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Alleviating Biotic Stress Induced by *Meloidogyne incognita* in Eggplant Using Dried Plant Residues and Compost

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ABSTRACT

Root-knot nematode, *Meloidogyne incognita* is considered one of the most destructive pathogens causing yield loss in eggplant. Organic amendments are a promising tool for the management of root-knot nematodes. Therefore, greenhouse experiments were conducted to assess the effect of dried plant residues as well as two types of compost (plant and mixed compost) on eggplant growth and nematode infection. Dried plant residues i.e. rice straw, potato or pomegranate peels or cabbage and cucumber leaves were applied at the rates of 10, 15 and 20g/pot. Whereas compost types were applied at the rates of 5, 10, 15 and 20g/pot for each. The tested dried plant residues as well as compost types exhibited nematicidal activity and significantly minimized nematode populations. Among all treatments of plant residues, incorporated soil with rice straw significantly ($P< 0.05$) boosted shoot length, fresh and dry shoot weight at all rates even plants harbored root galling and egg masses exceeded those of control. In addition, at the rate of 10g/pot, dried cucumber and cabbage leaves as well as pomegranate peels significantly suppressed soil nematode population, number of females, galls and egg masses. Both types of compost significantly induced shoot length and weight at rate 10g/pot. However, mixed compost significantly ($P< 0.05$) suppressed nematode parameters better than plant compost. Chemical constituents (NPK and chlorophyll A and B) were significantly enhanced by tested compost. Dried cucumber and cabbage leaves as well as composting appear promising ecological alternatives to inorganic fertilizers and have the potential to alleviate the deleterious impact of *M. incognita* infecting eggplant in conventional and organic farming.

Keywords: Plant residues, Mixed compost, Plant compost, *Meloidogyne incognita*, Eggplant

INTRODUCTION

Eggplant (*Solanum melongena* L.) is widely grown in tropical and subtropical regions for its edible fruit. The global production of eggplant exceeded 59 million tons in 2021 (FAOSTAT, 2023). Egypt (1.3 million tons) ranked the third, next to China (37.4 million tons) and India (12.9 million tons). Eggplant is subjected to be attacked by plant parasitic nematodes of which *Meloidogyne* spp. particularly *M. incognita* and *M. javanica* are considered the most destructive pathogens causing 100 billion US dollars yield loss (Lahm et al., 2017). Chemical control using nematicides has been employed conventionally against root-knot nematodes. However, their adverse impacts on the environment, soil conditions, human health and livestock (Brevik et al., 2020) have encouraged scientists to search for safe, ecofriendly alternative strategies. These strategies involve using organic fertilizers such as plant residues, compost, and vermicompost. These fertilizers are known to enhance the physical and chemical properties of soil by increasing organic matter content and soil microbial populations, ultimately leading to higher crop yields (Martens, 2000; Chang et al., 2007). Dried plant residues have demonstrated nematicidal properties against root-knot nematodes (Bailey and Lazarovits, 2003; D'Addabbo et al., 2011; El-Nagdi and Youssef, 2019; El-Deriny et al., 2020; Das et al., 2022) and their use has been recommended under greenhouse and field conditions.

Composting is an effective method for managing municipal and agro-industrial waste by converting raw materials into a stabilized form. It also helps in destroying plant pathogens such as fungi, bacteria, and nematodes as well as recycles valuable plant nutrients. (Lasaradi and Stentiford, 1996). Previous studies revealed that composted agricultural wastes have shown nematicidal properties against root-knot nematodes and act as plant growth promoter in many instances (Nico et al., 2004; Leroy et al., 2007; Cayuela et al., 2008; Abou El Atta et al., 2012; Al-Hendy et al., 2021; Bakr et al., 2022). The suppression of plant parasitic nematodes varies depending upon nematode species and type of plant residues or compost.

Therefore, the objective of this study was conducted to explore the effect of dried plant residues as well as plant and mixed composts on the reproduction of *M. incognita* and the consequently growth of eggplant cv. Black king under greenhouse conditions.

MATERIALS AND METHODS

Source of plant residues

Plant residues namely rice (*Oryza sativa*) straw, cabbage (*Brassica oleracea*) leaves, and cucumber (*Cucumis sativus*) leaves were collected from the Experimental Farm, Faculty of Agriculture, Mansoura University, Mansoura, Egypt. Whereas plant residues namely pomegranate (*Punica granatum*) and potato (*Solanum tuberosum)* peels were obtained from kitchen wastes.

Preparation of dried plant residues

Rice straw was air-dried and cut into 2–3 cm lengths. Whereas leaves of cabbage and cucumber and peels of potato and pomegranate were air dried for 2- 3 weeks then milled into powder with a blender. Dried residues were applied to soil, in pots at rates of 5,10 and 15 g/pot.

Types and Source of Compost

Two types of compost (plant and mixed) were purchased from AGRN-Beni Suef Organic Fertilizers, Egypt. The first type consists of medicinal and aromatic plant residue, the second one consists of plant and animal waste (rice straw + animal manure). Chemical and organic properties of such composts are shown in Table (1). Compost types were applied to soil, in pots at rates of 5, 10, 15 and 20 g/pot.

Experimental Design

Impact of certain plant residues on plant growth of eggplant and Meloidogyne incognita reproduction.

Plastic pots (12 cm-d) were filled with 800 g steam sterilized silty clayey loam soil (Coarse sand 3.89; Fine sand 22.47; Silt 42.16; Clay 31.48). Plant residues at the rates of 5, 10 and 20g were separately introduced and incorporated into soil. Pots were then watered and soil was covered with polyethylene and left for a week to allow proper decomposition.

Table 1: Chemical and organic properties of plant and mixed compost.

Compost properties	Plant Compost	Mixed Compost
pH 1:5	7.06	6.14
Moisture %	42.25	48.71
Organic matter (%)	22.26	31.34
Organic carbon (%)	14.46	20.41
Total nitrogen (%)	0.83	1.35
C/N ratio	17.42	15.11
Total Phosphorus (%)	0.89	1.12
Total Potassium (%)	0.67	0.89
Micronutrients (mg .kg-1)		
Copper	3.42	5.51
Zinc	7.56	18.66

Seedlings of eggplant cv. Black king (30 days old) were separately transplanted in plastic pots and simultaneously inoculated with 1000 eggs of *M. incognita* by pipetting into soil around the base of plant and slightly irrigated. The traditional nematicide, oxamyl was applied at the rate of 0.3ml/pot, two days after nematode inoculation. A randomized complete block design (RCBD) and four replications for each treatment were carried out under greenhouse conditions at Nematological Research Unit (NERU). Treatments were as follows:1- Three rates of rice straw; 2-Three rates of pomegranate peel powder, 3- Three rates of cucumber leaf powder; 4- Three rates of cabbage leaf powder; 5- Three rates of potato peel powder; 6-Oxamyl; and 7-Nematode only(N)

The experiment was terminated fifty days after nematode inoculation. Data on growth performance i.e., lengths and fresh weights of shoot and root were recorded. Shoots were kept in an oven at 58 °C ± 2 °C, and shoot dry weights were recorded. Nematodes were collected from 250g of soil using sieving and a modified Baermann technique (Goodey, 1957). The nematode suspensions were then examined using a Hawksley counting slide and an anatomy microscope to quantify the number of juveniles. Additionally, the roots were stained with acid fuchsin in lactic acid (Byrd et al., 1983) and counted for developmental stages, females, and egg masses.

Impact of two types of compost on plant growth of eggplant and Meloidogyne incognita reproduction.

Plastic pots (12 cm-d) were filled with 800 g steam sterilized silty clay loam (Coarse sand 3.89; Fine sand 22.47; Silt 42.16; Clay 31.48). Composts (plant and mixed) were separately applied and incorporated into soil, at rates of 5,10, 15 and 20g/pot. Simultaneously, seedlings of eggplant cv. Black king (30 days old) were transplanted and pots were irrigated with water. After a week from transplanting, nematode inocula (1000 eggs of *M. incognita*), were pippeted into soil in three holes around the base of plant and after three days from inoculation oxamyl (0.3 ml/pot) was introduced to soil. Plants were slightly irrigated with tap water. Treatments were as follows:1-Four rates of plant compost 2- Four rates of mixed compost; 3- Oxamyl; 4- Nematode only; and 5- Healthy plants. A randomized complete block design (RCBD) and four replications for each treatment were carried out under greenhouse conditions. Forty-five days of nematode inoculation, plants were harvested. Plant growth attributes (shoot and root lengths, shoot and root fresh weights, and shoot dry weights) were recorded. For dry weight, shoots were kept in an oven at 58 °C ± 2 °C. For each treatment, nematode juveniles present in 250g of soil were extracted according to Goodey (1957). The nematode suspensions were examined and number of juveniles present was determined. Roots were stained with acid fuchsin in lactic acid (Byrd et al., 1983) to assess the number of developmental stages, females, galls, and egg masses per root system of each treatment. Additionally, the average number of eggs per single egg mass in each treatment was calculated based on the counts from five egg masses of similar size. Galls (GI) and egg masses (EMI) indices were measured on 0-5 scales :0= no galls/egg masses; 1=1or 2 galls or egg masses ; 2=2-10; 3=11-30; 4=31-100; and 5= >100 galls or egg masses per root system (Taylor and Sasser, 1978).

NPK and Chlorophyll contents

Plant constituents namely nitrogen (N), phosphorus (P) and potassium (K) were measured in dried leaves of eggplant. Nitrogen was determined by the method of kjeldahl (A.O.A.C, 1980), while phosphorus and potassium were determined according to Jackson (1967). The study also measured the leaf photosynthesis pigments (chlorophyll A, B) in dried leaves using spectrophotometric methods purposed by Fadeel (1962). Chlorophyll concentrations were then calculated based on the methods described by Wellburn and Lichtenthaler (1984).

Data analysis

The data underwent analysis of variance (ANOVA) and then Duncan multiple range tests (DMRT) were used to compare the means (Duncan, 1955).

RESULTS

Impact of dried plant residues on eggplant growth and Meloidogyne incognita reproduction under greenhouse conditions.

Plant growth attributes

The effect of soil incorporation with dried plant residues on plant growth attributes of eggplant cv. Black King infected with *M. incognita* is illustrated (Table2). At all tested rates, soil incorporated with dried plant residues exhibited significant ($P>0.05$) increment in shoot length, being cucumber leaves the best effects followed by rice straw compared to untreated plants. The maximum increment in whole plant length was recorded with such residue at a rate of 15 and 10g/pot, with a percentage increase of 29.6 and 27.7%, respectively. Results also demonstrated that at all tested rates fresh and dry shoot weights were significantly ($P>0.05$) increased with the application of rice straw and cabbage leaves at all tested rates. However, a phytotoxicity was revealed with the application of dried pomegranate peel particularly at higher rate (15g/pot) compared to untreated plants (Table 2). Moreover, a non significant ($P>0.05$) increment in number of leaves was elicited with most treatments of plant residues.

Nematode parameters

Incorporation of soil with all tested rates of plant residues revealed a significant ($P>0.05$) suppression in nematode population/250g soil and final nematode population

Table 2: Impact of dried plant residues on plant growth attributes of eggplant infected with *Meloidogyne incognita* under greenhouse conditions.

Treatments	Rate (g)	Length (cm)		Plant Length	Inc.%.	Fresh Weight (g)		Total Plant F.W	Inc./Dec. %	Shoot Dry W. (g)	Inc.%	No. of Leaves
		Shoot	Root			Shoot	Root					
Rice straw	5	34.3 a-c	24.2 a-d	58.5	21.1	8.1 a	3.5 a-d	11.6	46.8	1.6 a	100	5.0 ab
	10	33.0 a-d	28.7 ab	61.7	27.7	7.5 ab	3.1 b-g	10.6	34.2	1.5 a	87.5	4.7 ab
	15	35.0 ab	23.1 a-e	58.1	20.3	7.0 a-c	3.3 b-f	10.3	30.4	1.5 a	87.5	4.2 ab
Pomegranate peel	5	29.8 c-e	25.0 a-d	54.8	13.5	5.3 c-f	3.4 a-e	8.7	10.1	1.1 a-c	37.5	4.0 b
	10	30.8 b-e	26.3 a-d	57.1	18.2	5.4 c-f	2.6 c-g	8.0	1.3	1.1 a-c	37.5	4.5 ab
	15	29.5 de	29.8 a	59.3	22.8	4.3 ef	2.1 fg	6.4	-18.9	0.9 bc	12.5	4.2 ab
Cucumber leaf	5	34.5 a-c	23.0 a-e	57.5	19.0	6.4 a-d	3.8 a-c	10.2	29.1	1.3 a-c	62.5	4.5 ab
	10	34.8 ab	21.2 b-e	56.0	16.0	6.7 a-d	4.1 ab	10.8	36.7	1.6 a	100	5.0 ab
	15	35.8 a	26.8 a-d	62.6	29.6	6.8 a-c	3.8 a-c	10.6	34.2	1.6 a	100	5.0 ab
Cabbage leaf	5	36.0 a	20.5 c-e	56.5	17.0	7.2 ab	2.8 c-g	10.0	26.6	1.5 a	87.5	4.7 ab
	10	35.3 ab	23.2 a-e	58.5	21.1	6.8 a-c	3.3 b-f	10.1	27.8	1.4 ab	75.0	5.3 a
	15	32.2 a-e	27.8 a-c	60.0	24.2	7.4 ab	4.6 a	12.0	51.9	1.4 ab	75.0	5.0 ab
Potato peel	5	32.0 a-e	18.8 de	50.8	5.2	6.1 b-e	1.9 g	8.0	1.3	1.1 a-c	37.5	4.2 ab
	10	34.3 a-c	15.3 e	49.6	2.7	6.8 a-c	2.2 e-g	9.0	13.9	1.5 a	87.5	5.0.ab
	15	34.1 a-d	21.0 b-e	55.1	14.1	5.8 b-e	3.1 b-g	8.9	12.7	1.3 a-c	62.5	5.2 a
Oxamyl		28.1 e	24.1 a-d	52.2	8.1	3.9 f	2.4 d-g	6.3	-20.3	1.4 ab	75.0	4.2 ab
Nematode only (N)		28.5 de	19.8 c-e	48.3	-	5.0 d-f	2.9 b-g	7.9	-	0.8 c	-	4.5 ab
LSD		4.8	8.0	12.8	-	1.8	1.3	3.1	-	0.5	-	1.3

The value presented is the average of four repeated measurements.
In each column, the means that shared the same letter (s) did not show a significant difference at P<0.05 based on Duncan's multiple-range test.
N=1000 eggs of *M. incognita*.

being dried cabbage as well as cucumber leaves and pomegranate peels the best mainly at higher rate (15g/pot) recording reproduction factor equal to 0.02, 0.14 and 0.42, respectively (Table 3). A non-significant reduction in number of females, number of galls was exhibited with most treatments, being cucumber leaves and pomegranate and potato peels the best at higher rate (15g/pot). Similar trend was noticed with number of egg masses. It is worth noting that although rice straw was found to act as plant growth promoter, eggplant roots sustained high number of galls and egg masses over control plants (Table 3).

Impact of two types of compost on eggplant growth and Meloidogyne incognita reproduction under greenhouse conditions.

Plant growth attributes

Data in Table (4) represent the effect of soil amended with plant and mixed compost, at four rates, on plant growth attributes of eggplant cv. Black king infected with *M. incognita* under greenhouse conditions. The root-knot nematode, *M. incognita* infection caused a substantial decrease in plant growth parameters, resulting in a reduction of 30.6% in plant length and 23.7% in total plant fresh weight. Results indicated that at all tested rates, the addition of compost led to a significant (P>0.05) increase in eggplant shoot length. However, when mixed compost was applied at a higher rate (20g/pot), no significant difference was observed compared to control plants. The maximum increment in whole plant length was recorded with plant and mixed compost at a rate of 10g/pot, with a percentage increase of 22.7 and 19.0%, respectively. Furthermore, the addition of mixed compost at lower rates (5g/pot and 10g/pot) resulted in a significant improvement in shoot weight, with an increase in total plant fresh weight of 28.2 and 26.8%, respectively. However, plant compost applied at a rate of 15g/pot showed the highest percentage increase in total plant fresh weight (30.9%). Additionally, the chemical nematicide, oxamyl had a significant effect on eggplant growth. It led to a significant increment in shoot length and fresh weight, recording the highest percentage of increase in plant length (50%) and whole fresh weight (38%) compared to the two types of compost. However, it is worth noting that among the observed data, shoot dry weights of eggplant were not significantly increased compared to the negative control.

Nematode parameters

Incorporation of soil with all tested rates of plant and mixed compost significantly suppressed nematode population within soil and root with different magnitudes compared to untreated plants (Table 5). Oxamyl proved to be the superior one. A significant (P>0.05) reduction in number of juveniles (J2s) /250g soil was recorded by all treatments compared to control. The highest reduction was indicated with higher rates (15 and 20g/pot) of both types of compost. Moreover, soil incorporated with mixed compost showed better performance in suppressing number of females, galls and egg masses than plant compost mainly at the rates of 15 and 20g/pot. Irrespective to oxamyl, the highest reduction in number of galls and egg masses was elicited by mixed compost at higher rate 20g/pot scoring 2.0 and 3.6 in root gall index and 0.5 and 2.5 in egg mass index compared to untreated plants (4.5 and 3.7), respectively. Number of eggs/single egg mass showed insignificant fluctuations compared to untreated plants. It is worth noting that the nematicidal potential was directly proportional to the rate of the compost, i.e., the higher the rate the greater the nematicidal potential and vice-versa. However, no significant differences were recorded among tested rates.

Table 3: Impact of dried plant residues on population of *Meloidogyne incognita* infecting eggplant under greenhouse conditions.

Treatments	Rate (g)	No. of juveniles/ 250g	No. of Females	Final population	Red.%	RF	No. of Galls	No. of Egg masses
Rice straw	5	216.6 de	112.0 a	806.0	58.8	0.80	102.2 ab	94.3 a
	10	245.0 cd	81.7 a-d	869.0	55.6	0.86	74.5 a-d	77.8 ab
	15	225.0 d	91.0 a-c	815.5	58.3	0.81	94.0 a-c	80.0 ab
Pomegranate peel	5	120.0 d-g	40.5 c-f	427.0	78.2	0.42	42.3 c-f	35.0 b-d
	10	196.6 de	24.0 ef	654.0	66.6	0.64	24.5 d-f	20.5 cd
	15	130.0 d-f	16.5 ef	432.7	77.9	0.43	16.0 ef	13.8 cd
Cucumber leaf	5	90.0 e-g	101.5 ab	400.0	79.6	0.39	109.3 a	95.0 a
	10	65.0 fg	55.5 b-e	263.5	86.5	0.26	52.5 b-f	51.8 a-c
	15	40.0 fg	14.2 ef	143.2	92.7	0.14	14.3 ef	11.8 cd
Cabbage leaf	5	150.0 d-f	20.7 ef	501.5	74.4	0.49	20.5 ef	19.3 cd
	10	200.0 de	23.7 ef	664.7	66.0	0.66	23.8 d-f	23.3 cd
	15	0.0 g	28.2 d-f	28.5	98.5	0.02	29.0 d-f	26.0 cd
Potato peel	5	155 d-f	89.0 a-c	588.0	69.9	0.58	88.8 a-c	81.3 ab
	10	365.6 bc	59.0 a-e	1231.0	37.1	1.19	58.5 a-e	50.0 a-c
	15	410.0 b	24.5 ef	1337.2	31.6	1.27	24.0 d-f	22.8 cd
Oxamyl		0.0 g	0.0 f	0.0	100.0	0.00	0.0 f	0.0 d
Nematode only (N)		600.0 a	33.0 d-f	1956.0	-	1.95	35.d-f	30.0 cd
LSD		127.4	54.0	427.4	-	0.42	53.2	47.8

The value presented is the average of four repeated measurements. In each column, the means that shared the same letter (s) did not show a significant difference at P<0.05 based on Duncan's multiple-range test.N=1000 eggs of *M. incognita*. *RF= Reproduction factor, Pf= Final population, Pi= Initial population.

Table 4: Impact of plant and mixed compost on plant growth attributes of eggplant infected with *Meloidogyne incognita* under greenhouse conditions.

Treatments	Rate (g)	Length		Total Plant Length (cm)	Inc.%	Plant Fresh Weight		Total Plant F.Wt. (g)	Inc.%	Shoot Dry Wt. (g)	Inc.%
		Shoot	Root			Shoot	Root				
Mixed compost	5	28.0 b	30.9 a-c	58.9	16.4	6.8 ab	2.2 ab	9.0	26.8	1.8 ab	20.0
	10	27.5 b	32.8 a-c	60.2	19.0	6.7 ab	2.4 ab	9.1	28.2	1.6 cd	6.7
	15	26.9 b	31.0 a-c	57.9	14.4	5.7 bc	2.9 a	8.6	21.1	1.6 d	6.7
	20	22.6 c	31.1 a-c	53.7	6.1	5.0 bc	1.7 b	6.7	4.2	1.6 cd	6.7
Plant compost	5	26.8 b	25.0 c	51.8	2.4	5.5 bc	2.1 ab	7.6	7.0	1.6 b-d	6.7
	10	28.4 b	33.8 a-c	62.1	22.7	5.5 bc	2.8 a	8.2	15.5	1.8 a-c	20.0
	15	28.9 ab	29.6 a-c	58.5	15.6	6.5 ab	2.9 a	9.3	30.9	1.9 a	26.7
	20	28.3 b	26.3 c	54.6	7.9	4.5 bc	2.0 ab	6.5	7.0	1.5 d	-
Oxamyl		31.9 a	44.1 ab	75.9	50.0	8.0 a	2.0 ab	9.8	38.0	1.7 a-d	13.3
Nematode only (N)		21.4 c	29.3 bc	50.6	-	4.4 c	2.9 a	7.1	-	1.5 d	-
Healthy plant		28.5 ab	44.4 a	72.9	44.1	6.7 ab	2.6 ab	9.3	30.9	1.8 a-d	20.0
LSD		3.4	15	18.4	-	2.2	1.0	3.2	-	0.3	-

The value presented is the average of four repeated measurements.
In each column, the means that shared the same letter (s) did not show a significant difference at P<0.05 based on Duncan's multiple-range test.
N=1000 eggs of *M. incognita*.

Table 5: Impact of plant and mixed compost on population of *Meloidogyne incognita* infecting eggplant under greenhouse conditions.

Treatments	Rate (g)	No. of juveniles/ 250g soil	No. of eggs / single egg mass	Females	Final nematode population	Red. %	RF* (Pf/Pi)	No. of galls	RGI**	No. of egg masses	EI***
Mixed compost	5	442.5 b	234.0 a-c	101.2 a	8619.5 bc	38.2	8.6 bc	116.0 a	4.7 a	29.0 b-d	3.2 ab
	10	262.5 cd	161.0 c	92.2 ab	6184.3 b-d	55.6	6.2 b-d	109.3 a	4.6 ab	32.3 bc	3.6 a
	15	227.5 cd	246.0 ab	31.2 de	4059.5 de	70.9	4.0 de	44.7 b	3.7 c	14.7 e	2.5 c
	20	182.5 d	306.0 a	42.0 de	4835.3 cd	65.3	4.8 cd	46.6 b	3.6 c	14.3 e	2.6 bc
Plant compost	5	31.00 c	280.0 a	58.2 b-d	8084.6 b-d	42.0	8.0 b-d	67.0 b	4.2 a-c	24.3 b-e	3.2 ab
	10	312.5 c	229.0 a-c	66.2 a-d	9370.3 b	32.8	9.4 b	69.0 b	4.0 bc	35.0 ab	3.7 a
	15	302.5 c	185.0bc	48.5 cd	5406.0 b-d	61.2	5.4 b-d	69.6 b.	4.2 a-c	23.0 c-e	3.0 a-c
	20	222.5 cd	230.0 a-c	84.7 a-c	5601.0 b-d	59.8	5.6 b-d	58.5 b	4.5 ab	20.5 de	3.5 a
Oxamyl		0.0e	0.0 d	8.0 e	8.0 e	99.9	0.0 e	7.7 c	2.0 d	0.7 f	0.5 d
Nematode only (N)		652.5a	265 ab	96.0 a	13944.0 a	-	14 a	112.5 a	4.5ab	43.7 a	3.7 a
LSD		109.6	83.5	37.5	4121.6	-	4.1	32.3	0.7	11.1	0.7

The value presented is the average of four repeated measurements. In each column, the means that shared the same letter (s) did not show a significant difference at $P<0.05$ based on Duncan's multiple-range test.
N=1000 eggs of *M. incognita.* *RF= Reproduction factor = Pf= Final population, Pi=Initial population**RGI= Root gall index, ***EI= egg masses index.

NPK contents

The concentrations of N, P and K in dried leaves of eggplant infected with root-knot nematode, *M. incognita* and treated with two types of compost are documented (Table 6). Next to oxamyl, mixed compost caused the highest percentage of increase in N, P and K with values of 15.8, 18.0 and 15.2 %, respectively, followed by plant compost with values of 15.1, 17.1 and 14.9 %, at the rates of 20g, respectively (Fig. 1 A).

Table 6: Effect of two types of compost on chemical constituents of eggplant infected with root-knot nematode, *Meloidogyne incognita* under greenhouse conditions.

Treatments	Rate (g)	%			Chlorophyll (mg/g)		
		N	P	K	Chl. A	Chl. B	Chl. A+B
Mixed compost	5	3.01 h	0.34 i	2.67 h	0.77 i	0.49 i	1.26 h
	10	3.19 e	0.36 f	2.83 e	0.81 f	0.54 f	1.36 e
	15	3.23 d	0.36 e	2.89 d	0.82 e	0.56 e	1.39 d
	20	3.30 b	0.37 c	2.95 c	0.85 c	0.59 c	1.43 bc
Plant compost	5	2.93 i	0.33 j	2.61 i	0.75 j	0.47 j	1.22 i
	10	3.08 g	0.34 h	2.74 g	0.79 h	0.51 h	1.30 g
	15	3.13 f	0.35 g	2.79 f	0.80 g	0.52 g	1.32 f
	20	3.28 c	0.37d	2.94 c	0.84 d	0.58 d	1.42 c
Oxamyl		3.31 b	0.38 b	2.98 b	0.85 b	0.59 b	1.44 b
Nematode only (N)		2.85 j	0.32 k	2.56 j	0.73 k	0.44 k	1.17 i
Healthy plant		3.37 a	0.38 a	3.04 a	0.86 a	0.61 a	1.47 a
LSD		0.02	0.002	0.02	0.002	0.02	0.022

The value presented is the average of four repeated measurements.
In each column, the means that shared the same letter (s) did not show a significant difference at P<0.05 based on Duncan's multiple-range test. N=1000 eggs of *M. incognita.* N=Nitrogen; P=Phosphorus; K=Potassium.

Chlorophyll Content

Photosynthetic pigments were significantly increased with soil amended with compost (Table 6). The highest percentage of increase in chlorophyll was more pronounced in chlorophyll B, at the rate of 20g /pot recording 32.1 and 31.0% in mixed and plant compost, respectively. Similarly, the highest percentage of increase in chlorophyll A+B was recorded with mixed compost (22.2%) followed by plant compost (21.5%) at the aforementioned rate. (Fig.1B).

DISCUSSION

Organic soil amendments such as postharvest plants, decomposed materials (compost), vermicompost, animal and green manure, are considered sustainable to the environment

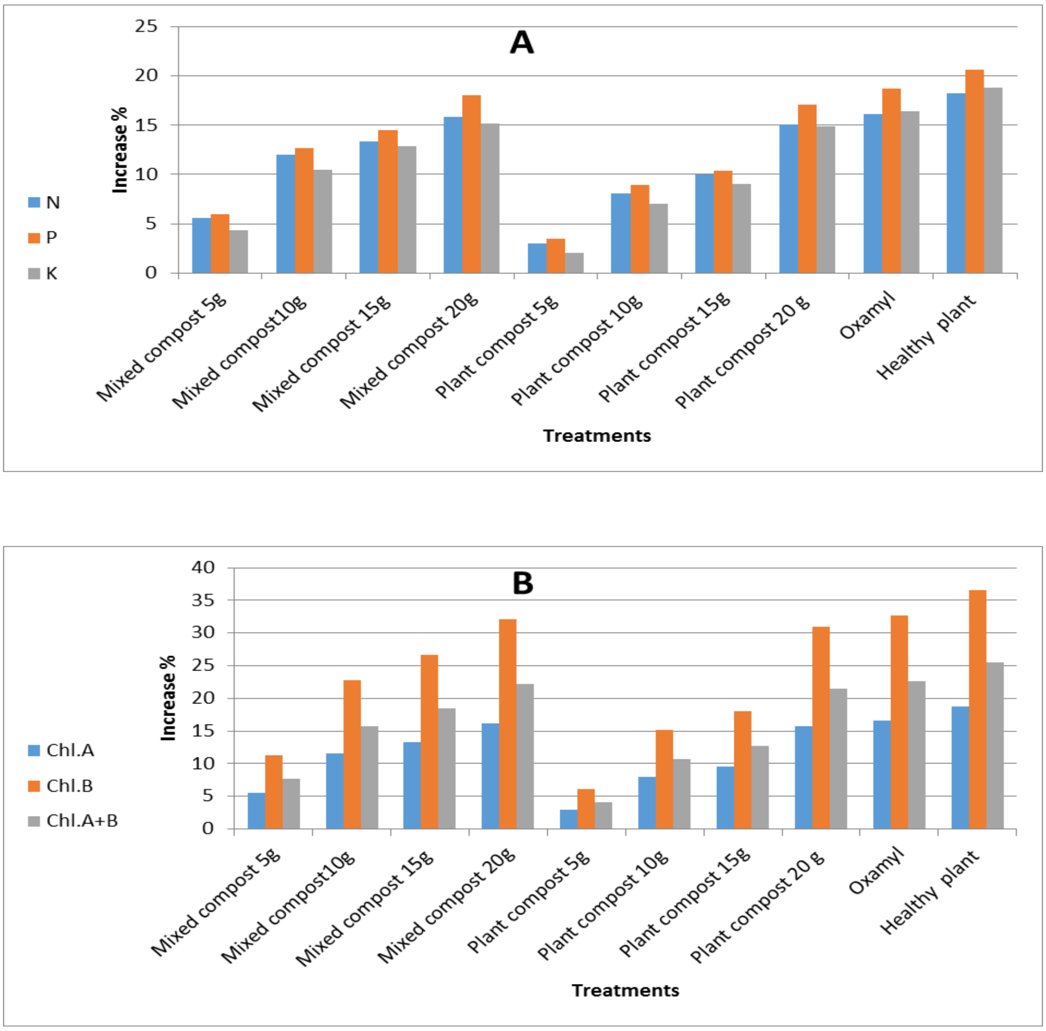

Figure 1: Impact of two types of compost on NPK and chlorophyll content in dried leaves of eggplant infected with *Meloidogyne incognita*. A=NPK; B-Chlorophyll.

as they have many beneficial effects on soil properties, and crop productivity (Xiaodan et al., 2020). Organic amendments are also suggested as a promising tool for the management of plant-parasitic nematodes (Bailey and Lazarovits, 2003; El-Deriny et al., 2020). The effectiveness of dried plant residues and compost in the suppression of root-knot nematodes, *Meloidogyne* spp., and enhancement of plant growth attributes is well documented (PiedraBuena et al., 2006; Mostafa et al., 2016; Ibrahim et al., 2018; Alam and El-Nuby, 2019; Abd‑El‑Khair and El‑Nagdi, 2021).

In the current study, at all tested rates of plant residues, soil incorporated with rice straw and dried cabbage leaves performed the best and significantly (P>0.05) improved shoot length, fresh and dry shoot weights compared to untreated plants. It has been reported that straw incorporation has significant beneficial effects on crop yields, soil properties and nutrients (Zhang et al., 2016, 2018; Zhao et al., 2019).

Regarding cabbage leaves, the present results agreed with Das et al. (2022) who demonstrated that the individual application of crushed cabbage leaves produced significantly better growth, yield and reproductive parameters in brinjal infected with *M.javanica* than control, in pot and field experiments. However, our results contradict with the findings of Youssef and Lashein (2013) who reported that cabbage leaves did not enhance plant growth parameters of tomato infected with *M.incognita* due to the immediate phytotoxicity exerted by the brassica.

A significant augmentation in plant growth such as shoot length, fresh and dry shoot weights was also recorded with dried cucumber leaves at the rate of 10 and 15g/pot. Dried plant residues are an essential source of carbon and also provide valuable nutrients like nitrogen, playing a crucial role in replenishing soil organic matter and supporting cultivation. **(**Davidson and Ackerman, 1993; Chèneby et al., 2010).

In addition, incorporation of soil with all tested rates of plant residues revealed a significant (P>0.05) suppression in nematode population/250g soil and final nematode population being dried cabbage mainly at higher rate (15g/pot) the best effect. These results are in accordance with those reported by a number of researchers (Zasada and Ferris, 2004; Youssef and Lashein, 2013; El-Nagdi and Youssef, 2019; Das et al., 2022). Brassicas are known to contain glucosinolates (GSL) (Martínez-Ballesta et al. 2013). When cells are damaged, glucosinolates (GSL) are released into the cytoplasm and transformed into toxic isothiocyanates (ITC) through enzymatic hydrolysis by myrosinase. These ITCs are known to be harmful to root-knot nematodes (RKNs) and other soil-borne diseases (Lazzeri et al., 2009). The profiles of GSL vary among plant species and cultivars, and their ITC derivatives also differ in toxicity to nematodes (Zasada and Ferris, 2004). Moreover, enzymatic conversion of GSL to ITC is temperature-dependent (Lazzeri et al., 2009) therefore, the effect of cabbage on PPNs could be inconsistent.

Several studies have already reported that not all types of organic amendments are beneficial in the suppression of root-knot nematodes (Bulluck et al., 2002). Application of rice straw at all tested rates (5, 10 and 15g/pot) significantly increased plant growth attributes although eggplant roots were found to support gall formation and egg masses compared to untreated plants which could be attributed to the usage of tested low rates 15g/800g soil. Hence, Maareg et al. (2008) illustrated that gall formation by *M. javanica* was obviously minimized (81.9%) by the introduction of amount of rice straw reached 30 g kg^{-1}.

Soil incorporated with dried cucumber leaves and pomegranate and potato peels at the higher rate (15g/pot) exhibited the best result in reducing number of galls and egg masses, even no significant differences compared to untreated plants. Several pharmacological activities including the antioxidant, antiwrinkle, antimicrobial, etc. potentials have been reported with cucumber plant (Mukherjee, 2013). Cucumber leaves were found to possess several bioactive compounds, of these cucurbitacins (group of triterpenoid substances) which are well-known for their bitterness and toxicity, anti-cancer, biological and antimicrobial activities (Olennikov and Kashchenko, 2023). Some studies have reported the presence of flavonoids i.e flavone *C*-glycosides, *C*-glycosyl flavonoid phytoalexins and acylated flavones in cucumber leaves (McNally et al., 2003; Olennikov and Kashchenko, 2023)

Potato and pomegranate peels are cheap and begnin selection that can be used as soil amendment in *M. incognita* infested fields to significantly boost plant growth and crop yield, reduce reliance on mineral fertilizer and mitigate the environmental consequences of inappropriate waste disposal problems (Fabiyi, 2022). Powder amendment of pomegranate peel exhibited a phytotoxicity compared to the untreated plants (Regaieg et al., 2017) which support the present findings and recorded the reduction in number of galls, egg masses and *M. javanica* nematode reproduction rate in tomato.

The effectiveness of composted agricultural wastes in the suppression of root-knot nematodes and improvement of plant growth parameters is well documented (Nico et al., 2004; Leroy et al., 2007; Cayuela et al., 2008; Abou El Atta et al. 2012). The suppression varies depending upon nematode species and type of compost. In the current study, results indicated that at all tested rates, the addition of two types of compost led to a significant (P>0.05) increase in eggplant shoot length. The addition of mixed compost (rice straw +animal manure) at lower rates (5g/pot and 10g/pot) resulted in a significant improvement in shoot weight better than plant compost (medicinal and aromatic plants). Moreover, soil incorporated with mixed compost showed better performance in suppressing number of females, galls and egg masses than plant compost particularly at the rates of 15 and 20g/pot. Application of rice straw compost in faba bean rhizosphere resulted in reducing root-knot nematode population by 74.9% (AbdelAzzez and Tewfike, 2014). Whereas, Al-Hendy et al. (2021) illustrated that single application of animal compost was the highest effective one in reducing *M. incognita* parameters especially at the rate of 10g/pot, followed by maize wood compost, plant compost and rice straw compost. Another study indicated that the highest increase in all growth characteristics of tomato infected with *M.javanica* was recorded with lower levels of mixed compost compared with the control plants (Bakr et al., 2022). Several mechanisms contribute to the suppressive effect, including the decomposition of compost into soil, ammonia production, stimulation of soil microbial biomass, and release of biocidal substances with nematicide activity (Oka and Yermiyahu, 2002).

The effectiveness of organic amendments depends directly on nitrogen content and inversely on C/N ratio. Fertilizers with high nitrogen content and narrower C/N ratio are more effective than those with low values and broader ratio. C/N ratio of 15-20 is the optimal to the soil microorganisms (Mian and Rodriguez-Kabana, 1982; Sideman et al., 2013; Osunlola and Fawole, 2015). In the present study, analyses of plant and mixed compost revealed a narrower C/N ratio scoring 17.4 and 15.1, respectively. whereas total nitrogen and carbon reached 0.83; 1.35 and 14.46; 20.41, respectively.

It was noticeable that mixed compost caused the highest percentage of increase in N, P and K and the photosynthesis pigments chlorophyll A+B compared to untreated plants. This result is in accordance with Bakr et al. (2022) who recorded the potential of different compost types in enhancement of physiological, biochemical parameters in eggplant infected with *M. javanica*.

Results of the current study indicated that the tested dried plant residues as well as two types of compost exhibited a considerable nematicidal activity against root-knot nematode, *M. incognita* and in most treatments significantly increased plant growth attributes due to releasing of available nutrients and some several toxic compounds such as ammonia, organic acids fatty acids, chitin, release of plant-specific toxins etc.

CONCLUSION

The current results suggest the practical role of dried plant residues and composted materials in enhancing plant growth, alleviating soil *M. incognita* root–knot nematode population and boosting chemical constituents in eggplants under nematode stress. Composting materials would be an efficient and suitable solution of discarding plant residues and polluting from by-products of agro-industry and appear as promising ecological alternative to conventional inorganic fertilizers. However, further studies are needed under greenhouse and field conditions.

REFERENCES

A.O.A.C. (`1980). "Official methods of analysis" Twelfth Ed. Published by the Association of Official Analytical chemists, Benjamin, France line station, Washington. Dc.

AbdelAzzez and Tewfike (2014). Rice straw as nematicidal on root-knot nematode and microbial impact of population in rhizosphere of Faba bean plant. J.Microbiol.Res.4(6):201-209. DOI:10.5923/j.microbiology.20140406.03

Abou El Atta, D.A.; Mostafa, F.A.M. and Taha, H.A. (2012). Effectiveness of certain botanical and city waste composts on *Meloidogyne incognita* infecting eggplant. Egypt. J. Agronematol.11(1): 90 – 105.

Abd‑El‑Khair, H. and El‑Nagdi, W.M.A. (2021). Application of dry powders of six plant species, as soil amendments, for controlling *Fusarium solani and Meloidogyne incognita* on pea in pots. Bull. National Res. Centre, 45:116.

Alam, E.A. and El-Nuby, A.S.M. (2019). Phytochemical and antinematodal screening on water extracts of some plant wastes against *Meloidogyne incognita*. Int. J. Chem Pharma. Sci.10 (4):1-17.

Al-Hendy, M.N.; Bakr, R.A.; Mahdy, M.E. and Mousa, E.M. (2021). Ecofriendly management of root-knot nematodes on eggplant using compost. Egypt. J. Crop Protect. 16(1): 1-19.

Bailey, K.L. and Lazarovits, G. (2003). Suppressing soil-borne diseases with residue management and organic amendments. Soil Tillage Res. 72: 169-180. Doi: 10.1016/S0167-1987(03)00086.

Bakr, R. A.; Abdelall, A.M. and Salem, M.F. (2022). Potential of different compost types in enhancement of physiological, biochemical parameters and control of *Meloidogyne javanica* in tomato plants. Egypt. J. Crop Prot. 17(1): 38-54.

Bulluck, L.R.; Barker, K.R. and Ristaino, J.B. (2002). Influences of organic and synthetic soil fertility amendments on nematode trophic groups and community dynamics under tomatoes. Appl. Soil Ecol. 21: 233–250.

Brevik, E.C.; Slaughter, L.; Singh, B.R.; Steffan,,J.J.; Collier, D. ; Barnhart, P. and Pereira, P. (2020). Soil and human health: Current status and future needs. Air, Soil Water Res. 13: 1–23. https://doi.org/10.1177/1178622120934441

Byrd, D.W.; Kirkpatrick, T. and Barker, K. (1983). An improved technique for clearing and staining tissues for detection nematodes. J. Nematol. 15: 142-143.

Cayuela, M.I.; Millner, P.D.; Myer, S.L. and Rog, A. (2008). Potential of olive mill waste and compost as biobased pesticides against weeds, fungi and nematodes. Sic. Total Environ. 309;11-18.

Chang, E.H.; Chung, R.S. and Tsai, Y.H. (2007). Effect of different applications rates of organic fertilizer on soil enzyme activity and microbial population. Soil Sci. Plant Nutr., 53:132-140. https://doi.org/10.1111/j.1747-0765.2007.00122.x

Chèneby, D.; Bru, D.; Pascault, N.; Maron, P.A.; Ranjard, L. and Philippot, L. (2010). Role of plant residues in determining temporal patterns of the activity, size, and structure of nitrate reducer communities in soil. Appl. Environ. Microbiol., 76(21). https://doi.org/10.1128/AEM.01497-10

D'Addabbo, T.; Papajova, I.; Sasanelli, N.; Radicci, V. and Renco, M. (2011). Suppression of root-knot nematodes in potting mixes amended with different composted biowastes. Helminthologia, 48:278–287.

Das, S.; Abdul Wadud, M.; Chakraborty, S.; Khokon, M.A.R. (2022). Biorational management of root-knot of brinjal (*Solanum melongena* L.) caused by *Meloidogyne javanica*. Heliyon 8 e09227.

https://doi.org/10.1016/j.heliyon.2022.e09227

Davidson, E.A., and Ackerman, I. L. (1993). Changes in soil carbon inventories following cultivation of previously untilled soils. Biogeochemistry 20:161-193.

Duncan, D.B. (1955). Multiple range and multiple, F-test. Biometries, 11:1-42.

El-Deriny, M.M.; Ibrahim, D.S.S. and Mostafa, F.A.M. (2020). Organic Additives and Their Role in the Phytoparasitic Nematodes Management: Recent Advances and Future Challenges,73-93. DOI: 10.1007/978-981-15-4087-5.

El-Nagdi, W.M.A. and Youssef, M.M.A. (2019). A brassica vegetable leaf residue as promising biofumigants for the control of root knot nematode, *Meloidogyne incognita*. Agric. Engin. Int.: CIGR Journal, 20(1):134-139.

Fabiyi, O.A. (2022). Application of composited municipal refuse dump site soil, orange, potato and pineapple peels in the control of root knot nematode (*Meloidogyne incognita*) infecting carrots (*Daucus carota* L.). J. Solid Waste Technol. Manage.48(3): 474-485. https://doi.org/10.5276/JSWTM/2022.474

Fadeel, A.A. (1962). Location and properties of chloroplasts and pigment determination in roots. Physiologia plantarum. 15: 130- 147.

FAOSTAT (2023). Eggplant production in 2018, Crops/Regions/World list/Production Quantity.

Goodey, J.B. (1957). Laboratory methods for work with plant and soil nematodes. Technology Bulletin No.2 Ministry of Agriculture and Fisheries education. London, 47pp.

Ibrahim, H.S.; Radwan, M.A.; Saad, A.S.A.; Mesbah, H.A. and Khalil, M.S. (2018). Assessing the potential of some Egyptian plants as soil amendments in *Meloidogyne incognita* management on tomato. J. Biopest. 11(2):154–160.

Jackson, M.L. (1967). Soil chemical Analysis. Printic Hall of India, New Delhi. Pp. 144-197.

Lahm, G.P.; Desaege, J.R.; Smith, B.K.; Pahutski, T.F.; Rivera, M.A.; Meloro, T.; Kucharczyk, R., Lett, R.M.; Daly, A.; Smith, B.T.; Cordova, D.; Thoden, T. and Wiles, J.A. (2017). The discovery of fluazaindolizine: A new product for the control of plant parasitic nematodes. Bioorganic Med. Chem. Lett. 27(7):1572-5.

Lasaradi, K.E. and Stentiford, E.I. (1996). Respirometric techniques in the context of compost stability assessment: principles and practice. In: De Bertoldi, M., Sequi, P., Lemmens, B. & Papi, T. (Eds). The science of composting, Part 1. Glasgow, UK, Chapman & Hall, pp. 274-285.

jackson L.; Curto, G.; Dallavalle, E.; D'Avino, L.; Malaguti, L.; Santi, R. and Patalano, G. (2009). Nematicidal efficacy of bio fumigation by defatted Brassicaceae meal for control of *Meloidogyne incognita* (Kofoid et White) Chitw. on a full field zucchini crop. J. Sustain. Agric. 33:349–358.

Leroy, M.; Bommele, L.; Reheul, D.; Mones, M. and De Neve, S. (2007). The application of vegetable, fruit and garden waste (VFG) compost in addition to cattle slurry in a silage maize monoculture. Effects on soil fauna and yield. European J. Soil Biol.43:91-100. DOI: 10.1016/j.ejsobi.2006.10.005

Maareg, M.; Gohar, I. and Tawfik, S.F. (2008). Effect of certain organic soil amendments on sugarbeet (*Beta vulgaris* L.) infested with root-knot nematode, *Meloidogyne javanica* under field conditions. Egypt. J. Biol. Pest Control 18:235–241.

Martens, D. A. (2000). Management and crop residue influence soil aggregate stability. J. Environ. Qual. 29: 723–727. doi: 10.2134/jeq2000.00472425002900030006x.

Martínez-Ballesta, M.D.; Moreno, D.A. and Carvajal, M. (2013). The physiological importance of glucosinolates on plant response to abiotic stress in Brassica. Int. J. Mol. Sci. 14(6):11607-25. doi: 10.3390/ijms140611607

Mian, I.H., and Rodriguez-Kabana, R. (1982). Survey of the nematicidal properties of some organic materials available in Alabama as amendments to soil for control of *Meloidogyne arenaria*. Nematropica 12 (2) :235–246.

McNally, D.J.; Wurms, K.V.; Labbé, C.; Quideau, S.; Bélanger, R.R. (2003). Complex C-glycosyl flavonoid phytoalexins from *Cucumis sativus*. J Nat Prod. 66(9):1280-3. doi: 10.1021/np030150y.

Mostafa, F.A.M.; Refaei, A.R.; Khalil, A.E. and El-Deriny, M.M. (2016). Potential use of botanicals rich in alkaloids for controlling *Meloidogyne incognita* and *Rotylenchulus reniformis* infecting cucurbits. Egypt J. Agronematol, 15 (1): 29-43.

Mukherjee, P.K.; Nema, N.K.; Maity, N. and Sarka, B.K. (2013). Phytochemical and therapeutic potential of cucumber. Fitoterapia 84:227–236.

Nico, A.I.; Jiménez-Díaz, R. M. and Castillo, P. (2004). Control of root-knot nematodes by composted agro-industrial wastes in potting mixtures. Crop Prot.23(7):581-7.

Oka, Y. and Yermiyahu, U. (2002). Suppressive effects of composts against the root-knot nematode *Meloidogyne javanica* on tomato. Nematology 4:891–898. https:// doi. org/ 10. 1163/ 15685 41023 21122 502.

Olennikov, D.N. and. Kashchenko, N.I. (2023). Green waste from cucumber (*Cucumis sativus* L.) cultivation as a source of bioactive flavonoids with hypolipidemic potential. Agronomy 13(9):2410. https://doi.org/10.3390/agronomy13092410

Osunlola, O.S. and Fawole, B. (2015). Evaluation of animal dungs and organ mineral fertilizer for the control of *Meloidogyne incognita* on sweet potato. Int.J.Agron. 5 pp. doi:10,115/2015/725363.

PiedraBuena, A.; Garc´ıa-´Alvarez, A.; Dıez-Rojo, M. and Bello, A. (2006). Use of crop residues for the control of *Meloidogyne incognita* under laboratory conditions. Pest Manag. Sci. 62:919–926.

Regaieg, H.; Bouajiila, M.; Hajii,L.; Larayadh, A.; Chilheni,N.; Guessmi-Mzoughi ; Horrigue-Raouani, N. (2017). Evaluation of pomegranate (*Punica granatum* L. var. *Gabsi*) peel extract for control of root-knot nematode *Meloidogyne javanica* on tomato. Arch. Phytopathol. Plant Prot. 839-849. https://doi.org/10.1080/03235408.2017.1396721

Sideman, B.; Majewski, C.; Haddad, Nada and Buob, T. (2013). Guidelines for using animal manures and manure-based composts in the garden. Fact sheet, UNH Cooperative Extension Programs, and Policies.

Taylor, A.L. and Sasser, J.N. (1978). Biology, identification and control of root-knot nematodes (*Meloidogyne species*). Raleigh: North Carolina State University Graphics, 111 pp.

Wellburn, A.R. and Lichtenthaler, H. (1984). Formulae and program to determine total carotenoids and chlorophylls A and B of leaf extracts in different solvents. In: Sybesma, C. (eds) Advances in Photosynthesis Research. Advances in Agricultural Biotechnology, vol 2. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-6368-4_3

Xiaodan, L.; Dengxiao, Z.; Huixin, L.; Xiuxiu, Q.; Gao, Y.; Zhang, Y.; Han, Y.; Jiang, Y. and Li, H. (2020). Soil nematode community and crop productivity in response to 5-year biochar and manure addition to yellow cinnamon soil. BMC Ecology 20:39. DOI: 10.1186/s12898-020-00304-8.

Youssef, M.M.A. and Lashein, A.M.S. (2013). Effect of cabbage (*Brassica oleracea*) leaf residue as a biofumigant, on root-knot nematode, *Meloidogyne incognita* infecting tomato. J. Plant Protect. Res. 53(3). doi: 10.2478/jppr-2013-0040.

Zasada, I.A. and Ferris, H. (2004). Nematode suppression with brassicaceous amendments: application based upon glucosinolate profiles. Soil Biol. Biochem., 36:1017–1024.

Zhang, P.; Chen, X.; Wei, T.; Yang, Z.; Jia, Z.; Yang, B.; Han, Q.; Ren, X. (2016). Effects of straw incorporation on the soil nutrient contents, enzyme activities, and crop yield in a semiarid region of China. Soil Tillage Res. 160: 65–72.

Zhang, Y.; Liu, Y.; Zhang, G.; Guo, X.; Sun, Z.; Li, T. (2018). The effects of rice straw and biochar applications on the microbial community in a soil with a history of continuous tomato planting history. Agronomy 8(5):65. https://doi.org/10.3390/agronomy8050065

Zhao, X.; Yuan, G.; Wang, H.; Lu, D.; Chen, X.; and Zhou, J. (2019). Effects of full straw incorporation on soil fertility and crop yield in rice-wheat rotation for silty clay loamy crop land. Agronomy 9(3):133. https://doi.org/10.3390/agronomy9030133

الملخص العربى

تخفيف الاجهاد الحيوى الناتج عن الاصابة بنيماتودا تعقد الجذور باستخدام متبقيات النباتات والكمبوست على نبات الباذنجان

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تعتبر نيماتودا تعقد الجذور *Meloidogyne incognita* من اهم المسببات المرضية التي تسبب خسارة كبيرة في زراعات الباذنجان. وتلعب المحسنات العضوية دورا فعالا في مكافحة النيماتودا والتقليل من الاثر الضار لها. لذا فى الدراسة الحالية تم تنفيذ تجربتين تحت ظروف الصوبة لتقييم تاثير متبقيات النباتات الجافة ونوعين من الكمبوست (نباتي وخليط) علي نمو نبات الباذنجان المصاب بنيماتودا تعقد الجذور*M.incognita* . فى التجربة الاولى تم استخدام المتبقيات النباتية الجافة مثل قش الارز وقشر البطاطس والرمان وورق الكرنب والخيار بمعدل ١٠ و ١٥و ٢٠ جم / اصيص . بينما فى التجربة الثانية تم استخدام الكمبوست بنوعيه النباتى والخليط بمعدل ٥ و١٠و ١٥و٢٠ جم / اصيص. اظهرت النتائج ان متبقيات النباتات الجافة التي تم اختبارها وكذلك انواع الكمبوست لها نشاط كبيرا في القضاء علي النيماتودا وقللت عددها بشكل كبير. ومن بين جميع معاملات متبقيات النباتات اعطت المعدلات المختبرة من الاوراق الجافة المطحونة للخيار وقش الارز زيادة معنوية في طول ووزن المجموع الخضري الرطب والجاف للباذنجان مقارنة بالنباتات غير المعاملة . بينما كان لمتبقيات النباتات المجففة من اوراق الخيار والكرنب وقشر الرمان المستخدمة بمعدل ١٠ جم/ اصيص اثر معنوى فى خفض تعداد النيماتودا/٢٥٠جم تربة وعدد الاناث والعقد الجذرية وكتل البيض. كما اظهرت النتائج ان جميع معدلات الكمبوست الخليط والنباتي اعطت زيادة معنوية في طول ووزن المجموع الخضري وكان معدل ١٠جم لكل اصيص هو الافضل .كما اظهر الكمبوست المختلط بجميع معدلاته تاثيرا معنويا علي عدد النيماتودا في ٢٥٠ جم تربة – عدد العقد الجذرية وكتل البيض عن الكمبوست النباتي ولم تسجل فروق معنوية في نمو النبات او تكاثر النماتودا مقارنة بالاوكساميل . وتبين من نتائج تحليل NPK والكلوروفيل A و B في أوراق الباذنجان المعاملة بالكمبوست زيادة معنوية ($P < 0.05$) مقارنة بالنباتات غير المعاملة. يتضح من هذه الدراسة امكانية الاستفادة من متبقيات النباتات الجافة من اوراق الخيار و الكرنب وكذلك الكمبوست بنوعيه كبدائل بيئية آمنة لمكافحة *M. incognita* التي تصيب الباذنجان سواء فى الزراعات التقليدية والعضوية.