579         3.59         8.5         0.5         6.4         183         15           MF         0.30         ns         Ns         Ns         Ns         14.7         Ns         ns         15           6 of R = mineral fertilizers as percent of recommended dose for wheat,         EPD = enrich poudrette,         ETR = enrich town refuse		100	4.59	3.68	0.23	3.28	521	38	57	173.8	10.6	1513	2490	176	261
at 5%  100  4.85  4.19  0.24  3.32  3.00  486  34  50  131.3  9.7  131.2  2259  153  150  at 5%  at	Mean	0	3.66	2.00	0.19	2.76	361	28	43	777	7.2	103 5	1440	110	166
at 5% by a sign of wheat plant, of RD and retter farm waste, RD and retail at 5% by at 5% at 5% at 5% by at 5% at 5% by at		20	4.29	2.91	0.22	3.00	486	3.4	20	121.2	1 0	2	0300	0 .	001
at 5%  at 5%  0.18		100	4.85	4 10	0.24	3 33	570	, ,	200	2000		7.161	6077	133	772
0.18 0.12 0.01 0.07 34.3 3.09 3.59 8.5 0.5 6.4 183 15 0.30 ns Ns Ns Ns Ns 14.7 Ns ns 317 ns a dry weight of wheat plant, OS = organic sources = enrich farm waste, EPD = enrich poudrette, ETR = enrich town refuse	LSD at 5%		25:	,	17.0	20.0	212	747	00	208.2	11./	162.1	2920	209	398
o.3 0.3 0.4 183 15 15 14.7 Ns ns 317 ns h town refuse	MF		0.18	0.12	0.01	0.07	24.3	3.00	2 50	0		į			- 1
14.7 NS ns 317 ns h town refuse	OS x MF		0.30	ns.	, N	No	5.5	V. V.	7 N.	0.0	C. 7	6.4	183	15	166
DW = dry weight of wheat plant,  OS = organic sources  M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,  EPD = enrich poudrette, ETR = enrich town refuse				?	25.7	CKI	CII	SVI	S	14.7	Z	us	317	us	us
W.F. % of R = mineral fertilizers as percent of recommended dose for wheat, SFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich town refuse	DW = dry wei	ght of wł	neat plant		SO	= organ	nic sour	rces							
Sr w = enrich farm waste, EPD = enrich poudrette, ETR = enrich town refuse	M.F. % of $R = \frac{1}{2}$	mineral	fertilizers	s as perce	ent of re	comme	anded d	lose for	wheat,						
	cr w = enrich	rarm way	ste,	EPD	= enric	ıpnod y	rette,	ETR	= enrich	1 town re	efuse				

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Table (12c): Effect the rate of used organic sources and mineral fertilizers on plant dry weight, concentration and uptake of wheat plant nutrients (pot exp.) after 70 days.

Rate of	MF	DW		С	Concentration	ration					Uptake	ake		
so	Jo %	-5a		%			µg.g-1		2	Mg/plant	ıt	n	Ug/plant	
Lon/fed	R	Plant	Z	Ь	K	Fe	Zn	Mn	z	Ь	X	Fe	Zn	Mn
0	0	2.81	0.93	0.13	1.77	100	10	23	24.9	3.6	48.2	281	27	62
	20	3.18	1.87	0.18	2.45	133	20	27	9.69	5.6	78.0	427	49	85
	100	4.05	2.79	0.19	3.05	283	23	33	112.7	7.7	123.8	1152	94	135
	Mean	3.35	1.87	0.17	2.42	172	18	28	65.7	5.6	83.3	620	62	94
5	0	3.33	1.85	0.16	3.12	311	26	43	9.19	5.4	104.0	1036	98	144
	20	4.45	2.73	0.18	3.13	456	36	49	123.7	8.2	139.6	2093	159	220
	100	4.87	3.60	0.19	3.26	955	47	57	127.7	9.5	1.651	2760	229	671
	Mean	4.22	2.73	0.18	3.17	441	36	90	121.0	7.7	134.2	1963	158	345
10	0	3.88	2.32	0.21	2.97	444	36	57	91.1	8.0	116.0	1751	138	195
	20	4.51	3.02	0.23	3.13	611	39	50	140.1	9.01	141.7	2764	176	244
	100	90.9	4.91	0.24	3.42	299	43	53	250.3	12.1	173.3	3382	221	337
	Mean	4.49	3.42	0.23	3.18	574	39	57	160.5	10.2	143.7	2632	179	258
Ŕ	0	4.60	2.88	0.26	3.18	589	41	57	133.3	11.7	146.0	2729	189	263
	20	5.03	4.01	0.28	3.29	744	42	70	202.0	14.4	165.6	3751	213	352
	100	5.41	5.44	0.32	3.55	811	54	83	293.3	17.4	192.0	4386	294	450
	Mean	5.02	4.11	0.29	3.34	715	46	70	209.5	14.5	891	3622	232	355
LSD at 5%	2	Ĕ	9.4	N T	200									
Rate		0.20	0.14	0.01	80.0	39.6	3.6	4.2	8.6	9.0	7.4	211	17	191
Rate x MF		0.35	0.25	0.02	0.15	ns	6.2	ns	17.0	ns	12.9	365	29	us
1	В													
DW = dry weight	eight of w	of wheat plant,	5	SO	= orga	OS = organic sources,	rces,							
M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,	= mineral	fertilizer	s as perc	ent of r	ecomme	ended d	ose for	wheat						
EFW = enrich farm waste,	h farm wa	ıste,	EPD	EPD = enrich poudrette.	pnod 4	rette.	ETR	= enric	= enrich town refuse	efuse.				
		2				, , , , ,				1000				

Table (13a): Effect of used organic sources and their rates on plant dry weight, concentration and uptake of wheat plant nutrients (field exp.I) after 70 day.

fed         Plant         %         Hg/Polant           fed         Plant         N         F         Zn         Mn         N         P         K           0         5.80         3.62         0.16         2.96         211         56         54         212.8         9.7         173           5         8.00         4.41         0.29         3.57         267         72         62         353.6         23.6         28.6         28.6         23.6         23.6         28.6         28.7         28.8         38.9         87         81         62.4         49.0         50.5         28.6         28.6         28.6         23.6         28.6         28.7         49.0         50.5         28.8         38.9         87         81         62.7         49.0         50.5         28.7         50.6         211         56         54         49.0         50.5         30.2         30.2         30.6         211         56         54         42.2         88         81         611.6         45.4         45.6         45.6         45.7         45.6         45.6         45.7         45.6         45.6         45.7         45.6         45.7         45.6	Organic	Kate	M O M		)	oncen	Concentration					IIn	Untake		
N         F         K         Fe         Zn         Mn         N         F         Fe         Zn           3.62         0.16         2.96         211         56         54         212.8         9.7         173.9         1235         333           4.41         0.29         3.57         267         72         62         353.6         285.4         2135         580           5.19         0.36         3.77         367         84         79         556.3         384         403.4         3035         911           4.80         0.38         3.88         389         87         81         627.4         490         505.4         5128         911           4.80         0.36         3.71         322         82         61         452.0         342.0         313         739         406         776           5.17         0.38         3.86         422         88         81         611.6         45.4         456.9         3060         776           5.17         0.38         3.86         422         88         81         611.6         45.4         456.9         3060         776           5.67	Sources	lon/	ò0 .		%			ug.g.			Mø/pla	1		I'a/nlon	
3.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 333 4.44 0.29 3.57 267 72 62 353.6 28.6 285.4 2135 580 4.80 0.38 3.88 389 87 81 627.4 49.0 505.4 5128 1134 4.51 0.30 3.55 306 75 69 437.5 30.2 342.0 3113 739 4.80 0.36 3.71 362 82 61 453.0 33.7 348.9 3060 776 5.17 0.38 3.86 4.22 88 81 611.6 45.4 456.5 5018 1042 5.67 0.40 4.14 489 91 87 849.2 60.3 616.8 7898 1363 1.482 0.33 3.67 361 79 71 531.7 37.3 399.0 4307 878 3.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 498 1363 1.482 0.33 3.67 361 79 71 531.7 37.3 399.0 4307 878 3.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 498 1363 1.482 0.33 3.67 361 79 71 531.7 37.3 399.0 4307 878 3.62 0.16 2.96 211 56 52 266.2 17.0 200.8 1394 408 5.00 0.34 3.56 267 69 66 410.3- 278 292.4 2206 573 5.11 0.36 3.78 3.11 78 72 463.1 32.8 335.9 2759 695 4.55 0.29 3.40 253 67 61 338.1 2.2 251 1903 5.44 0.36 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 0.36 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 0.36 enrich poudrette, ETR = enrich town refuse		led	Plant	z	Ь	X	Fe	Zn	Mn		Ь			Z Z	
4.41         0.29         3.57         267         72         62         35.6         23.6         23.6         12.3         33.9           5.19         0.36         3.77         367         84         79         556.3         38.4         403.4         3935         911           4.80         0.38         3.88         389         87         81         627.4         490         505.4         5128         911           4.80         0.36         3.71         362         241         490         505.4         5128         911           4.80         0.36         3.71         322         88         81         611.6         45.4         456.5         5018         1042           5.17         0.38         3.86         422         88         81         611.6         45.4         456.5         5018         1042           5.67         0.40         4.14         489         91         87         849.2         60.3         616.8         789         1363           4.82         0.36         2.1         4.89         91         87         849.2         60.3         616.8         789         1363           4.82	EFW	0	5.80	3.62		2.96	211	56	54	2128	0.7	172.0	1363	222	IMINI
5.19		2	8.00	4.41	_	3.57	267	72	62	353.6	23.6	7851	2135	223	370
4.80         0.38         3.88         389         87         81         627.4         49.0         505.4         5128         1134           4.51         0.30         3.55         306         75         69         437.5         30.2         342.0         3113         739           3.62         0.16         2.96         211         56         54         212.8         9.7         173.9         1253         333           4.80         0.36         3.71         322         82         61         453.0         33.7         348.9         3060         776           5.17         0.38         3.86         422         88         81         611.6         45.4         456.5         5018         1042           5.67         0.40         4.14         489         91         87         849.2         60.3         616.8         789         1363         14           4.82         0.36         3.67         3.61         79         71         531.7         37.3         399.0         4307         878           4.82         0.35         2.16         59         66         52         266.2         17.0         200.8         139		01	10.60	5.19		3.77	367	84	79	5563	38.4	403.4	2025	280	20
4.51         0.30         3.55         306         75         69         437.5         30.2         342.0         3113         739           3.62         0.16         2.96         211         56         54         212.8         9.7         173.9         1253         333           4.80         0.36         3.71         322         82         61         453.0         33.7         348.9         3060         776           5.17         0.38         3.86         422         88         81         611.6         45.4         456.5         5018         1042           5.67         0.40         4.14         489         91         87         849.2         60.3         616.8         7898         1363         1           4.82         0.40         4.14         489         91         87         849.2         60.3         616.8         7898         1363         1           4.82         0.33         3.67         361         79         71         531.7         37.3         399.0         4307         878           4.37         0.27         3.30         222         66         52         266.2         170         200.8		20	12.90	4.80	0.38	3.88	389	87	8	627.4	49.0	505.4	5170	1124	40.5
3.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 333 4.80 0.36 3.71 322 82 61 453.0 33.7 348.9 3060 776 5.17 0.38 3.86 422 88 81 611.6 45.4 456.5 5018 1042 5.67 0.40 4.14 489 91 87 849.2 60.3 616.8 7898 1363 1363 3.67 3.61 7.9 71 531.7 37.3 399.0 4307 878 1363 13.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 498 5.00 0.34 3.56 267 69 66 410.3 27.8 292.4 2206 573 5.21 0.36 3.78 311 78 72 463.1 32.8 335.9 2759 695 695 4.55 0.29 3.40 253 67 61 338.1 22 251 1903 5.44 0.38 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 162 162 17.0 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 162		Mean	9.30	4.51	0.30	3.55	306	75	69	437 5	30.2	342.0	2112	1134	105
4.80         0.36         3.71         322         82         61         453.0         33.7         348.9         360         776           5.17         0.38         3.86         422         88         81         611.6         45.4         456.5         5018         1042           5.67         0.40         4.14         489         91         87         8492.2         60.3         616.8         7898         1363           4.82         0.40         4.14         489         91         87         8492.2         60.3         616.8         7898         1363           4.82         0.33         3.67         361         79         71         531.7         37.3         399.0         4307         878           4.37         0.27         3.50         222         66         52         266.2         17.0         200.8         1394         408           5.00         0.34         3.56         267         69         66         410.3         27.8         220.4         2206         573           4.55         0.29         3.40         253         67         61         338.1         22         251         1903         544 <td>EPD</td> <td>0</td> <td>5.80</td> <td>3.62</td> <td>0.16</td> <td>2.96</td> <td>211</td> <td>56</td> <td>54</td> <td>212.8</td> <td>0.7</td> <td>173.0</td> <td>1752</td> <td>777</td> <td>000</td>	EPD	0	5.80	3.62	0.16	2.96	211	56	54	212.8	0.7	173.0	1752	777	000
5.17 0.38 3.86 422 88 81 611.6 45.4 456.5 5018 1042 5.67 0.40 4.14 489 91 87 849.2 60.3 616.8 7898 1363 4.82 0.33 3.67 361 79 71 531.7 37.3 399.0 4307 878 3.62 0.16 2.96 211 56 54 212.8 9.7 173.9 1253 498 5.00 0.34 3.56 267 69 66 410.3 27.8 292.4 2206 5.21 0.36 3.78 311 78 72 463.1 32.8 335.9 2759 695 4.55 0.29 3.40 253 67 61 338.1 22 251 1903 544  0.18 0.02 0.12 35.5 4.3 5.2 18.6 1.3 13.8 378 81 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162  EPD = enrich poudrette, ETR = enrich town refuse		v :	9.40	4.80	0.36	3.71	322	82	61	453.0	33.7	348.9	3060	222	526
5.6 /r     0.40     4.14     489     91     87     849.2     60.3     616.8     7898     1363       4.82     0.33     3.67     361     79     71     531.7     37.3     399.0     4307     878       3.62     0.16     2.96     211     56     54     212.8     9.7     173.9     1253     498       4.37     0.27     3.30     222     66     52     266.2     17.0     200.8     1394     408       5.21     0.34     3.56     267     69     66     410.32     27.8     292.4     2206     573       4.55     0.29     3.70     253     67     61     338.1     22     251     1903     544       0.18     0.02     0.12     35.5     4.3     5.2     18.6     1.3     13.8     37.8     81       0.36     0.03     ns     ns     8.5     ns     37.1     2.6     27.6     756     162       OS = organic sources		0 00	11.80	5.17	0.38	3.86	422	88	81	9.119	45.4	456.5	5018	1042	96
4.82     0.53     3.67     361     79     71     531.7     37.3     399.0     4307     878       3.62     0.16     2.96     211     56     54     212.8     9.7     173.9     1253     498       4.37     0.27     3.30     222     66     52     266.2     17.0     200.8     1394     408       5.00     0.34     3.56     267     69     66     410.3     27.8     292.4     2206     573       4.55     0.29     3.78     311     78     72     463.1     32.8     335.9     2759     695       4.55     0.29     3.40     253     67     61     338.1     22     251     1903     544       0.18     0.02     0.12     35.5     4.3     5.2     18.6     1.3     13.8     378     81       0.36     0.03     ns     ns     8.5     ns     37.1     2.6     27.6     756     162       OS = organic sources    Approximately poudrette, ETR = enrich town refuse		Magn	10.50	7.00	0.40	4.14	489	16	87	849.2	60.3	8.919	7898	1363	1297
3.62         0.16         2.96         211         56         54         212.8         9.7         173.9         1253         498           4.37         0.27         3.30         222         66         52         266.2         17.0         200.8         1394         408           5.00         0.34         3.56         267         69         66         410.32         27.8         292.4         2206         573           4.55         0.29         3.78         311         78         72         463.1         32.8         335.9         2759         695           4.55         0.29         3.40         253         67         61         338.1         22         251         1903         544           0.18         0.02         0.12         35.5         4.3         5.2         18.6         1.3         13.8         378         81           0.36         0.03         ns         ns         8.5         ns         37.1         2.6         27.6         756         162           OS = organic sources           EPD = enrich poudrette, ETR = enrich town refuse	FTR	INICALI	00.01	4.87	0.33	3.67	361	79	71	531.7	37.3	399.0	4307	878	791
4.37     0.27     3.30     222     66     52     266.2     17.0     200.8     1394     408       5.00     0.34     3.56     267     69     66     410.32     27.8     292.4     2206     573       4.55     0.29     3.78     311     78     72     463.1     32.8     235.9     2759     695       4.55     0.29     3.40     253     67     61     338.1     22     251     1903     544       0.18     0.02     0.12     35.5     4.3     5.2     18.6     1.3     13.8     378     81       0.36     0.03     ns     ns     8.5     ns     37.1     2.6     27.6     756     162       OS = organic sources       EPD = enrich poudrette, ETR = enrich town refuse		) V	5.00	5.62	0.16	2.96	211	99	54	212.8	6.7	173.9	1253	498	328
5.20 0.34 5.56 267 69 66 410.37 27.8 292.4 2206 573 4.55 0.29 3.40 253 67 61 338.1 22 251 1903 544 0.18 0.02 0.12 35.5 4.3 5.2 18.6 1.3 13.8 378 81 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 EPD = enrich poudrette, ETR = enrich town refuse		٥ -	0.00	4.57	0.27	3.30	222	99	52	266.2	17.0	200.8	1394	408	324
3.2.1         0.50         3.7.8         311         78         72         463.1         32.8         335.9         2759         695           4.55         0.29         3.40         253         67         61         338.1         22         251         1903         544           0.18         0.02         0.12         35.5         4.3         5.2         18.6         1.3         13.8         378         81           0.36         0.03         ns         ns         8.5         ns         37.1         2.6         27.6         756         162           CPD = enrich poudrette, ETR = enrich town refuse		20	07.0	00.0	0.34	3.56	267	69	99	410.35	27.8	292.4	2206	573	537
0.18 0.02 0.12 35.5 4.3 5.2 18.6 1.3 13.8 378 81 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162 OS = organic sources  EPD = enrich poudrette, ETR = enrich town refuse		Mean	7.20	17.0	0.30	5.78	311	78	72	463.1	32.8	335.9	2759	695	645
0.18 0.02 0.12 35.5 4.3 5.2 18.6 1.3 13.8 378 81 0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162  OS = organic sources  EPD = enrich poudrette, ETR = enrich town refuse	.SD at 5%	incan	07:7	4.33	0.29	5.40	253	29	19	338.1	22	251	1903	544	459
0.36 0.03 ns ns 8.5 ns 37.1 2.6 27.6 756 162  OS = organic sources  EPD = enrich poudrette, ETR = enrich town refuse	SC		0.21	0.18	000	0.10	2 2 5 6		(	9			ı		
OS = organic sources EPD = enrich poudrette, ETR = enrich town refuse	S x Rate		0.41	0.36	0.03	0.12 ns	sn.s	8.5	5.2 ns	37.1	1.3	13.8	378 756	81	53
	W = dry wei FW = enrich	ght of wh farm was	eat plant, te,	EPD	OS = enricl	= orgai 1 poudr	nic sour rette,	~	= enrich	town re	filse				

Table (13b): Effect of used organic sources and mineral fertilizers rates on plant dry weight, concentration and uptake of wheat plant nutrients (field exp.I) after 70 days.

Courses		× n		ر	Concentration	ration					$^{CD}$	Uptake		
Some	% of	/g		%			ug.g-1		_	mg/plant	ıt		Ug/plant	
	R	Plant	z	Ь	K	Fe	Zn	Mn	Z	Ь	×	Fe	Zn	Mn
EFW	0	8.20	3.90	0.26	3.20	233	58	55	330.6	23.8	271.2	2149	511	488
	20	9.30	4.60	0.31	3.59	325	9/	99	439.9	30.6	344.0	3248	750	644
	100	10.50	5.10	0.31	3.85	358	06	87	542.1	36.2	410.9	3941	926	919
EPD	0	9.50	4.20	0.30	3.36	283	19	09	430.2	31.3	336.4	3035	685	631
	20	10.40	4.90	0.33	3.69	342	77	19	536.2	36.9	396.1	3796	849	738
	100	11.40	5.30	0.37	3.96	458	94	98	628.6	43.5	464.5	1609	1101	1005
ETR	0	6.30	4.00	0.24	3.05	192	51	48	264.8	16.5	196.5	1293	454	323
	20	7.00	4.60	0.29	3.42	275	63	65	328.3	21.0	243.0	1956	446	423
	100	8.30	5.00	0.32	3.72	292	88	9/	421.1	28.0	312.7	2460	731	630
Mean	0	8.00	4.06	0.27	3.20	236	59	54	341.9	23.9	268.1	2159	550	481
	20	8.90	4.72	0.31	3.57	314	72	64	434.8	29.5	327.7	3000	682	602
	100	10.10	5.10	0.34	3.84	369	16	83	530.6	35.9	396.0	4164	930	852
SD at 5%					V									
MF		0.21	0.18	0.02	0.12	35.53	4.3	5.2	18.6	1.3	13.8	378	81	53
OS x MF		0.37	us	Ns	Ns	ns	Ns	ns	ns	2.2	23.9	655	ns	ns

DW = dry weight of wheat plant, OS = organic sources
M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,
EFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich

EPD = enrich poudrette, ETR = enrich town refuse

ns 19

94 ns

437

15.9

21.4

0.9 ns

4.9 Ns

41.0

0.14

0.02

0.21

0.24

Rate x MF Rate

Table (13c): Effect the rate of used organic sources and mineral fertilizers on plant dry weight, concentration and uptake of wheat plant nutrients (field exp.I) after 70 days.

Rate of	MF	DW		0	Concentration	tration					II	Untako		
	Jo %			%			1.							
	α	Plant	-	2	;		8.8			mg/plant	nt		Ug/plant	
- 11	4		2	Ь	¥	Fe	Zu	Mn	Z	ط	X	Fe	Zn	M
0	0		3.00	0.12	2.50	122	37	33	148.8	5.8	1190	315	326	163
	20		3.80	0.17	2.98	233	20	20	213.1	0.0	171	1207	000	100
	100	08.9	4.10	0.20	3.39	267	80	80	276.6	12.5	2216	1001	687	787
	Mean	5.80	3.62	0.16	2.96	207	98	54	212.8	0.7	172.0	1057	200	228
S	0	7.20	3.90	0.26	3.25	189	09	44	2817	10.6	236.0	1440	388	328
	20	7.70	4.70	0.32	3.57	278	71	26	360.4	24.0	230.0	1440	448	326
	100	8.50	5.00	0.35	3.76	344	86	76	430.8	20.00	222.4	1017	320	431
	Mean	7.80	4.53	0.31	3 53	070	73	0.00	2526	1	7.77	2770	00/	048
10	c	010	4 70	100	000	217	1.3	39	0./00	74.8	7/8.4	2196	588	468
21	5	9.10	4.70	0.34	3.41	300	29	69	426.5	31.0	312.6	2784	619	639
	00.	9.90	5.20	0.36	3.80	344	79	72	513.8	35.8	378.8	3509	700	722
	100	11.50	5.50	0.39	3.98	414	96	84	637.9	44 7	460 9	4866	1107	777
	Mean	10.20	5.12	0.36	3.73	352	80	75	1925	37.2	384.0	2720	040	707
20	0	11.00	4.60	0.35	3.65	333	71	71	5106	30.1	707	2707	740	184
	20	12.30	5.30	0.38	3.92	400	87	78	0.0.0	17.5	707.0	1616	160	190
	100	13.40	5.80	0.41	4.23	456	86	16	777	5.5.5	2,407	6057	1212	0/6
	Mean	12.20	5.23	0.38	3.93	396	85	80	6466	47.4	1860	5000	1074	1230
LSD at 5%									0.010	1.11	100.0	2020	1004	999

DW = dry weight of wheat plant,

M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, OS = organic sources,

EFW = enrich farm waste,

EPD = enrich poudrette, ETR = enrich town refuse

Table (14a): Effect of used organic sources and their rates on plant dry weight, concentration and uptake of wheat plant nutrients (field exp.II) after 70 day.

Organic	Rate	DW			Concentration	ration					Ü	Untake		
Sources	Ton/	/S		%			1.8.8 H			mg/plant			Ug/plant	
	Fed	Plant	z	Ь	Х	Fe	Zn	Mn	z	Ь	×	Fe	Zn	Mn
EFW	0	8.64	2.74	0.16	2.56	222	58	43	240.8	13.7	222.9	1962	505	382
	2	13.93	3.34	0.20	2.96	223	63	53	471.4	28.8	415.1	3335	806	770
	0	14.34	3.59	0.26	3.10	344	69	69	518.0	38.0	445.3	5010	1002	666
	20	15.10	4.11	0.32	3.24	422	73	73	624.0	48.7	480.0	6428	1119	1118
	Mean	13.00	3.45	0.24	2.96	306	99	09	463.6	32.3	390.8	4184	883	817
EPD	0	8.64	2.74	0.16	2.56	223	58	43	240.8	13.7	222.9	1962	505	382
	S	15.71	3.81	0.22	3.17	367	72	99	602.8	35.5	499.4	9069	1151	902
	01	16.39	4.00	0.28	3.32	489	78	92	662.1	45.8	546.6	8045	1291	1245
	20	17.73	4.57	0.34	3.38	556	83	83	813.5	60.1	601.0	8886	1486	1484
	Mean	14.62	3.78	0.25	3.11	408	73	64	8.678	38.8	467.5	6450	1108	1003
ETR	0	8.64	2.74	0.16	2.56	222	58	43	240.8	13.7	222.9	1962	505	382
į	2	11.65	3.20	0.21	3.07	522	99	40	376.8	24.4	357.7	6152	662	482
	01	12.52	3.34	0.26	3.18	959	09	59	419.3	32.3	399.1	8305	761	745
	20	12.77	3.72	0.31	3.10	789	29	99	477.1	39.6	396.9	10143	864	843
	Mean	11.40	3.25	0.23	2.98	556	09	52	378.5	27.5	344.2	6641	869	613
LSD at 5%														
SO		0.18	0.14	0.01	90.0	39.0	4.5	4.9	17.2	1.5	94	468	26	79
OS x Rate		0.35	us	0.02	ns	77.9	8.9	6.6	34.4	2.9	18.9	937	123	128
HCA														
DW = dry weight of		wheat plant,		SO	= orga	OS = organic sources	rces							
EFW = enrich farm	ı farm wa	waste,	EPD	EPD = enrich poudrette,	pnod y	rette,	×	= enric	= enrich town refuse	efuse.				

Table (14b): Effect of used organic sources and mineral fertilizers rates on plant dry weight, concentration and uptake of wheat plant nutrients (field exp.II) after 70 days.

Organic	M.F	MO			Concentration	motion								
Sources	% of	/ω			10000	ation	-				Up	Uptake		
		200		%			11g.g		-	mg/plant	ţ		Ug/nlant	
	¥	Flant	Z	Ь	¥	Fe	Zn	Mn	z	Ь	K	E	7.	
EFW	0	11.47	2.85	0 20	2.70	200	5.1	15			11	LC	1177	MIN
	20	13 28	2 5 5	9 6		777	1,	42	345.1	74.4	317.2	2758	599	549
	8 2	14.16	0.00	0.23	7.98	308	64	28	486.7	32.6	394.1	4274	698	800
CDD	001	14.10	5.90	0.27	3.21	383	83	77	561.0	39.9	461.3	5519	1183	1103
EFD	o (	12.93	3.13	0.20	2.91	333	09	53	432.7	28.3	389.0	4794	811	743
	00.	14.99	3.79	0.25	3.10	417	72	62	592.2	39.8	473.2	6653	11011	270
	100	15.95	4.41	0.29	3.32	475	87	79	714.5	48.1	540.2	7007	1212	1001
EIR	0	10.40	2.75	0.20	2.78	458	44	38	8 966	215	202 0	4000	7141	1671
	20	11.45	3.29	0.23	3.00	550	57	53	2016	0.10	0.000	7701	400	40/
	100	12.34	3 77	0 27	3 16	055	100	7 5	0.100	7.17	343.7	9869	657	909
Mean	<		100	17:0	2.10	000	0/	0	457.1	33.9	393.0	8511	973	826
Micall	<b>&gt;</b> (	09.11	2.91	0.20	2.80	339	52	45	357.5	24.7	333.3	4125	509	995
	00	13.27	3.54	0.24	3.03	425	64	57	4868	33.2	404 3	5030	920	200
	100	14.15	4.03	0.28	3.23	206	83	77	2778	700	474.0	0000	0/0	194
LSD at 5%						200	CO	†	0.110	40.0	404.8	/311	1189	1073
MF OS MF		0.18	0.14	0.01	90.0	39.0	4.5	4.9	17.2	1.5	9.4	468	95	179
OS A IMIL		0.30	Ns	Ns	Ns	us	Ns	us	29.8	2.5	16.4	ns	ns	ns
DW = dry weight of wheat plant,  M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,	ght of wh mineral	eat plant, fertilizers	as perce	OS ant of re	OS = organic sources of recommended dose	nic sour nded de	ces ose for	wheat,						
Li w cinicii larm waste,	iarm was	ie,	EPD	= enric	EPD = enrich poudrette,	ette,	ETR =	enrich	ETR = enrich town refuse	agnse				

Table (14c): Effect the rate of used organic sources and mineral fertilizers on plant dry weight, concentration and uptake of plant nutrients (field exp.II) after 70 days.

Rate of	MF	DW			Concentration	ration					Up	Untake		
SO	yo %	26		%			1.8.8.1			mg/plant		ut-es	Ug/plant	
Lon/fed	R	Plant	z	Ь	X	Fe	Zu	Mn	z	Ь	×	Fe	Zn	Mn
0	0	8.01	1.59	0.12	2.11	133	40	23	127.5	9.6	186.8	801	321	187
	20	8.90	2.71	0.16	2.73	233	09	40	240.9	14.5	242.6	2080	533	356
	100	9.02	3.92	0.19	2.85	333	73	29	354.0	16.8	257.4	3006	662	602
	Mean	8.64	2.74	0.16	2.56	233	58	43	240.8	13.7	222.9	1962	505	382
5	0	11.68	3.02	0.19	2.98	289	50	32	356.1	22.2	347.6	3302	594	384
	20	13.99	3.54	0.21	3.07	389	19	47	499.2	29.4	430.9	5322	698	199
	100	15.63	3.79	0.24	3.15	444	80	70	595.6	37.2	493.6	8929	1257	1109
	Mean	1376	3.45	0.21	3.07	374	64	50	483.7	29.6	424.1	5131	907	718
10	0	12.67	3.28	0.24	3.09	422	22	09	416.5	29.9	392.3	5313	726	692
	20	14.81	3.63	0.27	3.07	200	63	29	542.1	40.0	454.7	7328	952	1002
	001	15.77	4.01	0.29	3.44	267	87	77	640.8	46.3	544.1	8718	1375	1218
	Mean	14.42	3.64	0.27	3.20	496	69	89	533.1	38.7	463.7	7120	1018	966
20	0	14.03	3.75	0.26	3.01	511	09	64	529.8	37.1	424.5	7083	857	925
	20	15.40	4.27	0.32	3.23	578	73	74	665.0	49.0	489.2	8622	1148	1156
	100	16.17	4.39	0.38	3.48	829	06	83	719.7	62.2	564.2	10753	1463	1363
	Mean	15.20	4.13	0.32	3.24	589	74	74	638.2	49.5	492.6	8819	1156	1148
LSD at 5%														
Rate		0.20	0.16	0.01	0.07	45.0	5.2	5.7	19.8	1 7	10 9	541	64	7.7
														1 /

DW = dry weight of wheat plant,

OS = organic sources,

74 128

64 111

541 ns

10.9

5.2 Ns

0.07

0.01 0.02

0.16

0.20

Rate x MF

M.F. % of R = mineral fertilizers as percent of recommended dose for wheat,

EFW = enrich farm waste,

EPD = enrich poudrette, ETR = enrich town refuse

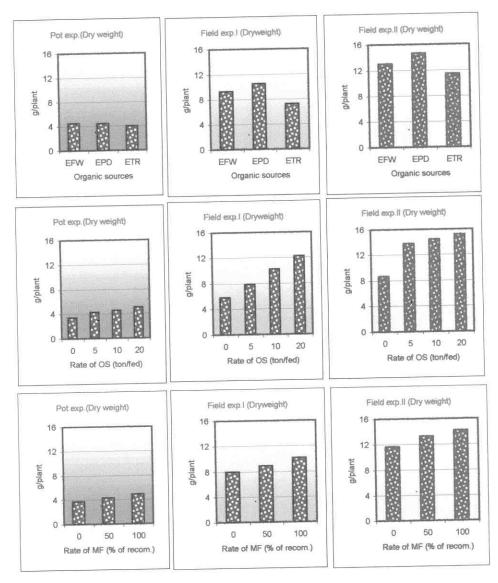


Fig.( 10 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant dry weight (g/plant) at 70 days.

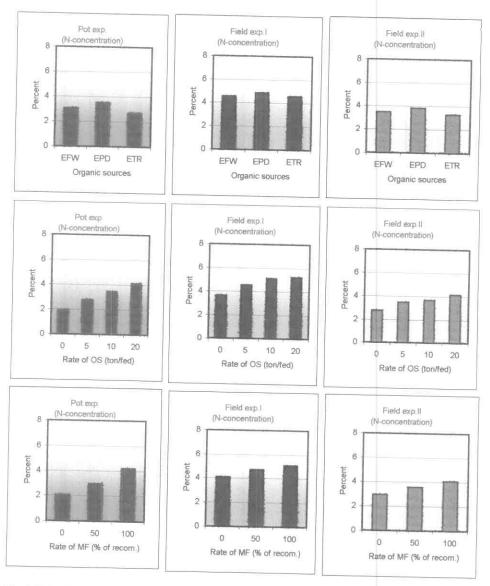


Fig.( 11 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant nitrogen concentration (%), at 70 days.

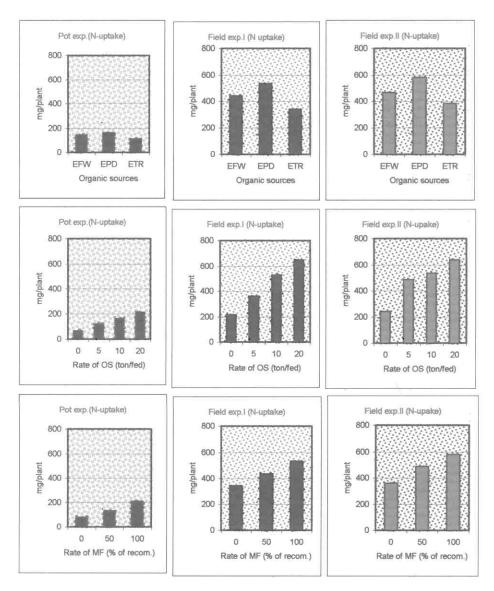


Fig.( 12 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant nitrogen uptake (mg/plant), at 70 days.

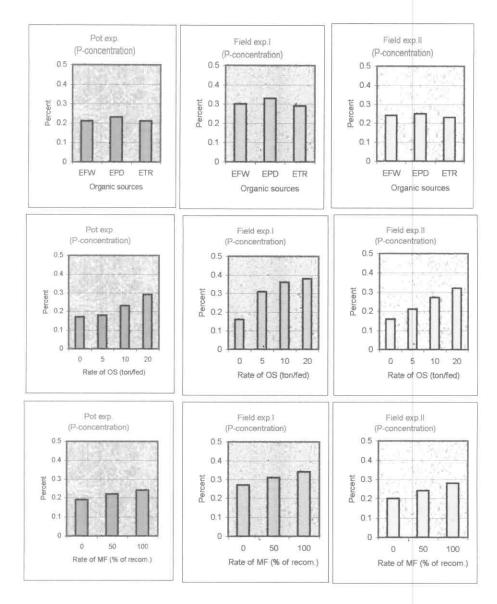


Fig.( 13 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant phosphorus concentration (%) at 70 days.

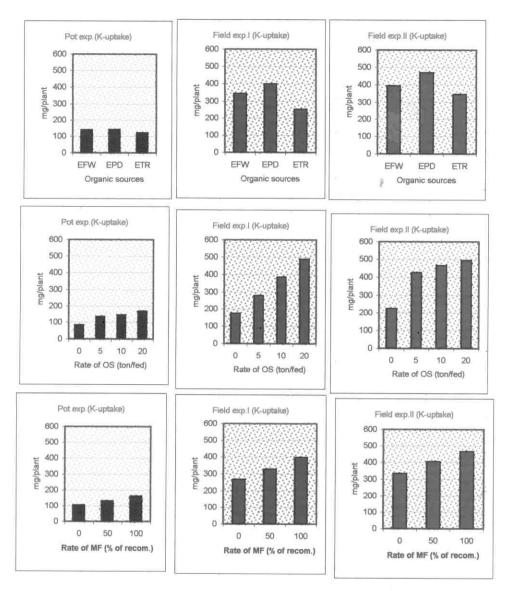


Fig.( 16 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant potassium uptake (mg/plant) at 70 days.

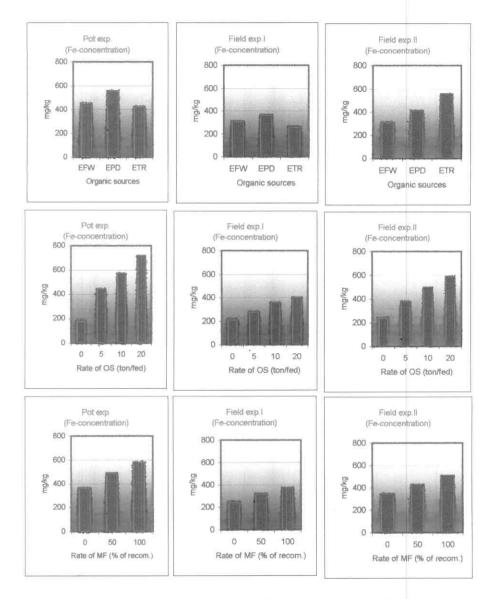


Fig.( 17 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant iron concentration (mg/kg) at 70 days.

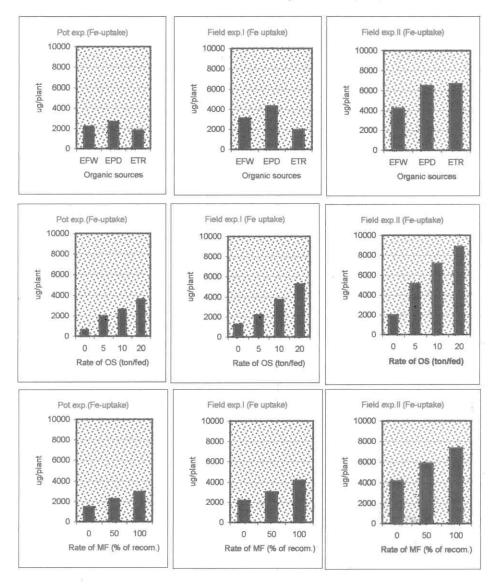


Fig.( 18 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant iron uptake (ug/plant) at 70 days.

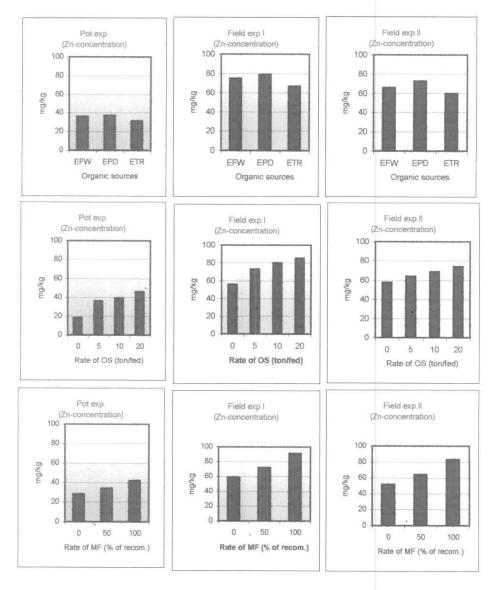


Fig.( 19 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant zinc concentration (mg/kg) at 70 days.

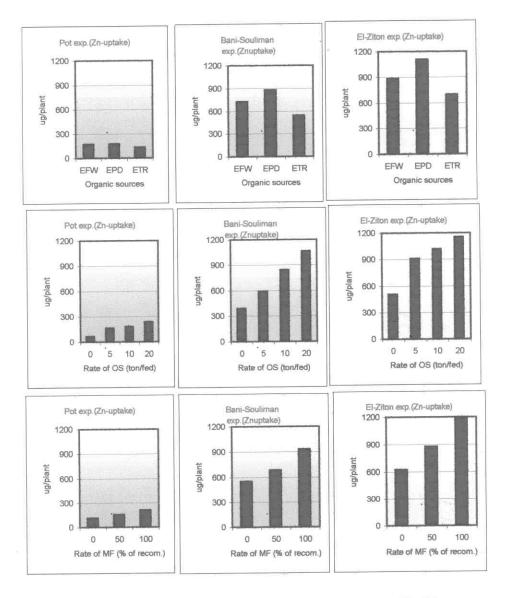


Fig.( 20 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant zinc uptake (ug/plant) at 70 days.

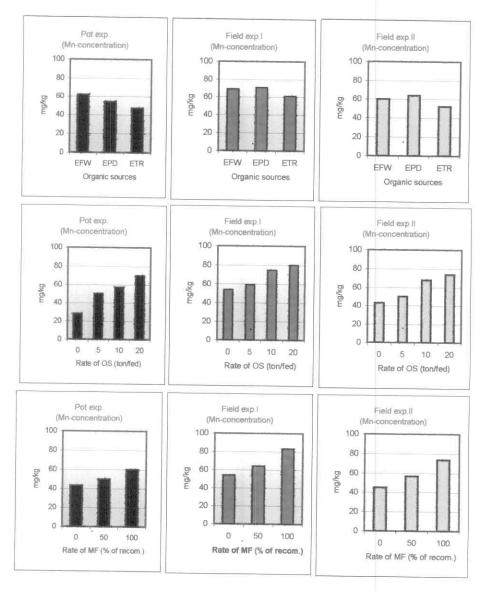


Fig.( 21 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant manganes concentration (mg/kg) at 70 days.

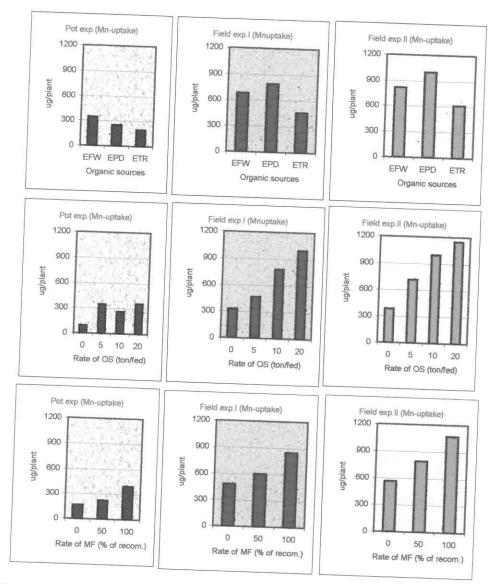


Fig.( 22 ): Effect of organic sources, rate of organic sources and fertilizer rate on plant manganes uptake (ug/plant) at 70 days.

# 4.4.Effect of treatments on wheat grain and straw yield at harvest:

The values of grain and straw yields of wheat plants grown in pot exp. (sandy clay loam) and field exp.I (sandy loam) and field exp.II (clay loam) under the individual and dinteraction effects of different organic sources (enrich farm waste, enrich poudrette and enrich town refuse), their rates (0, 5, 10, 15 ton/fed) and mineral fertilizer rates (0, 50 and 100%) at harvest (at 150 days after planting) are shown in table (15) and depict in fig.(23).

### 4.4.1.Grain yield:

Data in table (15) showed that The organic sources, their rates or mineral fertilizer rates as individual factors significantly increased grains yield of wheat plants in the three experiments. The successive ascending order of grains yield in the three experiments as affected by organic sources is enrich town refuse < enrich farm waste = enrich poudrette. As for the rates, either of organic sources or mineral fertilizers, they successively increased grains yield up to the highest rate in all the three experiments, (fig. 23). Similar results were obtained by Bowman and Halvosson (1998).

Organic sources types with their rates affected significantly the grains yield of wheat plants in the three experiments. Just, field exp.II showed that di-interaction of organic sources with mineral fertilizer rates was of significant effect on grains yield. On the other hand, the other two experiments showed insignificant effect. The interaction of organic sources with mineral fertilizer rates showed significant

effect on grains yield in the pot and field exp.II. Similar results were obtained by Derar and Eid (1996).

{Note: grain yield of pot was modified to ton/fed by dividing the g/pot by 5}.

## 4.4.2.Straw yield:

The organic sources, their rates or mineral fertilizer rates affected significantly straw yield of wheat plants in the three experiments. The successive increasing order of straw yield in the three experiments as affected by organic sources was enrich town refuse < enrich farm waste = enrich poudrette. As for the rates, either of organic sources or fertilizers successively increased straw yield up to the highest rate in the field exp.I and field exp.II. As for the pot exp., similar behaviour has been shown on the straw yield at the highest two rates of the organic sources (10 and 20 ton/fed) as well as the highest two rates of the mineral fertilizer (50 and 100%) on the straw yield, where the effect of the two rates were insignificant (fig. 23).

Di-interaction of organic sources with their rates showed significant effect on straw yield of wheat plants, while organic sources with fertilizer rates showed non-significant effect in the three experiments. Just, the field exp.II showed that di-interaction between the organic sources rates and mineral fertilizer rates had significant effect on straw yield, while the other experiments showed non-significant trend.

{Note: straw yield of pot was modified to ton/fed by divided the g/pot by 5}.

# 4.4.3. Grain/straw percentage:

The percentage of grain/straw for pot exp., field exp.I and field exp.II were 15, 42 and 40% respectively. This means that the pot exp. yielded less grains for every straw unit than each of field experiments. The two field experiments were almost similar in their grain/straw ratio.

Table (15a): Effect of used organic sources and their rates on grain and straw yield of wheat crop of the three experiments.

Organic	Rate	Pot	Pot exp.	Field exp.I	exp.I	Field	Field exp.II
Sources	Lon/	Grain	Straw	Grain	Straw	Grain	Straw
	Fed	g/pot	g/pot	Ton/fed	Lon/fed	Lon/fed	Lon/fed
FFW	0	1.34	19.29	0.56	2.41	0.83	2.99
i	2	4.34	28.66	1.81	4.26	1.98	5.28
	10	6.34	29.70	2.21	5.26	2.29	00.9
	20	7.59	31.66	2.76	5.86	2.86	6.27
	Mean	4.74	27.33	1.83	4.44	1.99	5.13
EPD	0	1.34	19.29	0.56	2.41	0.83	2.99
	2	4.18	23.70	2.17	4.47	2.33	5.17
	10	90.9	32.90	2.49	4.91	2.62	5.69
	20	6.11	31.31	2.57	6.23	2.69	7.17
	Mean	4.42	26.80	1.94	4.50	2.12	5.25
ETR	0	1.34	19.29	0.56	2.41	0.83	2.99
	S	3.66	31.15	1.66	3.91	1.73	4.64
	10	4.53	33.09	1.66	3.69	1.69	4.47
	20	4.86	35.63	1.98	4.40	2.02	5.06
	Mean	3.60	29.79	1.46	3.60	1.57	4.29
LSD at 5%		THE ST	10.52	c			
OS		0.40	Ns	0.14	0.20	0.12	0.32
Do Do		0.70	137	0 27	0.40	0.24	0.63

2/0							
OS	0.40	Ns	0.14	0.20	50	0.12	0.32
OS x Rate	0.79	4.37	0.27	0.7	0.40	0.24	0.63
OS = organic source EFW = enrich farm waste		EPD = enrich pou	oudrette,	ETR = e	enrich towr	refuse	

Table (15b): Effect of used organic sources and mineral fertilizers on grain and straw yield of wheat crop of the three experiments.

Organic	ME						
Course	0 / 0	Pot	Fot exp.	Field	Field evn I	1	
Saarnas	10 %	Grain	Straw	1000	2000	Field	Field exp.II
	R	g/pot	ø/not	Ton/fod	Straw	Grain	Straw
EFW	0	2 49	20 67	Dail/iio	1 on/fed	Ton/fed	Ton/fed
	20	1.10	75.4.37	1.40	3.68	1 43	7.00
	201	44.4	70.70	1.83	4.60	2.00	27.4
FPD	001	0.24	30.72	2.27	5.05	253	5.23
1	<b>-</b>	3.17	24.30	1 64	273	6.73	5.93
	20	4.20	27.09	1 03	5.73	1.74	4.43
	100	5.90	29 00	200	4.68	2.10	5.28
ETR	0	2.95	26.72	07.7	5.10	2.52	6.05
	50	3.23	21.01	CI.I	2.95	1.28	3 66
	100	4.61	30.81	1.44	3.56	1.52	4.23
Mean		10.1	20.84	1.78	4 29	1 00	77.
Thomas	<b>-</b>	3.20	25.20	140	3 45	7.77	4.98
	50	3.97	28 53	1.74	5.45	1.48	4.10
	100	5 58	20.02	1./4	4.28	1.87	4 92
LSD at 5%			20.19	2.10	4.81	2.32	5.66
MF		0.40	,	7			
OS x MF		0.40 Nc	2.19	0.14	0.20	0.12	
		SN	ns	ns	Ns	0.21	Ns. N
M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, EFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich	nineral fer Irm waste,	tilizers as pe EP	percent of recommendec EPD = enrich poudrette,	nmended dose udrette, ET	ı to	OS = organic source wn refuse	source

Table (15c): Effect the rate of used organic sources and mineral fertilizers on grain and straw yield of wheat crop of the three experiments.

				Field exp.	exp.I	Field exp.II	exp.II
Rate of	Z.F	Pot exp.	exp.	niol I		.:	Ctrow
in area	J 0 /0	Croin	Straw	Grain	Straw	Crain	Sulan
S	10 %	g/not	a/not	Ton/fed	Ton/fed	Lon/fed	Ton/fed
1 on/red	4	g/por	27.73	00.0	1.63	0.23	2.47
0	0	00.0	10.13	0.20	05.0	09 0	2.50
	50	0.00	19.45	0.40	2.30	1 67	4 00
	001	3 57	22.28	1.07	3.08	1.07	20.1
	100	1.10	10.00	95 0	2.41	0.83	2.99
	Mean	1.19	17.27	25.0	3.48	191	3.97
5	0	2.82	24.59	1.44	0.40	000	527
,	20	4.14	31.17	1.94	4.20	2.00	77.0
	3 -	5 0.3	27.75	2.24	4.96	2.36	09.0
	100	20.0	20.00	1 00	421	2.02	5.03
	Mean	3.99	27.83	1.00	17.5	1 03	4 33
10	C	4.87	29.61	1.86	3.90	1.93	200
2	· (	000	21 35	2.11	4.71	2.22	2.77
	20	7.29	0.10	2 30	5 19	2.44	90.9
	100	6.77	34.74	4.37		0000	5 30
	Mean	5 64	31.90	2.12	4.62	7.00	10.0
	Moder	5 13	30.46	2.10	4.75	2.16	2.04
20	0	5.15	21.00	2 40	5 71	2.59	6.13
	20	6.46	32.10	7.7	6.03	2.82	6.71
	100	86.9	35.98	7.71	0.00	03.0	919
	Mean	61.9	32.87	2.43	5.49	7.32	0.10
LSD at 5%		0.40	2 53	0.16	0.23	0.14	0.36
Rate		0.46	2.33	21.0	Su	0.24	0.63
		0 70	Su	CII	2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

1

OS = organic source ETR = enrich town refuse M.F. % of R = mineral fertilizers as percent of recommended dose for wheat, EFW = enrich farm waste, EPD = enrich poudrette, ETR = enrich Rate x MF

0.16 us

2.53 us

0.46

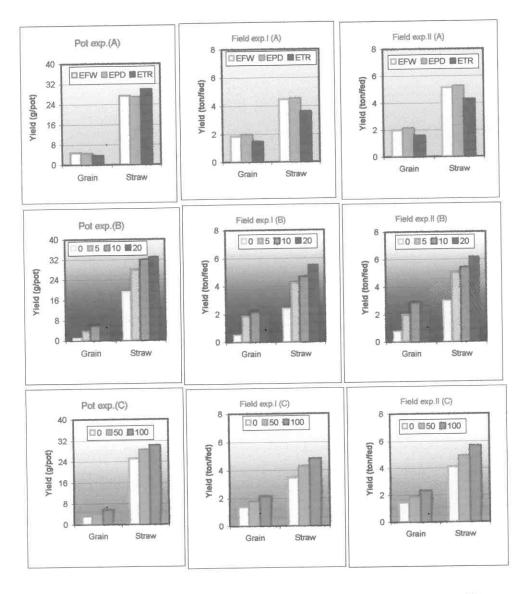


Fig.( 23 ): Effect of organic sources (A), rate of organic source (B) and fertilizer rate (C) on grain and straw yield.