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Evaluation of Compost and Compost tea as Promising Method for *Meloidogyne Incognita* Management

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Abstract

Two types of compost, (plant and animal) as well as furan 10%G were effective in reducing *Meloidogyne incognita* number of galls, nematode reproduction and fecundity. Compost was investigated as amendment for suppressing populations of *Meloidogyne incognita* and increasing plant vigor. The greenhouse and laboratory studies were conducted with mature compost produced in SEKEM organic farm. Compost extract was prepared by steeping 100 g compost in 200 ml tap water and removing biomass with cheesecloth filtration followed by centrifugation. The supernatant was diluted I: 4 in water, sterile filtered and used as I00% compost extract treatment. In micro well as says, *M. incognita* J_2 activity were inhibited by all tested compost extract concentrations (25%, 50%, 75% and 100% extract), with >55% inhibition in 100% compost extract after 72h. (Animal and plant) Compost treatments mixed with soil at doses 25, 50,100g/ kg were greater treatment gave the best result in reducing the nematode reproduction compared with untreated check. (Animal and plant) compost suppressing final nematode population values that average 92.18% and 92.54 respectively, at doses 100g/kg soil compared with nematicide Furan 10% at dose 2g/ kg suppressing final nematode population values that average 79.10%. Also the used (animal and plant) compost tea at two times 2 days before inoculation and 10 days after inoculation showed the same results. The highest percentage of reduction in nematode final population (80.59%) and (82.90%) was noticed in concentration dose100 g/200 cm^3 water / kg by animal and plant compost tea 2 days before inoculation.

All the tested materials significantly suppressed nematode final population and rate of buildup. In general there were positive correlation between the concentration used and the obtained degree of nematode management.

Key words: organic, extract, compost, compost tea, plant parasitic nematode, *Meloidogyne incognita*, soil amendments.

Introduction

Root-knot nematodes (*Meloidogyne* spp.) are among the most economically damaging genera of plant parasitic nematodes on horticultural and field crops, causing an estimated US $100 billion loss annually **(Oka *et al.*, 2000).** *Meloidogyne* *incognita* (Kofoid& White) Chitwood is one of the most harmful root -knot nematode species, which infects a wide range of vegetable crops in Egypt **(Ibrahim *et al*., 2000).** Root knot nematodes are among the most difficult crop-pest to be controlled. Although chemical nematicides are effective, easy to apply and show rapid effects, they have begun withdrawn from the market owing to concerns about public health and environmental safety (**Rich *et al*., 2004).** Also, nematicides have higher cost of application, limited availability in many developing countries or their diminished effectiveness following repeated applications (**Schneider *et al*., 2003; Ahmad and Siddiqui, 2009).**

Attention on environmental safety has led to the search of alternative strategies including the use of compost, one promising management strategy that can use to suppress nematode populations and increase soil health and plant vigor composts produced from various organic residues have been reported to suppress populations of nematodes and other plant disease-causing organisms.

Recently, several studies concerned the effectiveness of compost used as soil amendments in managing root –knot nematode and compost tea extract Considerable progress in the use of compost as soil amendment for the control of plant parasitic nematodes under field conditions has been reported by **(McSolery and Galher, 1995,1996, 1997; Nico, 2004; zhu *et al*., 2006 and Zhang, 2009).**

Many studies emphasized that nematode populations were greatly suppressed after compost application **(Farahat *et al*., 2010; Renco *et al*., 2010; Addabbo *et al*., 2011 and Sasanelli *et al*., 2011). Meyer *et al*., (2011) and Ravindra *et al*., (2014)** they reported that compost was investigated as an amendment for suppressing populations of *Meloidogyne incognita* and increasing plant vigor.

Material and Methods

Preparation of compost extracts

Laboratory studies were conducted with two source of organic compost (animal and plant). Compost extract was prepared by soaking for 100 g compost in 200 ml tap water and removing biomass with cheesecloth filtration followed by centrifugation 3000rpm for 10 min. The extract was served as standard solution. The extract was diluted to make four concentrations (i.e. 25, 50, 75,100 mg/ml)

Nematicidal activity

One ml of nematode suspension containing 100 freshly hatched juveniles of *Meloidogyne incognita* was added to constant volume of extracts into petri dishes (80mm) and 100 freshly hatched second stage larvae of *Meloidogyne incognita* in 5 ml distilled water as control. All dishes were incubated in an incubator at (25±2C$^{\circ}$). After 24, 48 and 72 h the juveniles were counted for mortality and non mortality under stereoscope microscope. The death of nematodes was confirmed by keeping them in tap water for 24 h. The percent mortality was worked out from an average of three replicate.

Table (1): Plant compost analysis.

Analysis	Unit	Plant compost analysis
weight per cubic meter	Kg	660
Moisture	%	32
PH(1:10)		7.61
EC(1:10)	Ds/m	2.26
Total(N)	%	.98
Nitrogen alamonyumi	PPm	27
Nitrogen nitrate	PPm	--
Organic matter	%	32.0
Organic Carbon	%	18.56
Ash	%	68.0
C:N		1:18.93
Total phosphorus	%	.27
Total Potassium	%	.52
Weed seeds	--	--
Nematode	Juveniles/200g	--

Table (2): Animal Compost analysis.

Analysis	Unit	Animal compost analysis
weight per cubic meter	Kg	699
Moisture	%	32
PH (1:10)		7.33
EC (1:10)	Ds/m	2.49
Total (N)	%	0.79
Nitrogen alamonyumi	PPm	43
Nitrogen nitrate	PPm	109
Organic matter	%	22.9
Organic Carbon	%	13.28
Ash	%	77.10
C:N		1:16.81
Total phosphorus	%	0.38
Total Potassium	%	0.48
Weed seeds	--	--
Nematode	Juveniles/200g	--

A. Compost experiment

One month old eggplant seedlings, *Solanummelongena* cv. Black Balady, with uniform size were transplanted singly in 15cm clay pots filled with organic soil from SEKEM farm. Each treatment was replicated three times two source of organic compost (animal and plant) were applied at rates 25, 50 and100g/kg soil. One week later each pot was inoculated with 2000 freshly hatched juveniles *Meloidogyne incognita.* Each treatment was replicated three times. All treatments were arranged in a complete randomized design under greenhouse condition at 32±5ºC. Also two control treatments were done (nematicides and untreated infected plants). Pots were watered periodically every two days. The plants were harvested after 45 days from inoculation time

B. Compost tea experiment

One month old eggplant seedlings, *Solanum melongena* cv. Black Balady, with uniform size were transplanted singly in 15cm clay pots filled with organic soil from SEKEM farm. Pots were divided into two groups; first group received animal tea compost and second received plant tea compost. The two kinds of compost were added at rates 25, 50 and 100 g/200 cm3water for each pot as drench application two days before inoculation and ten days after inoculation. Each pot was inoculated with 2000 freshly hatched juveniles *Meloidogyne incognita*. Each treatment was replicated three times. All treatments were arranged in a complete randomized design on clean benches in greenhouse. Also two control treatments were done (nematicide (furan 10% G at rate 2gm /plant) and untreated infected plants). Pots were watered periodically every two days. For each experiment, the plants were uprooted after 45 days from inoculation time.

Nematode enumeration and plant growth parameters determination

Soil of each pot was processed for nematode extraction by sieving and Baerman –pan technique **(Southey, 1970).** A count of second stage juveniles (J2) in soil of each pot was determined by means of Hawksley counting slide under stereoscopic microscope. Also, average numbers of eggs/egg-masses were determined by rinsing four randomizely selected egg-masses per root system of each replicate in 1% sodium hypochlorite to release eggs from egg matrix. Then, the released eggs were suspended in water and counted under stereoscopic microscope. Collected juveniles were counted. Galls and egg-masses and their indices were rated. The reduction percentage in galls formation, egg-masses production, also female's numbers were counted and juveniles' number were calculated

According to the following formula:

$$R\% = (\text{Control-Infected})/\ \text{Control}) \times 100$$

The final population and nematode build-up were calculated for all treatments.

The rate of nematode increase (R.B) was detected by dividing the nematode Final Population by the nematode Initial Population (FP/PI).

Plant growth response based on leaves number, fresh shoot and root length also dry and fresh shoot and root weights were determined and calculated for all treatments. Statistical analysis was carried out according to the procedure "Anova" recorded by **Senedecor and Cochran (1980).** Means of treatments were compared by Dancann's Multiple Range Test at 5%level of probability. These steps were accomplished using SPSS Program version 16.

Results

Impact of compost (animal and plant) extract at four concentration 25%, 50%, 75% and 100% on mortality percentage of newly hatched juveniles (J_2) of *Meloidogyne incognita* are depicted in table (3). As it is clear appositive correlation has observed between *Meloidogyne incognita* J_2 mortality percentages and compost extract concentration at the three different exposure times. Meanwhile, larval mortality percentages increased with the increase of compost extract concentration from 25% up to 100 %.It is also evident that the tested concentrations of plant compost extract were superior over that of animals.

Compost extract in larval mortality percentages at all the time of exposure, since their values were amounted to28.57, 42.42, 49.00 and 58.82 for the plant compost extract at 25%, 50%, 75% and 100% concentrations, respectively, whereas those of animal compost extract at the same time were 16.45, 32, 35, 46 and 55.44 accompanied with 25, 50,75, 100 concentrations, respectively.

Table (3): Nematicidal effect of compost extracts on mortality percentage of *Meloidogyne incognita* juveniles (J_2) under different concentration at different exposure times.

Treatment	Time / Conc.	%Mortality juveniles(J_2)		
		24 h.	48h.	72h.
Animal compost	25	10.14	14.63	16.45
	50	20.38	25.86	32.35
	75	23.52	32.39	46.00
	100	27.94	36.36	55.44
Plant compost	25	14.08	19.29	28.57
	50	20.00	27.47	42.42
	75	41.17	47.94	49.00
	100	44.93	49.97	58.82
Check	00	00	00	00

Compost treatment

Data presented in table (4) reveals that the tested compost (animal and plant) applied at all doses significantly impaired gall formation, juveniles, egg-masses, final population as well as nematode build up and egg production comparing with untreated check. Differences in nematode reduction were obvious among and/or doses treatment, while, no significant difference between the compost type, the higher the dose the higher reduction in nematode number, and gave the best results. Animal compost suppressing final nematode population values that average 73.57%, 85.14% and 91.70, at doses 25, 50 and 100g/kg soil respectively. On the other hand, plant compost suppressing final nematode population values that average 71.92%, 87.98% and 92.54 % at doses 25, 50 and 100g/kg soil respectively. Furan at dose 2g/pot suppressing final nematode population values that average 79.22% (fig., 1).

Improvement in plant growth parameters in terms of shoot and root length and weights was variable and proportioned with the compost (animal and plant) treatments at different doses (table 3), while the dose100g/ kg gave the best result in increment the leave number and the shoot length in all treatments of compost (animal and plant) on other hand, fresh and dry shoot weight were increased also with the dose 100g/pot in all treatment, also length and fresh weights of roots were increased. All treatments recorded an increment for all growth parameters than the control except in root fresh weight was decreased when the dose 25and 50g/kg in some treatment.

(Animal and plant) compost tea 2 Days before inoculation and 10 Days after inoculation)

Data in table (6) showed that, all treatments (animal and plant compost tea) were explicated with two time; two days before inoculation and ten days after inoculation. All treatments significantly affected *Meloidogyne incognita* development and could arrest its reproduction rate compared with check treatment. Concerning reduction percentage of juvenile's number, galls, females, egg-masses, eggs per egg masses, the final population and nematode build-up were diminished with all treatments. Animal compost tea treatment (2 days before inoculation) was better than the plant compost tea 2days before inoculation in all doses expect the dose of 100 g/200 cm3 water plant compost tea which better than animal compost tea in final population. Also animal was compost tea 10 days after inoculation achieved best result than the plant compost tea 10 days after inoculation in final population.

On other hand the treatment with animal and plant compost tea 2 days before inoculation achieved the best result than that 10 days after inoculation. Also, the calculations of final population and rates of build –up were significantly affected by animal and plant compost tea 2 days before inoculation, the highest percentage of reduction in the nematode final population (80.59%) and (82.90%) was noticed in concentration dose100 g/200 cm^3 water /kg while, the lowest reduction was (69.94%) and (65.69%) in concentration dose25 g/200 cm^3 water /kg. All treatment at the highest concentration level achieved the lowest rate of build-up (1.19 folds) and (1.05 folds), resembling that obtained by the highest concentration dose100 g/200 cm3water for /kg.

Accordingly, the calculated final population (fig., 2) and rates of build –up were significantly affected by animal and plant compost tea 10days after inoculation, the highest percentage of reduction in the nematode final population (79.04%) and (74.12%) was noticed in concentration dose100 g/200 cm^3 water for each pot. while, the lowest reduction was (66.94%) and (57.97%) in concentration dose 25g /200cm^3 water /kg all treatment at the highest concentration level achieved the lowest rate of build-up (1.28 folds) and (1.95folds), resembling that obtained by the highest concentration dose100 g/200 cm3water /kg.

Data on response of *M. incognita* –infected eggplant plants to drench application of (animal and plant) compost tea was tabulated in table (7). It was noticed that plant growth parameters, on basis of number of leaves, weights and length of both shoots and roots, highly responded to material applications, even with nematode infection. With regard to the influence of tested materials on shoot length no definite trend was noticed. Although, all materials used increased shoot lengths of treated plants, differences among values of such parameter were mostly insignificant. Moreover, plant and animal compost tea 10 days after inoculation and plant and animal compost tea 2 days before inoculation, was gave the best result 48.42, 46.88% and 45.33% respectively compared to check. Also, these previous materials showed an increase in fresh weight that recorded 33, .78%, 29, 91%, and 47.89% respectively. Regarding to dry weight registered increase percentage were 80.57%, 71.01% and 63.37% respectively. While the dose 100 g in animal compost tea 2days before inoculation gave the best result 82.88% in shoot dry weight, while the less result achieved by nematicide furan 20.70% , also the dose of 25g/ 200cm^3 by plant compost tea10 days after inoculation and animal compost tea 2 days before inoculation recorded 41.08% and 45.54% respectively. Likely, root parameters had erratically respond to different concentration level of the tested materials. Most treatments which had significantly improved such parameters when compared to the check. However, with few exceptions as well as the dose 25 and 50/ 200cm3by plant compost tea10days after inoculation caused decreased in root fresh weight.

Table (4): Effect of animal and plant compost different concentrations on *Meloidogyne incognita* development infected eggplant (*Solanum melongena*) under greenhouse condition.

Treatments	Dose / pot (g)	In soil	%R	Galls/ root	%R	Egg masses/ root	%R	Eggs/ egg mass	%R	Females	R%	developmental stages	%R	F.P	%R	R.B
Animal compost	25	2340^{b}	70.62	311^{c}	81.83	211^{c}	80.35	231^{c}	32.05	373^{c}	85.47	322^{b}	52.99	3246	73.57	1.62
	50	1600^{c}	79.91	120^{d}	92.99	47^{ef}	95.62	207^{d}	39.11	132^{d}	94.85	47^{e}	93.13	1826	85.14	.91
	100	893^{d}	88.79	74^{e}	95.67	39^{f}	96.36	216^{cd}	36.47	74^{ef}	97.11	14^{g}	97.95	1020	92.18	.51
Plant compost	25	2383^{b}	70.08	328^{c}	80.89	290^{b}	72.99	275^{b}	19.11	425^{b}	83.45	131^{c}	80.87	3452	71.92	1.72
	50	1485^{c}	81.36	105^{d}	93.86	62^{e}	94.22	183^{e}	46.17	105de	95.91	31^{f}	95.47	1683	86.31	.84
	100	790^{d}	90.08	62^{e}	96.37	45^{ef}	95.81	138^{f}	59.41	62^{f}	97.58	19^{g}	97.22	916	92.54	.45
Check1 (Furan 10%)	2	2070^{b}	74.01	372^{b}	78.27	176^{d}	83.61	122^{f}	64.11	372^{c}	85.51	112^{d}	93.64	2554	79.10	1.27
Check2	----	7967^{a}	----	1712^{a}	----	1074^{a}	----	340^{a}	----	2568^{a}	----	685^{a}	80.90	12294	--	6.14

In each Column, means followed by the same letters did not different significantly at ($p=0.05$) according to Duncan, s multiple range test.

*Final Population (F. P.) Including number of juveniles in soil + egg-masses + females + developmental stages.

Table (5): Plant growth parameters of eggplant (Solanum *melongena*) affected by *Meloidogyne incognita* treated by different animal and plant compost concentrations under greenhouse conditions.

Treatments	Dose/ Pot (g)	Shoot								Root			
		Length (cm)	%Increase	Leave number	%Increase	Fresh Weight (g)	%Increase	Dry Weight (g)	%Increase	Fresh Weight (g)	%Increase	Length (cm)	%Increase
Animal Compost	25	28.66^{a}	34.36	6.67^{bc}	11.16	12.89^{e}	7.56	4.50^{de}	43.31	4.30^{b}	4.87	9.26^{c}	0.75
	50	29.66^{a}	39.05	9.00^{a}	50	20.27^{ab}	70.33	5.48^{bc}	74.52	3.60^{d}	-12.19	11.00^{b}	17.89
	100	29.87^{a}	40.03	9.00^{a}	50	21.82^{a}	83.36	5.92^{ab}	88.53	4.40	7.31	12.36^{a}	32.47
Plant compost	25	24.66^{bc}	15.61	8.00^{ab}	33.33	14.07^{de}	18.23	5.26^{bc}	67.51	3.34^{d}	-18.53	9.66^{c}	3.53
	50	28.66^{a}	34.36	7.33^{abc}	22.16	15.99^{cd}	34.36	5.45^{bc}	73.56	3.62^{d}	-11.70	10.66^{b}	14.25
	100	30.33^{a}	42.19	9.00^{a}	50	18.26^{bc}	53.44	6.33^{a}	101.59	4.73^{b}	15.36	12.50^{a}	33.97
Check1 (Furan 10%)	2	28.33^{ab}	32.81	8.00^{ab}	33.33	13.22^{e}	11.09	3.76^{ef}	19.74	6.07^{a}	48.04	9.00^{c}	-3.53
Check2	–	21.33^{c} *	–	6.00^{c}	–	11.90^{e}	–	3.14^{f}	–	4.10^{b}	–	9.33^{c}	–
Healthy	–	29.00^{a}	35.95	7.67^{abc}	27.83	14.16^{de}	18.99	5.11^{cd}	62.73	3.80^{d}	-7.31	10.83^{b}	16.07

In each Column, means followed by the same letters did not different significantly at (p=0.05) according to Duncan' s multiple range test .

Table (6): Effect of different animal and plant compost tea treatments on *Meloidogyne incognita* development infected eggplant (*Solanum melongena*) under greenhouse condition.

Treatments	Dose/ pot (g)	Soil/ pot	%R	Galls/ root	%R	Egg masse/ root	%R	Eggs/ egg mass	%R	Females	%R	Develop mental stages	%R	F.P	%R	R.B
Animal compost tea 2days before Inoculation	25	2970de	62.72	331^{gh}	80.66	228^{g}	78.77	210^{d}	38.23	397^{fg}	84.54	132^{f}	80.72	3727	69.94	1-86
	50	2340^{e}	70.62	290^{i}	83.06	180^{i}	83.24	160^{f}	52.94	319^{h}	87.57	116^{g}	83.06	2955	73.38	1.47
	100	1960^{f}	75.39	190^{k}	88.90	122^{k}	88.64	99^{h}	70.88	209^{j}	91.86	95^{h}	86.13	2386	80.59	1.19
Plant compost tea 2 days before Inoculation	25	4185^{b}	47.74	400^{e}	76.63	288^{e}	73.18	243^{c}	28.53	520^{e}	79.75	200^{c}	70.88	5193	57.57	2.59
	50	3360^{c}	57.82	342^{fg}	80.02	264^{f}	75.41	161^{f}	52.64	410^{f}	84.03	148^{e}	78.39	4182	65.98	2.09
	100	1650^{g}	79.28	234^{j}	86.33	106^{k}	90.13	129^{g}	62.05	255^{i}	90.07	93^{h}	86.42	2102	82.90	1.05
Animal Compost tea 10 days after Inoculation	25	3327^{c}	58.24	360^{fg}	78.97	270^{ef}	74.86	241^{c}	29.11	491^{e}	80.88	181^{d}	73.57	4269	65.27	2.13
	50	2941^{d}	63.08	308^{hi}	82.00	209^{h}	80.54	189^{e}	44.41	400^{fg}	84.42	123^{fg}	82.04	3673	70.12	1.83
	100	2167^{ef}	72.08	188^{k}	89.07	148^{j}	86.21	129^{g}	62.05	205^{j}	92.01	56^{i}	91.82	2576	79.04	1.28
plant compost tea 10 days after Inoculation	25	3472^{c}	56.42	654^{c}	61.79	583^{b}	45.71	305^{b}	10.29	913^{b}	64.44	262^{b}	61.75	5230	57.45	2.61
	50	2650^{d}	66.73	564^{b}	67.05	367^{c}	65.82	198de	41.76	677^{c}	73.63	169^{d}	75.32	3868	68.39	1.93
	100	2060^{ef}	74.14	505^{d}	70.50	313^{d}	70.85	170^{f}	50.00	556^{d}	78.34	152^{e}	77.81	3181	74.12	1.59
Check1 (Furan)	2	2070^{ef}	74.01	372^{ef}	78.27	176^{i}	83.61	122^{g}	64.11	372^{g}	85.51	112^{g}	83.64	2554	79.10	1.27
Check 2	--	7967^{a}	--	1712^{a}	--	1074^{a}	--	340^{a}	--	2568^{a}	--	685^{a}	--	12294	--	7.03

In each Column, means followed by the same letters did not different significantly at (p=0.05) according to Duncan, s multiple range test.

*Final Population (F. P.)Including number of juveniles in soil + egg-masses + females + developmental stages.

Table (7): Plant growth parameters of eggplant (*Solanum melongena*) infected by *Meloidogyne incognita* and treated by compost tea (animal and plant) concentration under greenhouse conditions.

Treatments	Dose/ pot (g)	Shoot								Root			
		Length (cm)	% Increase	Leave number	% Increase	Fresh Weight (g)	% Increase	Dry Weight (g)	% Increase	Fresh Weight	% Increase	Length (cm)	% Increase
Animal compost tea 2days before Inoculation	25	25.33^{bc}	18.75	7.67^{bcd}	27.38	12.97^{cd}	8.99	4.57^{bcd}	45.54	5.18^{c}	26.34	9.66^{cde}	3.53
	50	28.33^{ab}	24.70	7.67^{bcd}	27.38	15.65^{abc}	31.51	5.42^{abc}	72.61	5.29^{c}	29.02	11.50^{ab}	23.25
	100	30.00^{a}	40.64	7.67^{bcd}	27.38	14.56^{bc}	22.35	5.74^{a}	82.88	5.40^{c}	31.70	12.00^{a}	28.61
Plant compost tea 2 days before Inoculation	25	28.33^{ab}	24.70	7.33^{bcd}	22.16	15.04^{abc}	26.38	4.75^{abcd}	51.27	3.84^{d}	-6.34	10.33^{bcde}	10.71
	50	28.33^{ab}	24.70	7.67^{bcd}	27.38	15.97^{ab}	34.20	5.13^{abc}	63.37	3.93^{d}	-17.00	11.33^{ab}	21.43
	100	31.00^{a}	43.88	100.00^{a}	66.66	17.60^{a}	47.89	5.13^{abc}	63.37	4.30^{d}	4.87	12.00^{a}	28.61
Animal Compost tea 10 days after Inoculation	25	29.00^{ab}	35.95	6.33^{cd}	5.50	15.40^{abc}	29.41	5.68^{a}	80.89	3.70^{d}	-9.75	10.66^{abcd}	14.25
	50	30.66^{a}	43.74	6.33^{cd}	5.50	16.52^{ab}	38.82	5.74^{a}	82.80	4.87^{c}	18.78	11.16^{abc}	19.61
	100	31.33^{a}	46.88	7.33^{bcd}	22.16	15.46^{abc}	29.91	5.37^{abc}	71.01	5.09^{c}	24.14	11.83^{ab}	26.79
plant compost tea 10 days after Inoculation	25	26.00^{b}	21.89	6.00	–	14.55^{bc}	22.26	4.43^{cd}	41.08	6.41^{b}	56.34	10.83^{abcd}	26.79
	50	31.33^{a}	43.74	6.67^{bcd}	11.16	15.31^{abc}	28.65	5.50^{ab}	75.15	6.76^{ab}	64.87	10.66^{abcd}	14.25
	100	31.66^{a}	48.42	8.00^{bc}	33.33	15.92^{ab}	33.78	5.67^{a}	80.57	7.25^{a}	76.82	12.17^{a}	13.43
Check1 (Furan)	2	28.33^{ab}	32.81	8.33^{b}	38.83	13.22^{cd}	11.09	3.79^{de}	20.70	6.07^{b}	48.0.4	9.00^{e}	-3.5
Check2	-	21.33^{c} +	–	6.00^{d}	–	11.90^{d}	–	3.14^{e}	–	4.10^{d}	–	9.33^{de}	–
Healthy	-	29.00^{ab}	35.95	7.67^{bcd}	27.38	14.17^{bcd}	19.07	5.11^{abc}	62.73	3.80^{d}	-7.31	10.83^{abcd}	19.61

In each Column, means followed by the same letters did not different significantly at (p=0.05) according to Duncan's multiple range test.

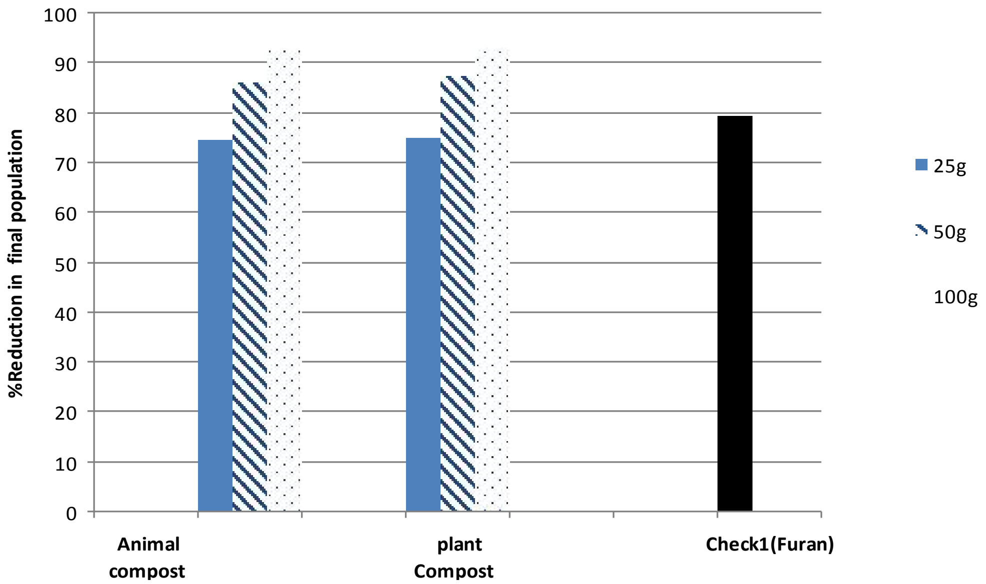

Fig. (1): %Reduction in final population of *Meloidogyne incognita* infected eggplant roots and influenced by two type of Compost.

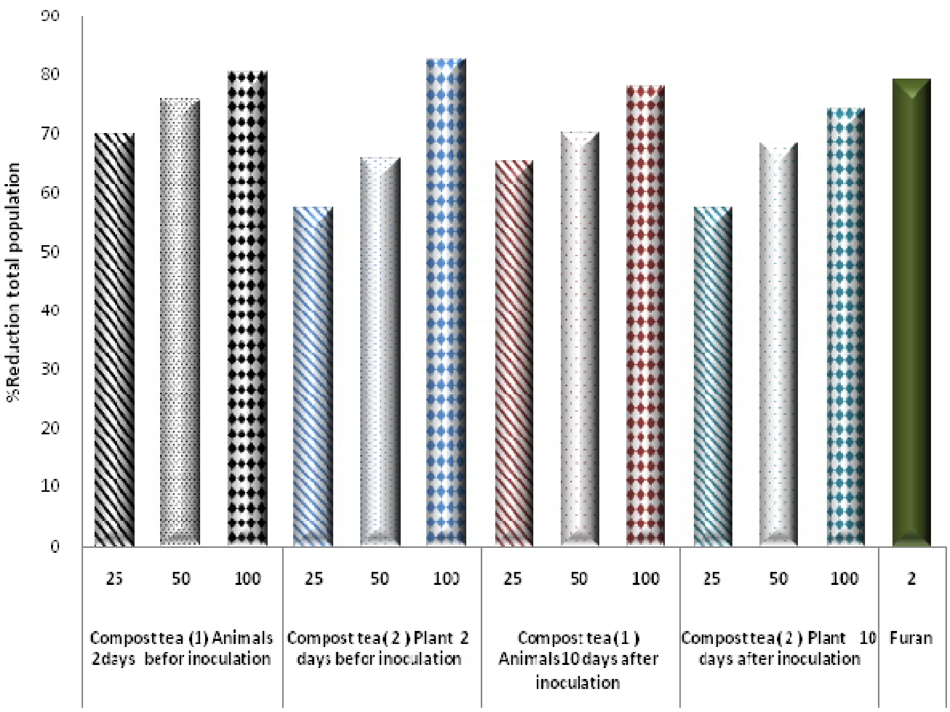

Fig. (2): %Reduction in total population of *Meloidogyne incognita* infected eggplant roots influenced by Compost tea.

Discussion

The efficacy of compost seemed to be depends on the components of which it were produced, so differences were observed in the present work among the two tested types of compost (plant and animal) the present study are harmony with those of **Moselhy (2009)** who reported that compost significantly reduced formation of galls on sunflower roots, the developmental stages and the final population nematode many reports indicated that compost application improved growth of infected plants and diminished nematode population **(Leroy *at el*.,2007** and **Cayuela *et al*.,2008).** The beneficial effects of compost on treated plants rather than its role in controlling nematode were outlined by many authors they mentioned that compost improves soil structure, porosity; increases infiltration and permeability of heavy soils, increases water holding capacity, supplies variety of macro and micronutrients; supplies significant quantities of organic matter, improves cation exchange capacity. Also, compost stabilizes soil PH, provides humus, vitamins, hormones, and plant enzymes which are not supplied by chemical fertilizers **(Field guide to compost use, 2001; Evanylo *et al*., 2008; Ahamed *et al.,* 2009).**

The mechanisms by which composts suppress plant diseases and plant parasitic nematodes are still speculative but it may be due to increase competition from fungivorous and bacterivorous nematodes resulting from increased availability of food sources after compost applications. There is good evidence **(Edwards, 1998)** that earthworms greatly increase overall microbial activity in organic wastes greatly by providing fragmented organic materials for microbial growth of soil bacteria and fungi. Soils that were treated with inorganic fertilizers only had much less organic matter available for microbial growth compared to those in the Compost treated soils. The effects of compost applications on soil were much greater on fungivorous nematode populations than on bacterivorous nematode populations. As it is know, Earthworms depend upon fungi as a main source of food and tend to increase fungal activity in their casts by excreting fungal spores **(Edwards & Fletcher, 1988)** which may also explain why there were greater increases in populations of fungivorous nematodes than in those of bacterivorous nematodes. Moreover, plant parasitic nematodes are attacked by cyst fungi and nematode trapping fungi populations of which could have increased in response to compost applications **(Kerry, 1988).** The greater availability of microorganisms as a source of energy could increase the competitive ability of both bacterivorous and fungivorous nematodes as compared to plant parasitic nematodes.

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الملخص العربي

تقييم فعالية الكمبوست وشاي الكمبوست كوسيلة واعدة لمكافحة نيماتودا تعقد الجذور

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تم اختبار فعالية نوعيين من الكمبوست (حيواني ونباتي) بالإضافة إلى المبيد فيوران ١٠% كجرعات مفردة ضد نيماتودا تعقد الجذور *Meloidogyne incognita* **على الباذنجان. وأدى ذلك إلى خفض أعداد العقد الجذرية وقلل من تكاثر النيماتودا وأدى إلى تحسين نمو النبات.**

وتم إجراء هذه الدراسة تحت ظروف المعمل والبيوت الزجاجية عن طريق استخدام الكمبوست المنتج في مزارع سيكم العضوية. وتم تحضير مستخلص الكمبوست عن طريق إذابة ١٠٠ جرام كمبوست في ٢٠٠ ملي ماء ثم التخلص من الرواسب وتم تخفيف المستخلص بنسبة ١:٤ وتم استخدامه بجرعات ٢٥، ٥٠، ٧٥، ١٠٠% ضد يرقات نيماتودا تعقد الجذور *Meloidogyne incognita* **وقد أعطى التركيز ١٠٠% أعلى نسبة موت يرقات وصلت إلى أكثر من ٥٥% بعد مرور ٧٢ ساعة. وتم استخدام الكمبوست بنوعية بجرعات ٢٥,٥٠,١٠٠ جرام/ كجم تربة وأدى ذلك إلى أعلى تأثير في خفض العدد الكلي للنيماتودا ومعدل التكاثر بنسبة ٩٢.١٨% و٩٢.٥٤ عند أعلى تركيز ١٠٠ جرام/كجم تربة بالمقارنة بالمبيد النيماتودي . على الجانب الآخر تم استخدام شاي الكمبوست بطريقتين قبل العدوى بيومين وبعد العدوى بعشرة أيام. جميع المعاملات أدت إلى خفض أعداد النيماتودا بالإضافة إلى معدل التكاثر وكان معدل الخفض في العدد الكلي للنيمادودا ٨٠.٥٩ و٨٢.٩٠% بالتتابع وذلك عند أعلى تركيز١٠٠جرام في ٢٠٠سم ماء/ كجم تربة. وكان هناك ارتباطًا ايجابيًا بين التركيز المستخدم لكافة المعاملات وخفض معدلات التكاثر لنيماثودا تعقد الجذور** *Meloidogyne incognita*.