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Effect of Tea and Powder Compost on Control of Root Rot Disease Severity, Enzyme Activity, Seeds Chemical Components and Yield of Soybean under Greenhouse and Field Conditions.

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ABSTRACT

This study aimied to study the effect of tea and powder compost on controlling root rot disease of soybean. The obtained results from the effect of compost powder and compost tea at different levels on damping off%, fresh and dry weight of shoot and root (g), length of soybean plants (cm), and enzymatic activity under greenhouse (artificial inoculation) and field (natural infection) conditions indicated that :under greenhouse condition, using of compost powder at level of 10 g/pot and using of compost tea at level of 100% (v/v) were the most effective on decreasing damping off as well as increasing seed germination %, increasing of fresh and dry weight of shoot and root, increasing of plant length (cm) and increasing of polyphenl oxidase and peroxidase activity. While, using of compost powder at level of 8 g and 6 g/pot or using of compost tea at level of 50% and 25% (v:v) gave least effect on tested characters which mentioned above. On the other hand, and under field condition, the obtained results cleared that, the compost powder at high level (12 tons/feddan) and the compost tea at 100% (v:v) concentration obtained the highest effect on decreasing pre and post emergence damping off% as well as germination percentage , decreasing disease severity, and gave also the highest effect on increasing yield per plot (kg), weight of 100 seeds, polyphenol oxidase and peeroxidase activity, protein and oil content %, followed by the compost powder at level of 10 ton/feddan and compost tea at level of 50% (v:v), comparing with control treatment.

Keywords: Compost , *Fusarium oxysporum* and *Rhizoctonia solan i*

INTRODUCTION

In recent years, an environmentally friendly and sustainable alternative to protect plant against plant pathogens is biological control using an aqueous compost extracts (Haggag and Saber, 2007 and Bayoumi and Elkot, 2010).El-Masry *et al*. (2002) determined the effect of various compost (leaf fruit,garden and crops compost and their water extract on *Pythium debaryanum, Fusarium oxysporum f.sp. lycopersic, Sclerotium bataticola*.some In vitro tests showed that, suppressive of the hyphal growth of *S. bataticola* by using ferst compost,while *F. oxysporum f.sp. lycopersici* was suppressed by using either composts. Abbasi *et al*. (2002) fond that bacterial spot on tomato caused by *Xanthomonas campetis* pv. *ormoraciae* were suppressed by using compost in the field. Scheurell and Mahaffee (2002) indicated that plant disease can be suppressed by treating plant surfaces with a some of compost liquid (compost tea).Pharand *et al*. (2002) found that addition of *Pythium oligandrum* peat moss amended with compost reduced root rot disease incidence caused by *F. oxysporum, F. sporadicis – lycopersici* compared with control grown in peat moss alone. They also found that the tested compost induction of systemic induced resistance and play role in the biological control of soil borne diseases.Pascual *et al*. (2002) found that addition of waste compost and its water-soluble and humic fraction to soil have effect on suppressing *Pythium ultimum* on pea plants and significantly reducing the number of root lesions and *Pythium* population.Hoitink *et al*. (2003) found that compost extract suppressed root rots and provided excellent growth of ornamental plants.

Steinberg *et al*. (2004) evaluated the ability of spent mushroom composted cattle manure to improve soil suppressiveness both to Fusarium wilt (*Fusarium oxysporum*) and to *Rhizoctonia solani* disease in two soils in relation to alterations of the indigernous microbial communities. The intensity of the bacterial activities was mainly associated to the soil supperssiveness to *Fusarium* wilt but had not interaction with soil suppressiveness to *R. solani* disease (in flax and pine, *Pinus Nigeria*). The changes in the composition of the fungal communities could be associated to emerging specific population able to antagonize *R. solani* and/or *F. oxysporum.* Because organic amendments could enhanced soil suppressiveness to disease, they appeared as a potential management practice to control *Fusarium* wilt and *R. solani* damping-of.Sylvia (2004) found that compost extracts applied to soil or sprayed on plants enhance plant growth compared to control. This enhancement plant growth either indirectly by reducing the disease severity or directly by excreting plant regulating hormones.El-Farnawany and Amer (2006) tested different types of agriculture and animal manure composts for their efficiency to suppress *R. solanii* cotton damping-off incidence. The greenhouse studies showed that, horse manure compost was the most effective one in reducing the disease incidence followed by sheep manure compost, whereas both of wheat straw and mushroom compost showed the least control values (infections % 21.44, 27.33, 29.63 and 40.1%, respectively). Studstill *et al*. (2006) reported that, preparation of peat moss needs to organic additives to be suitable for seedlings. The local production of such materials particular, if they were efficient and dependent essentially on the natural and local resources, does not only save some of the national income but also to reduce the environmental pollutions.Abd El-Rahman and Hosny (2001) indicated that application of chicken and cattle manures significantly increased vegetative growth of egg plant compared with the chemical fertilization. Abbasi *et al*. (2002) indicated that, marketable yield increased by 33% incase of using compost-amended organic plots. Plots amended with a high compost rate had more ripe fruits than the unamended control. Abou-Hussein *et al*. (2002)

conducted field experiments on seed potato tuber cv. Nicola to determine the effects of chicken manure, compost and biofertilizers on vegetative growth, tuber characteristics and yield-chicken manure and compost + biofertilizers increased plant height, total yield and fresh and dry weight of the leaves and stems. An increase in the rate of compost from 70 to 60 m^3/fed. increased plant height, number of leaves and stems, and fresh and dry weight of leaves and stems. Soil application of compost increase the average tuber weight and size. Elfarnawany and Amer (2006) indicated that, inhibition response of *R .solanii* liner growth *in vitro* with tea composts (30.70% growth reduction). The horse manure compost tea was proved to be most effective one in suppressing growth of *R. solani* followed by sheep manure compost tea.Van der Gaag *et al*. (2007) tested the suppressive effect of some composts against *F. oxysporum, f. s. cyclamini* and *F. foetens*. They found that none of the composts had a significant effect on Fusarium wilt in cyclamen. While the other composts significantly induced suppressiveness against Fusarium wilt in Begonnia.Bayoumi *et al*. (2008) showed that problems included damping of pathogens, too late production on the seedlings as well as the most expensive cost required to import peat moss as a major media needed for seedlings production. The relative cost of 100 seedling trays filled with imported peat moss was 71.74, while the parallel price was 15.65 for 100 seedlings trays filled with rice straw compost.Ahlam *et al*. (2009) indicated that sowing seeds in rice straw compost were induced to earlier emergence, and percentages of the emergence were clearly enhanced and reached to 95 and 96% due to us ing this compost.Abo-Elyosr *et al*. (2014) study the efficacy of *Trichoderma harzianum* and two types of compost, plant compost and animal compost to control the soybean root rot disease caused by *R .solani*,and they indicated that, tested *Trichoderma* spp. were the most effective on the pathogen growth. The presented study was aimed to investigate the effect of tea and powder compost on controlling root rot disease and inhancing growth and yield of soybean plands under greenhouse and field conditions.

MATERIALS AND METHODS

The present work was carried out at the Experimental Farm of Sakha Agricultural Research Station, greenhouse and Plant Disease Research Laboratory of Sakha Agricultural Research Station, during the period 2010-2014. Seeds of soybean genotypes were obtained from department of Legume Research at Sakha Agric. Res. Station, Agric. Res. Center, Giza ,Egypt.

Isolation and identification of fungal pathogens :

Samples of infected soybean rotted roots were randomly collected from different fields cultivated with different soybean cultivars during 2010 growing season. Infected soybean roots were taken and cut to small pieces, sterilized in 1% sodium hypochlorite for 3 minutes, washed several times in distilled sterilized water, blotted between two sterilized filter paper and plated in Petri plates containing 10 ml of potato dextrose agar (PDA). Plates were incubated at 27^{o}C for 4-7 days, microscopically examined and purified using the hyphal tip technique. Pure cultures of each isolate were maintained on PDA slants at 4^{o}C preserved for further experiments. Obtained fungi were estimated in each location and cultivar according to their frequency of developing on isolation plates according to AOAC (1990).Isolated fungi were identified in department of fungal taxonomy. Institute of Plant Pathology, ARC, Giza, Egypt.

Soil infestation

Pots (30 cm in diameter) were filled with sterilized sandy clay soil (1:1 w/w), by 5% formalin solution, and covered with plastic polyethylene and kept for about 7 days before sowing. Fungal inocula were grown on sterilized barley grains and sand medium (30 g barley grains + 10 g sand + 30 ml water) and incubated at 25$\pm$2^{o}C for two weeks. Soil infestation was carried out using the inoculum was mixed thoroughly with the soil in each pot with about 5 g of inoculum per each pot (each pot contain 5 kg soil) (Abd El-Rahman, 2001), then watered and left for one week to secure establishment of the inoculated fungi. Control pots were filled with the same soil mixed with the same amount of sterilized barley grains-sand medium without inoculation (non-infested soil).A set of four pots, with 10 seeds per pots, was used for each tested fungus. Soybean cultivar seeds (Crawford) were surface sterilized using 1% sodium hypochlorite solution for 2 minutes, washed with sterilized water, dried and sown at a depth of about 2 cm and watered regularly every 3 days under greenhouse conditions. Pre and post emergence damping of was estimated after 10 and 20 days from sowing, respectively. Disease severity was estimated after 21 days from sowing according to the scale from 0 to 4 which reported by Dorrance *et al*. (2003). Finally, length of seedlings (cm), fresh and dry weights of shoot and root (g) were estimated after 30 days from sowing.

Disease assessment: were estimated according to Haggag and Saber (2001) as follows:

%pre-emergence damping off =

$$\frac{\text{No. of non - emerged seeds}}{\text{No. of sown seeds}} x100$$

% post-emergence damping off =

$$\frac{\text{No. of killed seedlings}}{\text{No. of emerged seedlings}} x100$$

Length of plants and fresh and dry weights of shoot and root were estimated for all seedlings on 30 days from sowing. After 21 days from sowing determination of the root rot disease severity (DSI) was carried out based on a scale from 0 (no visible damage) to 4 (completely destroyed roots) according to Dorrance *et al*. (2003) as follows:

0 = No root rot

1=1 to 33% of roots with visible lesions or root rot

2=Approximately 34 to 50% of the roots rote or damaged

3=51 to 80% of the roots rote

4=Completely destroyed roots and pre-emergence damping-off

$$DI\% = \frac{\sum(1A + 2B + 3C + 4D)}{4T} x100$$

where,A,B C and D are the number of plants corresponding to the numerical grade, 1,2,3 and 4 respectively and 4T is the total number of plants (T) multiplited by the maximum discoloration grade 4, where T=A+B+C+D.

Some chemical composition analysis:

Grain protein content:

The micro-kjeldahl method was used to determine the total nitrogen in seed and multiplied by 6.25 to obtain the percentage to crude according to AOAC (1990).

Oil content:

Soybean seeds of susceptible soybean cultivars (Crawford) were sun dried and milled twice. The obtained powdered samples were soaked in petroleum ether for 48 hrs with an occasional shaking. The crude extracts were collected by decantation. The meal was soaked once more with the same solvent for another 24 hrs. The combined extracts were filtered over a sufficient amount of anhydrous sodium sulphate (25 g/100 m) and solvent was removed by distillation under vacuum (Abdel Rahman, 2001). The resulting oils were kept in dark bottles in the refrigerator ready for analytical purpose. The chemical analysis of oil samples was brought by Seed Technology laboratory, Seed Technology Department, Sakha Agriculture Research Station.

Plant induced resistance:

Treated soybean plants were sampled and tested for the activity of peroxidase and polyphenol oxidase as indicators of induced resistance.Peroxidase (Pox) and polyphenol oxidas (ppo) activity was estimated according to Abd EL-Rahman (2001).

Preparation of compost powder:

Rice straw was chopped and collected in heap form. The chopped rice straw was incorporated with farmyard manure, bentonite, rock phosphate, urea and elemental sulfur at rates of 10, 15, 10, 2.5 and 1% respectively. Compost heaps constructed at dimensions 2 x 3 x 1.5 m for width, length and height, respectively by stowing the rice straw in successive layers. Each layer was supplemented with equal portion from the different amendments and received suitable water.

Turning process was done every 30 days with keeping the moisture within the range of 40-60% along the composting process. After the first turning, fungal inoculant of *T. viridi* was spread on the compost heap to accelerate the decomposition rate. After elapsing the composting process (three months), heaps were collapsed and moistened to the suitable range at maturity stage, heaps which inoculated with *T. viridi* were also inoculated with the rhizobacteria and actinomycetes (Badwi, 2003). After maturation, main chemical and microbial characteristics of the powder compost wer estimated in Table (1).

8.Preparation of compost tea:

Compost powder and tap water were mixed in the ratio of 1:1 (w:v) in plastic container with covers for about 48 hr. The mixture was filtered through double layers of nylon, the resulted extracts were named compost tea.

Table(1):Chemical and biological analysis of compost materials

Character	Value
Acidity (pH)	7.28
(Electrical conductivity)(EC.) (dS m^{-1} at	4.63
25^oC)	21.35
Organic nitrogen (%)	1.52
Total nitrogen (%)	14.05
C/N ratio	0.84
Total phosphorus (%)	1.01
Total potassium (%)	4.86
NO_3/NH_4	92.4
Cross seed germination test (%)*	22.00
Calcium (mg L^{-1})	105.00
Manganese (mg L^{-1})	4-90
Magnesium (mg L^{-1})	44-90
Zinc (mg L^{-1})	12.70
Copper (mg L^{-1})	8.7×10^7
Total count of bacteria (cfu/ml)	1.3×10^6
Total count of fungi (cfu/ml)	1.2×10^6
Total count of actinomycetes (spor/mil)	

*** Cross germination test was carried out using *Eruca sativum* seeds after 72 h**

Effect of tea and powder compost on control of root rot diseases under greenhouse condition:

Pots (30 cm in diameter) were filled with infested soil by mixture of the tested pathogens (*F. oxysporum* and *R. solani*) by adding 5 g of mixture inoculum in each pot (each pot contain 5 kg soil). The powder compost was added at rate of 6, 8 and 10 gram per pot, the tea compost was added at rate of 100, 50 and 25 ml in 100 ml water (v/v). The fungicide Rizolex T50% WP at 3 g/kg seeds were used as the check treatment, the control treatment was left without any inoculation by tested pathogen. All pots which used in this experiment were sown by 10 seeds/pot, each treatment was repeated in four replicates (pots), and watered in the suitable time. The disease was estimated as pre and post emergence damping off after 10 and 20 days from sowing, respectively. Random samples (three plants) from each treatment were collected after 15 days from sowing to determination of enzymes activity (peroxidase “POX” and Polyphenol oxidase “PPO”)

Effect of tea and powder compost on control of root rot diseases under field conditions:

This experiment was carried out in Sakha Agricultural Research Farm during 2013 and 2014 growing seasons, and designed as split plot in three replicates. The main plots included two types of compost (compost powder and compost tea), the subplots included three levels of each compost as follows: three levels of compost powder 12, 10 and 8 ton per feddan which equal 6.8, 8.5 and 10.8 kg per plot, and three levels of compost tea 1 liter compost/1 liter water 500 ml compost/1 liter water and 250 ml compost/1 liter water (v:v) per each plot. The compost powder was applied during soil tillage and before sowing, while the compost tea was applied as spraying of soil after sowing and before irrigation. The each experiment plot contained 2 rows, 3 meters long and 60 cm distance. Each row contained 16 hills, each hill was planted by three seeds (the plot size 3.6 m^2, and contain of 100 plants). All agricultural practices were applied as recommended and in suitable time. The fungicide Rizolex T50 % WP at 3 g/kg seeds was used as the check treatment, the control was left without any treatments. This experiment was planted by seeds of susceptible soybean cultivar Crawford. The disease was assayed as pre and post emergenc damping-off after 10-20 days from sowing, respectively. Random samples (three plants) from each treatment were collected after 21 days from sowing to determination of enzymes activity (Peroxidase "POX" and polyphenol oxidase "PPO") at harvest time a random of seed samples (100 seeds) from each treatment were taken in both seasons to determine the percentages of crude protein contents according to AOAC (1990) and determine the percentage of oil contents according to Abdel-Rahman (2001).at harvest, the yield was estimated as kg per plot

RESULTS

Effect of tea and powder compost on control of root rot disease 2013 under greenhouse condition.

Data presented in Table (2) and Fig. (1, 2 & 3) indicated that, during 2013 growing season, the highest level of powder compost (10 g/pot) was the most effective in decreasing the pre and post emergence damping off ratios to be (9.28 and 7.35%, respectively) and disease severity (23-72) and also has the highest effect in improving seedling growth characters, it increasesd shoot and root fresh weight (95.50 and 74.61 g, respectively), shoot and root dry weight (57.66 and 33.65 g, respectively), length of plants (24.91 cm) and it also increase polyphenol oxidase and peroxidase activity (0.073 and 0.696, respectively). In the reverse, the lowest level of powder compost (6 g/pot) had the least effect on decreasing pre and post emergence damping off (17.10 and 15.36%, respectively), disease severity (41.91), shoot and root fresh weight (81.90 and 56.95 g, respectively), shoot and root dry weight (36.03 and 23.28 g, respectively), and polyphenol oxidase and peroxidase activity (0.060 and 0.503, respectively). As regard to compost tea at tested three levels, the presented results in Table (2) showed that, the highest effects of compost tea on reduction of pre and post emergence damping off and disease severity and improving seedlings characters were obtained at the highest compost tea level (compost tea 100%) and the reverse was true with using the lowest level (25%). Regarding during 2014 growing season, data in Table (2) showed the same trend of 2013growing season.

Table (2):Effect of tea and powder compost on control of root rot disease of susceptible soybean cultivar (Crawford) during 2013 and 2014 growing seasons.

Treat.	Disease incidence				Seedling growth					Enzyme activity	
	Pre	Post	Survival %	Disease severity	Fresh weight (g) Shoot	Fresh weight (g) Root	Dry weight (g) Shoot	Dry weight (g) Root	Length (cm)	Poly phenol	Peroxides
					Season 2013						
Compost-1	9.28 g	7.35 f	80.06 b	23.72 d	95.50 b	74.61 b	57.66 b	33.65 b	24.91 b	0.073 b	0.696 b
Compost-2	13.21 f	13.08 d	70.03 d	46.58 c	87.33 c	66.44 c	41.47 c	25.70	21.50 d	0.060 d	0.583 c
Compost-3	17.10 d	15.36 c	65.72 e	41.91 c	81.90 cd	56.95 d	36.03 cd	23.28 de	17.35 f	0.060 d	0.503 c
Compost 100%	15.10 e	11.05 e	72.87 c	23.77 d	79.29 d	73.06 bc	40.41 c	29.79 c	23.45 c	0.077 b	0.676 b
Compost 50%	18.98 c	14.05 d	64.17 f	42.51 c	71.30 e	66.46 c	29.99 de	21.46 e	20.16 e	0.066 c	0.537 d
Compost 25%	22.27 b	17.51 b	59.81 g	66.99 b	68.46 df	56.03 d	26.75 ef	21.98	14.96 g	0.055 e	0.476 e
Rizolex	3.54 h	2.52 g	91.09 a	0.00 e	110.70 a	85.84 a	64.85 a	44.95 a	29.55 a	0.083 a	0.843 a
Control	25.17 a	18.96 a	50.02 h	80.00 a	61.29 f	48.73	20.95 f	17.02 f	9.98 h	0.033 f	0.406 f
L.S.D.	0.67	1.14	1.42	7.67	7.41	6.84	6.50	2.70	1.31	0.002	0.038
					Season 2014						
Compost-1	7.36 e	7.06 d	80.17 b	33.76 c	99.17 b	76.91 b	56.50 b	39.13 b	23.87 h	0.066 b	0.646 b
Compost-2	11.09 d	10.08 c	75.94 c	59.27 b	88.33 c	70.71 c	40.38 c	34.96 c	18.17 c	0.060 c	0.581 c
Compost-3	15.25 c	12.17 bc	70.24 d	61.18 b	80.24 d	63.20 d	34.36 d	30.39 d	16.61 cd	0.053 d	0.516 de
Compost 100%	11.87 d	7.07 d	77.31 c	36.21 c	88.29 c	71.69 c	45.10 c	32.64 cd	21.65 b	0.066 c	0.556 cd
Compost 50%	14.13 c	14.38 b	69.95 d	56.54 b	69.63 e	50.25 e	32.54 de	25.39 e	16.69 cd	0.053 d	0.484 e
Compost 25%	16.98 b	13.64 b	67.04 e	64.53 b	63.80 ef	44.61 f	29.87 de	23.00 e	15.81 d	0.046 e	0.426 f
Rizolex	3.32 f	3.17 e	93.36 a	0.00 d	111.36 a	90.31 a	63.91 a	49.94 a	77.28 a	0.073 a	0.723 a
Control	20.61 a	17.87 a	70.73 f	79.98 a	58.62 f	45.55 ef	27.73 e	19.28 f	10.32 e	0.043 f	0.363 g
L.S.D.	1.682	2.25	1.40	9.15	6.34	4.92	3.55	2.58	2.25	0.004	0.057

Compost 1 = 10- g/pot, Compost 2 = 8 g/pot, Compost 3 = 6 g/pot

Effect of tea and powder compost on control of root rot diseases of susceptible soybean cultivar (Crawford) under field condition during 2013 and 2014 growing seasons:

Regarding to 2013 growing season, data presented in Table (3) and Fig. (4, 5 and 6) indicted that the compost powder at high level (12 tons/feddan) was the most effective on decreasing of pre, post emergence damping off and disease severity (9.80, 8.73 and 57.36, respectively), increasing yield per plot, weight of 100 seeds, polyphenol oxidase activity, peroxidase activity, protein content (%) and oil content (2.432 kg, 74.43 g, 0.083, 0.653, 30.84% and 28.55%, respectively) comparing with control treatment. The compost powder at moderate level (10 tons per feddan) had intermediate effect on the tested characters, while the compost powder at the lowest level (8 tons/feddan) obtained the lowest effect on decreasing pre, post emergence damping off (15.85%, 13.62% and 71.73%, respectively), and the lowest effect on increasing of yield per plot, weight of 100 seeds, polyphenol oxidase activity, peroxidase activity, protein content % and oil content % (1.89 kg, 57.17 g, 0.066, 0.495, 29.29% and 26.99%, respectively) comparing with control treatment. As regard to treatment by compost tea during 2014 growing season, data presented in Table (3) showed that, the compost tea at 100% concentration obtained the highest effect on decreasing pre, post emergence damping off and disease severity (12.09%, 9.65% and 41.88%, respectively) and highest effect on increasing of yield per plot, weight of 100 seeds, polyphenol oxidase activity, peroxidase activity, protein content % and oil content ratio (2.33 kg, 74.21 g, 0.066, 0.583, 30.51% and 28.54%, respectively), followed by the compost tea at intermediate level (50%).

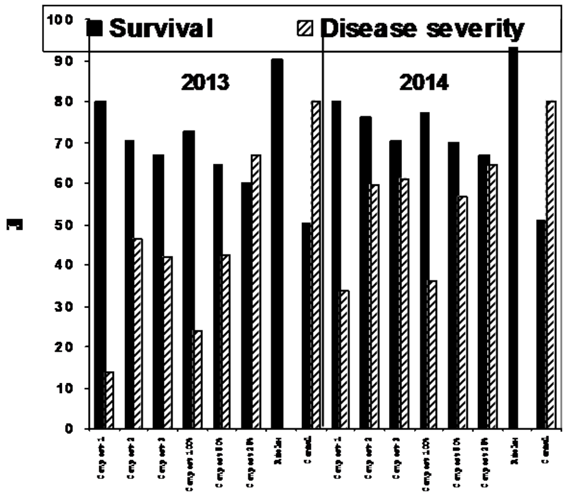

Fig. (1): Effect of tea and powder compost on disease severity % and survival % during 2013 and 2014 seasons.

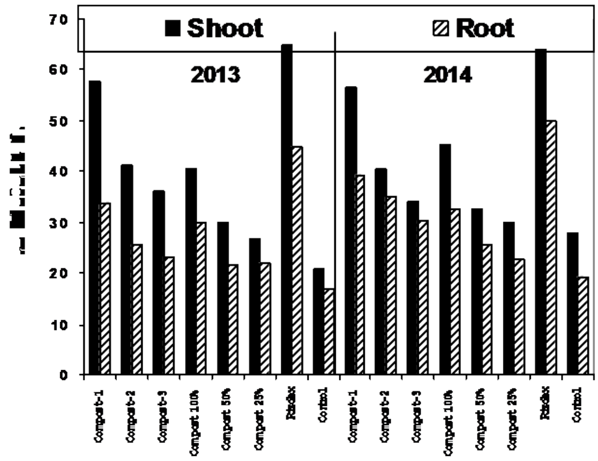

Fig. (2):Effect of tea and powder compost on shoot and root dry weight during 2013 and 2014 seasons.

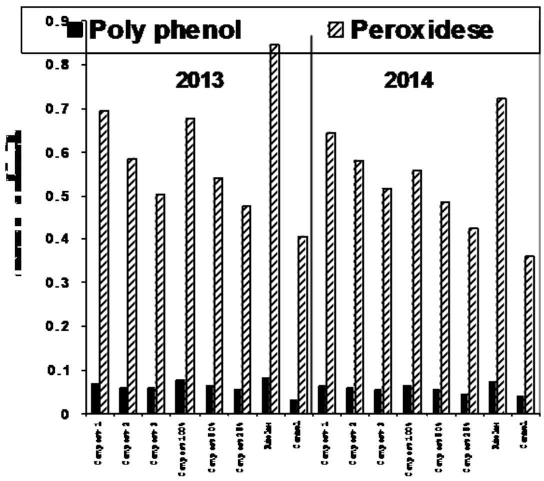

Fig. (3):Effect of tea and powder compost on poly phenol and peroxidese activity during 2013 and 2014 seasons.

Table (3):Effect of tea and powder compost on control of damping off%, disease severity %, yield/plot, weight of 100 seeds (g), enzymes activity, protein and oil content % on susceptible cultivar (Crawford) under field condition during 2013 and 2014 growing season.

Treatment	Disease incidence			Disease severity	Yield		Enzyme activity		Chemical components	
	Pre	Post	Survival		Yield/plot (kg)	100 seeds weight (g)	Poly phenol	Peroxidase	Protein content %	Oil content %
Season 2013										
Compost 1	9.80 f	8.73 d	78.39 b	57.36 cd	2.43 b	74.43 b	0.083 ab	0.653 ab	30.84 a	28.55 ab
Compost 2	12.70 de	11.36 c	71.29 d	53.03 d	2.06 d	61.84 cd	0.076 bc	0.513 cd	30.54 b	27.99 b
Compost 3	15.85 c	13.62 b	69.17 de	71.73 b	1.89 e	57.17 cd	0.066 de	0.495 cd	29.29 c	26.99 cd
Compost 100%	12.09 e	9.66 d	74.69 c	41.88 e	2.33 bc	74.21 b	0.066 cd	0.583 bc	30.51 b	28.54 ab
Compost 50%	13.95 d	11.58 c	69.66 d	55.54 cd	2.20 cd	65.21 bc	0.056 ef	0.543 cd	30.06 bc	27.81 bc
Compost 25%	18.69 b	14.10 b	66.69 e	60.70 c	2.20 cd	49.87 de	0.050 f	0.510 cd	29.21 c	26.91 cd
Rizolex	4.02 g	3.50 e	86.43 a	33.77 f	2.70 a	88.57 a	0.096 a	0.693 a	31.76 a	28.95 a
Control	26.80 a	18.32 a	51.65 f	81.91 a	1.77 e	42.51 e	0.035 g	0.693 a	27.95 d	26.66 d
L.S.D.	1.7	1.19	2.48	7.66	153.55	12.01	12.01	0.11	0.946	0.94
Season 2014										
Compost 1	7.243 e	7.543 d	79.210 b	34.90 cd	2.30 ab	85.28 ab	0.077 ab	0.733 ab	30.92 a	27.87 b
Compost 2	9.810 d	9.106 c	76.276 c	45.53 bc	2.00 cde	78.54 ab	0.063 bcd	0.546 de	29.22 bc	26.81 cd
Compost 3	11.693 c	11.316 b	70.290 e	71.20 a	1.796 ef	63.24 bcd	0.056 bcd	0.513 ef	28.77 bc	26.33 de
Compost 100%	8.316 e	9.283 c	76.550 c	33.58 cd	2.166 abc	92.57 ab	0.073abc	0.666 bc	30.55 a	27.59 bc
Compost 50%	11.250 c	11.916 b	73.313 d	33.47 cd	2.100 bcd	74.21 abc	0.046 cd	0.607 cd	29.48 b	26.62 cde
Compost 25%	13.840 b	12.286 b	67.286 f	52.43 b	1.900 def	48.64 cd	0.048 cd	0.556 de	29.33 b	26.77 cd
Rizolex	4.576 f	4.356 e	88.100 a	26.98 d	2.366 a	96.25 a	0.099 a	0.793 a	31.33 a	29.55 a
Control	24.470 a	16.870 a	51.870 g	82.91 ---	1.700 f	41.88 d	0.036 d	0.456 f	28.29 c	25.62 e
L.S.D.	1.27	1.50	1.82	12.10	218.29	26.20	0.02	1.00	1.06	1.05

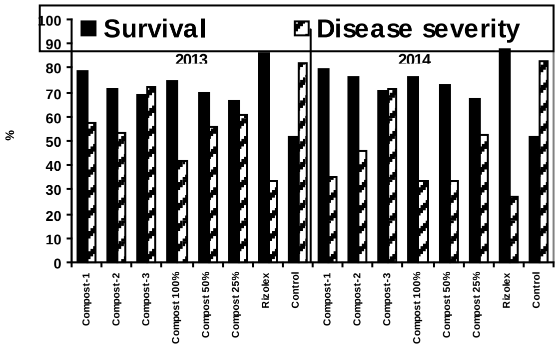

Fig. (4):Effect of tea and powder compost on survival and disease severity (%) during 2013 and 2014 seasons.

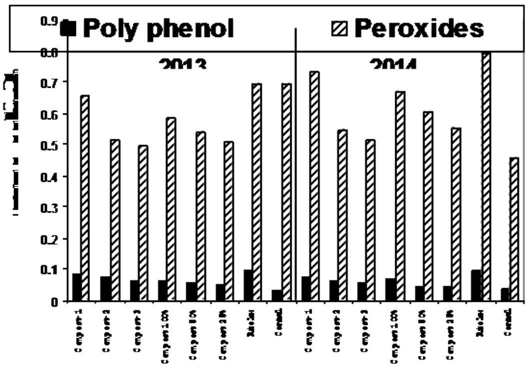

Fig. (5):Effect of tea and powder compost on enzyme activity during 2013 and 2014 seasons.

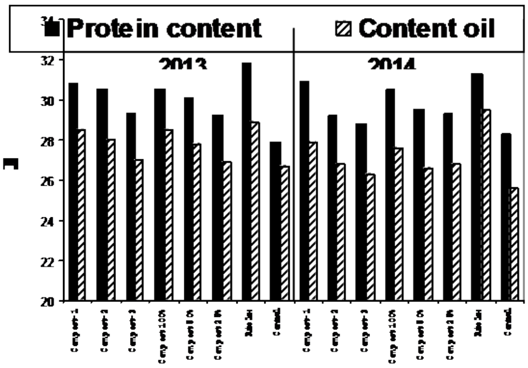

Fig. (6):Effect of tea and powder compost on chemical components during 2013 and 2014 seasons.

While, the compost tea at low concentration (25%) obtained the lowest effect on decreasing pre, post emergence damping off and disease severity, in addition to the lowest effect on increasing of yield per plot, weight of 100 seeds, polyphenol oxidase activity, peroxidase activity, protein content % and oil content % as compared with control treatment. Regarding to 2014 growing season, data presented in Table (3) indicated that, the effect of tea and powder compost on tested characters were in the same direction which obtained during 2013 growing season.

DESCUSSION

The results obtained from the effect of tea and powder compost under greenhouse condition on Seedling growth and controlling of root rot disease indicated that the highest effect of compost tea in reduction of pre and post emergence damping off and disease severity of soy bean and improving seedlings characters were obtained at the highest compost tea level. These results were in the same line with those obtained by El-Masry *et al*. (2002), and Ahlam *et al*. (2009). They found that, percentages of the emergence were clearly enhanced and reached 95 and 96% due too using compost tea and powder at highest tested level. On the other hand , under field condition The compost powder at moderate level (10 tons per feddan) had intermediate effect on the tested characters, while the compost powder at the lowest level (8 tons/feddan) obtained the lowest effect on decreasing of pre, post emergence damping off ,and the lowest effect on increasing of yield per plot, weight of 100 seeds, polyphenol oxidase and peroxidase activity, protein content % and oil content % ,comparing with control treatment. These results were in agreement with those reported by Pharand *et al*. (2002), Sylvia (2004), El-Frnanwany and Amer (2006), Van der Gaag *et al*. (2007) and Ahlam *et al*. (2009). They found that, percentages of the emergence were clearly enhanced and reached to 95 and 96% due to use of different composts as soil treatments. They also added that, using of compost led to reduce disease incidence of crown and root rot of greenhouse-grown tomato caused by *F. oxysporum*, compared with control. They also found that systemic induced resistance can play role in the biological control of soil borne disease provided by compost amendments, and also agreement with those reported by Studstill *et al*. (2006 and Abo-Elyosr *et al*. (2014). They found that, the tested compost at 50% concentration was effective on control of soybean root rot disease caused by *R hizoctonia solani*, they also added that the treatment with tested compost led to increasing of oxidative enzymes activity.

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تأثير الكمبوست على مقاومه مرض عفن الجذور ، النشاط الأنزيمى ، التركيب الكيماوى والمحصول لفول الصويا تحت ظروف الصوبه والحقل.

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دلت النتائج المتحصل عليها من دراسة تأثير الكمبوست البودرة والشاى عند مستويات مختلفة على موت البادرات والوزن الطازج والجاف للريشة والجذير وأطوال النباتات والنشاط الإنزيمى فى الصوبه (ظروف العدوى الصناعية) والحقل (ظروف العدوى الطبيعية) على الاتى : اولا : تحت ظروف الصوبة فإن استخدام مستخلص شاى الكمبوست عند مستوى ١٠٠% (حجم/حجم) و الكمبوست البودرة عند مستوى ١٠ جرام/ للأصيص كانوا ذو تأثير عالى فى خفض شده عفن الجذور وزيادة نسبة الإنبات وخفض الشدة المرضية وزيادة الوزن الطازج والجاف للريشة والجذير وزيادة أطوال النباتات وزيادة نشاط إنزيمات البولى فينول أوكسيديز والبيروكسيديز. وعلى الجانب الآخر فإن استخدام الكومبوست البودرة عند مستوى ٨ جرام ، ٦ جرام لكل أصيص أو استخدام شاى الكومبوست عند مستوى ٥٠ ، ٢٥% (حجم/حجم) كان ذو تأثير أقل على الصفات المختبرة والمذكورة بعالية. ثانيا : تحت الظروف الحقلية فقد دلت النتائج المتحصل عليها على أن استخدام الكمبوست البودرة عند مستوى ١٢ طن/فدان أو استخدام مستخلص شاى الكمبوست عند مستوى ١٠٠% (حجم/حجم) أدى إلى تأثير عالى فى خفض نسبه موت البادرات وزيادة نسبة الإنبات وخفض شده الاصابه بمرض عفن الجذور وزيادة محصول البذور للقطعه التجريبيه للبلوط ووزن المائة بذرة وزيادة نشاط إنزيمات البولى فينول أوكسيديز والبيروكسيديز وزيادة نسبة البروتين والزيت فى البذور. يلى ذلك المعاملة بالكمبوست بودرة ومستخلص شاى الكمبوست عند التركيزات المنخفضة منهم وذلك مقارنتا بالمعاملة بالكنترول.