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Influence of Root-Dipping Tomato Roots within Water Extracts of Three Composite Grinded Seeds under the Infection of *Meloidogyne incognita*

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ABSTRACT

A trial test was set to assess the impact of root-dipping of tomato cv. Alisa plants separately for 15 or 30 minutes within aqueous grinded seeds extracts of three compositae seeds extracts i.e. chicory, artemesia and chrysanthemums below the anxiety of *M. incognita* disease in the greenhouse circumstances (29±2°C). Every one of the experienced materials mend the increments proportion enlarge values of plant vegetation metrics of tomato plants and decrease nematode gauges too. Evidently, tomato plants growth metrics were positively improved when the time of root dipping raised from 15 to 30 minutes. Plant getting artemesia ranked first with the maximum rates values that was between 68.57 and 82.85% or 28.12 and 46.87% or 55.6 and 77.8% for plant height, sum plant fresh and shoot dry weights for root dipping treatment for 15 and 30 minutes, that talented the highest percentage of reduction in final nematode population, number of galls and egg-masses, with values of 66.7, 68.0; 64.7, 61.7; 78.12 and 81.25%respectively. On the other hand, chicory grinded seeds extract recorded the slighter values for similar nematode metrics which were almost on par either at 15 or 30 minutes, these values were averaged 28.1, 42.3; 44.1, 55.8 ; 78.12, 81.25% for reduction percentage of total nematode numbers, galls and eggmasses numbers, in that order. It was plain that N,PandK concs, total chlorophyll; phenol contents were noticeably increased by infection of nematode. Every experienced components at 30 minutes of root-dipping in such tested aqueous grinded seeds extracts recorded better values of N,PandK, total phenol and chlorophyll contents than those results at 15 minutes of root dipping. The resulted values ranged between 4.5 to 33.0% or 5.5 to 58.9% or 6.9 to 31.4 or 6.05 to 14.21 or 0.55 to 5.53 for N,P and K concentrations and total chlorophyll and phenol contents of chicory at 15 min (lowest values) to artemesia at 30 (highest values) min of root-dipping within such aqueous tested extracts, respectively.

Keywords: compositae, control, Grounded, Oxamyl, *Meloidogyne incognita* ,seeds.

INTRODUCTION

Phytonematodes give rise to momentous injure and fatalities to different farming crops at different regions all over the world (Luc *et. al*., 2005). The root-knot nematodes, (*Meloidogyne* spp.) characterized by extensive spread as well as injurious farming pests within the world agricultural system that causing losses expected 100 billion loss Us $ per year worldwide (Oka *et al* ., 2000). The root-knote nematodes were broadly scattered in the developing regions of Egypt and causing outstanding harvest fatalities. Abiotic segment of soil including soil air circulation, dampness, temperature, surface and structure likewise influence nematode work (Wallace, 1973). Through the two earlier decades, nematode control depended by and large on the use of concoction nematicides. On the other hand, because of natural poisonous quality and high charge of these synthetic compounds, strengthening control procedures are of an immense target. The advancement in plant development and yield measurements after the expansion of natural issue because of the cleansing of such plants with nematode and/or to the nutritive estimation of plant parts which filled in as manures were expressed by various specialists (Siddiqui and Alam, 1988 a, b ; Almihanna *et al*., 1999 and El-Sherif *et al*., 2001and 2004). Additionally it is notable that natural issue lessen nematode number in two unique ways, legitimately by having nematicidal properties during its corruption or in a roundabout way by upgrading the advancement of nematode normal foes. Numerous Compositae plants have allelopathic possibilities and the sorts just as amount of contributory mixes differ contingent upon the plant species. The joining of allelopathic substances into agrarian administration may diminish the utilization of pesticides and decrease ecological decay (Chon and Nelson, 2010). The greater part individuals from the family Asteraceae are herbaceous, yet a critical sum are likewise bushes, vines, or trees. The family has an overall division, from the polar locales to the tropics, colonizing a wide assortment of environments. It is most normal in the bone-dry and semiarid districts of subtropical and brings down mild scopes. The Asteraceae may speak to as much as 10% of autochthonous vegetation in numerous areas of the world. The dynamic principle(s) for the nematicidal action of family Asteraceae plant items have not been found and no plant-inferred items are sold monetarily for control of nematodes (Gibbs, 1986). The vitality aggregate of Asteraceae is for the most part in the figure of inulin beautiful than starch as they produce iso/chlorogenic corrosive, sesquiterpene lactones, pentacyclic triterpene alcohols different alkaloids, acetylenes (cyclic, sweet-smelling, with vinyl end gatherings), tannins (Stevens, 2001). Be that as it may, coordinated nematode the executives by a few control strategies, for example, oil cakes, powder of various pieces of therapeutic plants and their plant extricates as abiotic factors with littlest use of nematicides is extremely fundamental in nematologists to offer viable control occasions adjoining the item nematode, remain the nematode abject at the sheltered level and staying away from environmental discharge. Along these lines, the targets of this work to check the impact of root-plunging tomato roots inside water concentrates of three composite crushed seeds for 15 or 30 minutes beneath the strain of *M. incognita* infection at the nursery setting.

MATERIALS AND METHODS

Source of Nematodes and inocula:

Meloidogyne incognita culture initiated by way of just one eggmass of previous recognized nematode females (Talyor *et al.*, 1955), remote as of galled infected roots of extremely impure tomatoes serene of Dakahlia governorate, then proliferate on roots of *Coleus blumei* plant then nematode inocula was primed according to the technique recorded by Hussey and Barker, (1973).

Plant grinded powders and aqueous extracts preparation:

Chicory, Artemesia and Chrysanthemums seeds be alone grinded by grinder and reserved in a close container pending to use. The doses of each were added according to

the design of the experiment. Standard aqueous seeds extracts of the chosen plants were prepared by grinding and dissolving five grams in 100 ml distilled water that were separately done using mortar and pestle. The resulted suspension was separately centrifuged at 5000 rpm for five minutes. Each supernatant was filtered through a layer of muslin cloth and this suspension for each standard water seed extract which used for dipping plant seedling roots (30 days old) separately in such aqueous leaf extract for 15 or 30 minutes according to the design of such experiment.

Data Analysis:

Data analysis of variance (ANOVA) was conducted according to (Gomez and Gomez, 1984) then Duncan's multiple ranges test (Duncan, 1955) to balance data means

Experiment Design:

Chicory, Artemesia and Chrysanthemums were independently utilized as seeds water extract on tomato grimy with *M. incognita* as root plunging application beneath greenhouse circumstance (29±2ºC).The came about suspension for every standard of each crushed water seeds concentrate was utilized for plunging tomato seeding roots cv. Alisa (35 days old) independently for 15 or 30 minutes before transplanting to 10-cm-d plastic pots containing 900 g . disinfected. steam soil (1:1). Multi week later, thirty-two out of thirty-six plastic pots with one tomato seeding each got 2000 adolescents of *M .incognita* per pot. Meanwhile, four seedlings, with nematode adolescents got oxamyl at the pace of 0.3 ml per pot (seedling) also other four seedlings (pots) with nematode just as another four seedling (pots) free of nematodes and any treatment were filled in as control. Every treatment was replayed multiple times and medications were as:

1- Chicory (15 minutes),
2- Chicory (30 minutes),
3- Artemesia (15 minutes),
4- Artemesia (30 minutes),
5- Chrysanthemum (15 minutes),
6- Chrysanthemum (30 minutes),
7- Oxamyl
8- N only,
9- Healthy plants.

Plants be flooded by water as needed, treated horiculturally the comparative and were set at 29±2ºC. All through the time of the preliminary, plants were segregated against parasites and creepy crawlies bothers. Tomato plants were up-rotted following 45 days of nematode immunization. Plant development measurements and nematode measurements were evaluated and recorded as recently referenced. Information were exposed to measurable examination and compound investigation was resolved as once referenced.

RESULTS AND DISCUSSION

Data summarized the efficacy of root-dipping of tomato cv. Alisa plants disjointedly for 15 or 30 minutes within aqueous grinded seeds extracts of three compositae seeds extracts i.e. chicory, artemesia and chrysanthemums beneath the pressure of *M. incognita* infection at the greenhouse conditions (29±2°C). Overall, the tested materials improved the increments fraction increase values of tomato growth metrics and reduce nematode criteria too (Tables 1 & 2) and (fig 1 & 2), in that order. Clearly, tomato plants growth parameters be certainly amplified as the time of root dipping of the experienced treatments enlarged as of 15 to 30 minutes. For occasion, plant receiving artemesia ranked first with the greatest increments values that averaged 68.57 and 82.85% or 28.12 and 46.87% or 55.6 and 77.8% for plant length, sum plant fresh weight and shoot dry weight, by root dipping treatment for 15 and 30 minutes, in that order, then that of chrysanthemums aqueous dried leave extracts for 15 or 30 minutes with values of 62.85 and 77.14% , or 31.25 and 53.12% or 55.6 and 77.8%, in that order. Conversely, chicory aqueous extracts treatments recorded the smallest amount values of plant length (37.14 and 71.43%) total plant fresh weight (28.12 and 43.75%) and shoot dry weight 55.6 or 61.1%) for 15 and 30 minutes of root dipping, respectively. Oxamyl give significant percentage increase values for plant length (77.14%) total plant fresh weight (71.87%) and shoot dry weight (66.7%), respectively. Moreover, plant free of nematode and untreated with any tested extracts showed reasonable percentage increase values of 11.43, 12.5 and 11.1% for plant length, total plant fresh weight and shoot dry weight, respectively.

Data summarize galls, egg-masses and females numbers of *M. incognita* on tomato roots under the stress of root-dipping within aqueous dried grinded seeds extracts of three compositae seeds i.e. chicory, artemesia and chrysanthemums separately for 15 or 30 minutes in comparison with oxamyl at full recommended dose in the greenhouse conditions 29±2°C (Table 2) Data indicated that all treatments either at 15 or 30 minutes obviously diminished nematode criteria with different degree (Table 2).

Table 1. Influence of root-dipping tomato roots within aqueous extracts of three compositae grinded seeds for 15 or 30 minutes under *Meloidogyne incognita* infection.

Treatment	Doses	*Plant growth response											
		Length (cm)		Total plant length (cm)	** Inc %	Fresh weight (g)		Total plant F.Wt (g)	** Inc %	No. Leaves	** Inc %	Shoot dry weight(g)	** Inc %
		shoot	root			shoot	root						
Chicory	15	28.0g	20.0e	48.0f	37.1	20.0c	21.0e	41.0e	28.12	35.0f	84.2	14.0c	55.6
	30	35.0d	25.0b	60.0b	71.4	24.0ab	22.0d	46.0c	43.75	40.0e	110.5	14.5bc	61.1
Artemesia	15	34.0e	25.0b	59.0c	68.5	21.0b	20.0f	41.0e	28.12	35.0f	84.2	14.0c	55.6
	30	38.0a	26.0a	64.0a	82.8	24.0ab	23.0c	47.0b	46.87	42.0d	121.0	16.0a	77.8
Chrysanthemums	15	33.0f	24.0c	57.0e	62.8	20.0c	22.0d	42.0d	31.25	51.0b	168.4	14.0c	55.6
	30	36.0c	26.0a	62a.0b	77.1	25.0a	24.0b	49.0ab	53.12	55.0a	185.4	16.0a	77.8
Oxamyl (Ox)		37.0b	25.0b	62a.0b	77.1	25.0a	30.0a	55.0a	71.87	45.0c	136.8	15.0b	66.7
N alone		17.0i	18.0f	35.0h	-----	13.0f	19.0g	32.0g	-----	19.0h	----	9.0f	0.0
Free		24.0h	15.0g	39.0a	11.4	14.0e	22.0d	36.0f	12.50	30.0g	57.8	10.0e	11.1
LSD		9.6	7.8	4.6	-----	3.4	2.6	5.21	-----	3.26	------	1.6	------

***Means in every column followed with the similar letter (s) are similar (P< 0.05) - Duncan multiple- range test.**

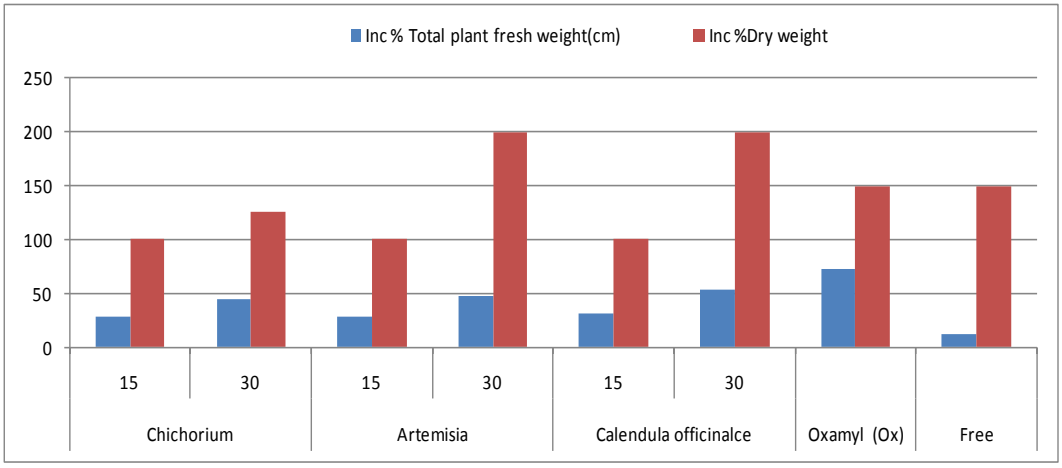

Fig. 1. Enhance percentage of total tomato fresh and shoot dry weights of contaminated by *M. incognita* as exaggerated by root-dipping within aqueous extracts of three composite grinded seeds for 15 or 30 minutes under in the greenhouse conditions (29±2◦C).

Table 2. *Meloidogyne incognita* metrics that attacking tomato plants prejudiced by root dipping inside aqueous extracts of three composite grinded seeds separately for 15 or 30 minutes.

Treatments	Doses	**Nematode population in Roots			Final population (pf)	Red %	RF	No. galls	Red %	RGI	No .of Egg-masses	Red	EI
		Soil (j_2)	Females	Dev. Stages									
Chicory	15	2500.0b	14.0b	13.0f	2527.0 b	28.1	1.01	19.0b	44.1	3.0	7.0c	78.1	2.0
	30	2000.0c	13.0c	14.0e	2027.0 c	42.3	1.26	15.0c	55.8	3.0	6.0d	81.2	2.0
Artemesias	15	1150.0f	10.0f	12.0g	1172.0h	66.7	0.59	14.0d	64.7	3.0	7.0c	78.1	2.0
	30	1000.0g	10.0f	115.0b	1125.0 g	68.0	0.56	13.0e	61.7	3.0	6.0d	81.2	2.0
Chrysanthemums	15	1800.0d	11.0e	16.0d	1827.0 d	48.0	0.91	14.0d	58.8	3.0	9.0b	71.8	2.0
	30	1310.0e	12.0d	18.0c	1340.0 e	61.9	0.67	13.0e	61.7	4.0	6.0d	81.2	2.0
oxamyl		110.0h	1.0g	1.0h	112.0 h	96.8	0.06	2.0f	94.1	1.0	0.0e	100.0	0.0
*N alone		3276.0a	40.0a	200.0a	3516.0 a	0.0	1.76	34.0a	-----	3.0	32.0a	-----	3.0
L.S.D $_{0.05}$		9.65	1.33	11.21	16.4			2.75	-----	------	1.98	-----	-----

***Means in every column followed with the similar letter (s) did not differ (P< 0.05) -Duncan multiple- range test**

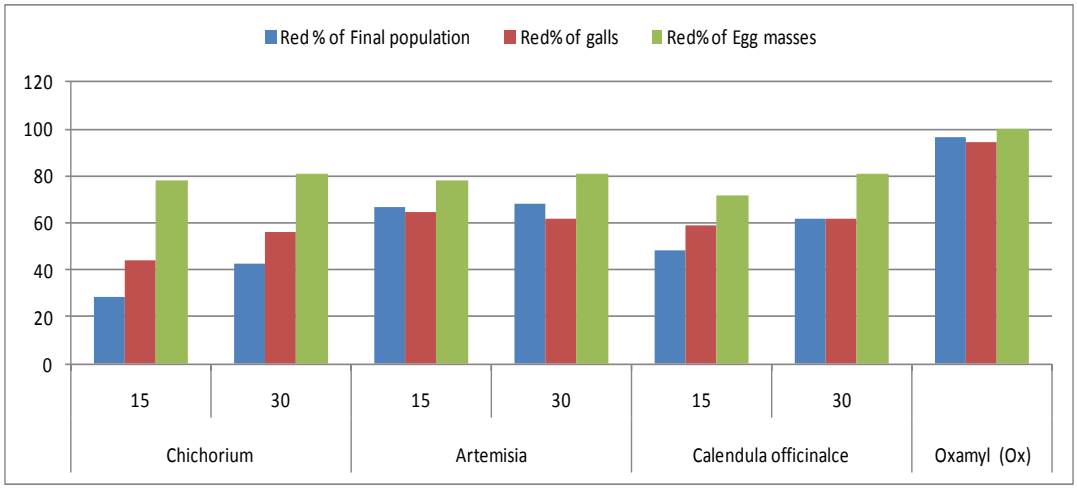

Fig. 2. Reduction percentage of nematode population, galls eggmasses numbers of *M. incognita* attacking tomato plants cv. Alisa influenced by root dipping within aqueous extracts of three composite grinded seeds separately for 15 or 30 minutes below greenhouse conditions (29±2C◦).

Amongst tested applications it was evident that plant treated by dried grinded seeds extract of artemesia root-dipping either at 15 or 30 minutes accomplished the highest percentage of reduction in final nematode population, number of galls and egg-masses, followed by chrysanthemums with values of 66.7, 68.0; 64.7, 61.7; 78.12, 81.25% and 48.0, 61.9; 58.8, 61.7; 71.87, 81.25%, respectively, whereas chicory ground extract showed the slighter values for the similar nematode metrics which were almost on par either at 15 or 30 minutes, these values were averaged 28.1, 42.3; 44.1, 55.8 ; 78.12, 81.25% for reduction percentage of final nematode population, number of galls and eggmasses, respectively. Also, nematode growth parameters (RF) were drastically diminished in all tested materials as such effects ranged between 0.56 to 1.26 vs 1.76 for artemesia grinded seed extracts as root-dipping at 30 min to chicory grinded seeds extract as root-dipping at 15 min, where the former had the lowest rate of nematode reproduction (0.56) and the latter had the highest one (1.26) vs nematode only (1.76), correspondingly.

However, oxamyl had the lowest rate of nematode reproduction values of 0.06 vs 1.76 for nematode alone, respectively (Table 2). Promising results were also noticed for three compositae seeds extracts i.e. chicory, artemesia and chrysanthemums applications with the indices of root galls as well as egg-masses number where the lowly indices for those two nematode metrics was achieved by those oxamyl with values one and zero vs 3&3 for nematode only in that order.(Table 2).

Data showed the effect of root-dipping of tomato seedlings within aqueous grinded seeds extracts of three compositae seeds extracts i.e. chicory, artemesia and chrysanthemums separately for 15 or 30 minutes on nitrogen, phosphorus and Potassium concs, sum chlorophyll as well as phenol contents below the stress of *M. incognita* at the greenhouse conditions (29±2°C) (Table, 3). It was apparent that N, P and K concs , sum chlorophyll and phenol contents were visibly greater than before by nematode infection only. Every one tested components at 30 minutes of root-dipping in such tested aqueous grinded seeds extracts recorded better values of N, P and K, total phenol and chlorophyll contents than those results at 15 minutes of root dipping. The resulted values ranged between 4.5 to 33.0% or 5.5 to 58.9% or 6.9 to 31.4 or 6.05 to 14.21 or 0.55 to 5.53 for N, P and K concentrations and total chlorophyll and phenol contents of chicory at 15 min (lowest values) to artemesia at 30 (highest values) min of root-dipping within such aqueous tested extracts, respectively, comparing to nematode alone.

Oxamyl recorded the considerable values of of N (148.2%), P (101.2%) and K (91.8%), chlorophyll content (4.95%) total phenol content (29.07), respectively. Moreover, plant receiving none of any tested treatment and free of nematode gave notable values of N (67.9%), P (58.9%) and K (35.8%), total chlorophyll (0.83%) and phenol contents (18.49) respectively.

Table 3. "Nitrogen, phosphorus and potassium concentrations in addition to contents of chlorophyll and phenol in tomato leaves infected with *M. incognita* as affected by aqueous extracts of three composite grinded seeds for 15 or 30 minutes as root - dipping under stress of *M. incognita* infection.

Treatments	Doses	* N Mg/g	Inc. %	* P Mg/g	Inc. %	* K Mg/g	Inc. %	* Chlorophyll content		Total chlorophyll Mg/g	Inc. %	Total phenol content	Inc. %
								a Mg/g	b Mg/g				
Chicory	15	1.17	4.50	0.172	5.5	1.70	6.9	0.581	0.402	0.983	6.05	420.3	0.55
	30	1.19	6.20	0.183	12.3	1.78	11.9	0.592	0.410	1.002	7.79	421.7	0.89
Artemesias	15	1.42	26.8	0.210	28.8	2.06	29.6	0.619	0.436	1.055	12.65	427.4	2.25
	30	1.49	33.0	0.259	58.9	2.09	31.4	0.627	0.445	1.072	14.21	441.1	5.53
Chrysanthemums	15	1.27	13.4	0.192	17.8	1.89	18.9	0.599	0.419	1.018	9.26	424.2	1.48
	30	1.35	20.5	0.201	23.3	1.97	23.9	0.608	0.427	1.035	10.82	425.8	1.87
Oxamyl		2.78	148.2	0.328	101.2	3.05	91.8	0.539	0.432	0.971	4.95	539.5	29.07
Nematode alone		1.12	0.0	0.163	0.0	1.59	0.0	0.505	0.412	0.917	0.00	418.0	0.00
Check		1.88	67.9	0.259	58.9	2.16	35.8	0.538	0.388	0.926	0.83	495.3	18.49

***Means in every column followed with the similar letter (s) did not differ (P< 0.05) -Duncan multiple- range test**

As for the impact of root-dipping of tomato cv. Alisa plants separately for 15 or 30 minutes within three of composite seeds extracts i.e. Chicory, Artemisia and chrysanthemums beneath the pressure of *M. incognita* disease, every one of the tested materials clearly approved tomato enlargement scale and decrease nematode metrics too. Artemisia applications ranked first as root-dipping at 15 or 30 minutes recorded first into civilizing growth metrics and in diminish nematode parameters, then by those of chrysanthemums seed extract. It was apparent that plant treated by seeds extract of Artemesia as root-dipping either at 15 or 30 minutes talented the maximum percentage of reduction in number of galls, females as well as egg-masses , then by chrysanthemums amid values of 66.7, 68.0; 64.7, 61.7; 78.12, 81.25% and 48.0, 61.9; 58.8, 61.7; 71.87, 81.25%, respectively. The present findings that occurred by Artemesia dried powder extract treatment by root-dipping tomato seedlings for 15 or 30 minutes time of exposure against *M. incognita* may owing to nematicidal activity of family composite plants products which have the photodynamic compound such as alpha-terthienyl iso/ chlorogenic acid, sesquiterpene lactones, pentacyclictriterpenealcohols,various alkaloids, acetylenes (cyclic, aromatic, with vinyl end groups), tannins Trifone *et al* (2014). Moreover, Chicory grinded seeds extract showed the lesser values for the same nematode criteria which were almost on par either at 15 or 30 minutes, these values be averaged 28.1, 42.3; 44.1, 55.8 ; 78.12, 81.25% for galls, females and egg-masses numbers in that order. These observations agreed with the findings reported by Huber (1980) who as well stated that root gall index damage on lima bean decreased with augmented amount of ammonium supplied toward the plant. All tested components at 30 minutes of root-dipping in such tested aqueous grinded seeds extracts achieved better values of N;P and K sum phenol; chlorophyll contents than those results at 15 minutes of root dipping. The resulted values ranged between 4.5 to 33.0% or 5.5 to 58.9% or 6.9 to 29.6 or 6.05 to 14.21 or 0.55 to 5.53 for N&P and K concs as well as sum chlorophyll and phenol contents of chicory at 15 min (lowest values) to artemesia at 30 (highest values) min of root-dipping within such aqueous tested extracts, in that order, this might serve as defense compounds adjacent to plant pathogens (Kosuge, 1969).

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تقييم كفاءة ثلاثة مستخلصات نباتية لبذور ثلاث نباتات من العائلة الزنبقية علي نيماتودا *Meloidogyne incognita* التي تصيب نبات الطماطم كمعاملة غمس للجذور تحت ظروف الصوبة الزراعية

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تم إجراء تجربة لتقييم تأثير غمس جذور شتلات الطماطم صنف اليزا لمدة 15 و 30 دقيقة المصاب بنيماتودا تعقد الجذور في المستخلص المائي لثلاثة من مطحون مسحوق البذور نباتات التابعة للعائلة الزنبقية هي الشيكوريا والشيح والأقحوان بالمقارنة بالمبيد النيماتودي الاوكساميل تحت ظروف الصوبة الزراعية (29± 2م°) وقد أوضحت النتائج مايلي :بصفة عامة حسنت جميع المعاملات المختبرة المقاييس النباتية المختبرة مع خفض واضح في تعداد النيماتودا. كان من الواضح زيادة المقاييس النباتية لنبات الطماطم بشكل إيجابي مع زيادة وقت غمس الجذور من 15 إلى 30 دقيقة. واحتلت المعاملة بغمس جذور نباتات الطماطم بمستخلص مسحوق بذور الشيح المرتبة الأولى في تحسن المقاييس النباتية المختبرة بقيم 68.57 و 82.85٪ أو 28.12 و 46.87٪ أو 55.6 و 77.8٪ لكلا من الطول النباتي ومجموع الوزن الرطب والوزن الجاف ، وذلك لمدة 15 و 30 دقيقة علي التوالي. كما احتلت نفس المعاملة المركز الأولي في تحقيق اعلي النسب في خفض المقاييس النيماتودية المختبرة بقيم 66.7، 68.0؛ 64.7، 61.7؛ 78.12 و 81.25٪ لكلا من مجموع التعداد وكذلك عدد العقد وأكياس البيض لمدة 15 و 30 دقيقة على التوالي. من ناحية أخرى، أظهرت المعاملة بمستخلص بذور نبات الشيكوريا إما لمدة 15 أو 30 دقيقة اقل القيم في خفض المقاييس النيماتودية المختبرة بنسب 28.1، 42.3؛ 44.1، 55.8؛ 78.12، 81.25٪ لنفس المقاييس النيماتودية السابقة الذكر علي التوالي.كان من الواضح أن تركيزات النتروجين والفسفور والبوتاسيم وكذا المحتوي الكلوروفيل والفينول الكلي زادت بشكل واضح عن المعاملة بالنيماتودا وحدها. سجلت المعاملات بغمس الجذور لمدة 30 دقيقة من الجذر عن المعاملات لمدة 15 دقيقة حيث تراوحت القيم بين 4.5 إلى 33.0٪ أو 5.5 إلى 58.9٪ أو 6.9 إلى 31.4 أو 6.05 إلى 14.21 أو 0.55 إلى 5.53 نتروجين والفسفور والبوتاسيم وكذا المحتوي الكلوروفيل والفينول الكلي لمدة 15 دقيقة من الغمس في مستخلص بذور الشيكوريا (أدنى القيم) و لمدة 30 دقيقة من الغمس في مستخلص بذور الشيح (أعلى القيم) على التوالي.