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EFFECT OF COMPOST TEA ON DOWNY MILDEW AND POWDERY MILDEW ON GRAPE VINES

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ABSTRACT

The application of compost tea of fermented mature composts prepared from animal sources (cattle manure and poultry manure), plant source and added molase to compost tea, were tested for their ability to control downy mildew (*Plasmopara viticola*) (B & C) Brel. and powdery mildew *(Uncinula necator* (Schw.) Burr. on grape vine. Downy mildew was reduced by 97.3% when dipped leaves, while it was 88.22% when plants sprayed. It also reduces the infection in berries to 69.5%. Compost tea was also active against powdery mildew it reduced the disease incidence to76.5% But it was 85.3% When we added wettable sulphur to the compost tea.

In some cases even shorter fermentation time prepared the compost tea was sufficient, addition of nutrients to the fermenting mass did not generally improve disease control so the period, during extraction time of compost and use is very important, also pasteurization of compost tea nullify their efficacy. Two bacterial strains isolated from the compost tea controlled the disease effectively.

From studies compost tea reduced the most dangerous diseases on grape vine (downy mildew it significantly cp< 0.1%) compared with the water control. Also compost tea achieve good results when it used in controlling downy mildew in field, the efficiency was 76.12% on leaves while it was 76.5% in berries. While compost tea + wettable sulphur were the best application for controlling powdery mildew it reached to 83.0% in controlling powdery mildew in berries.

We conclude that a major inhibitory principle of compost tea is allow molecular weight, heat stable , non – protein metabolite produced by anaerobic microorganisms in the compost tea induced resistance is one of the mechanisms. (Cronin, 1996).

INTRODUCTION

The literature on preparation and various uses of compost tea on grape vine health is voluminous (Ingham, 1985, and Ketterer1992). A potential application, about which little is known scientifically, is the used of water extracts from composts adding molase for control of foliar diseases such as downy mildew *[Plasmopara viticola*] (B&C) Brel. , and powdery mildew (*Uncinula necator*) Burr. , on grape vine (Weltzien, 1991). In brief, compost tea is prepared by mixing compost and water adding to molase, typically in a 1 to 4 compost to water ratio, and incubating the resulting slurry without agitation for several days. Then the slurry is filtered through cheesecloth or centrifuged, and the filtrate or supernatant. Termed an extract, is sprayed onto the aerial surfaces of plants. This approach to biological control, if effective in practice, is potentially attractive alternative to fungicides, many of which are being curtailed because of environmental and health concerns and development of resistance in plant pathogen populations (De Waad *et al*., 1993).

Grape diseases downy mildew or powdery mildew caused by *Plasmopara* viticola (B&C) Brel. And *Uncinula necator* (Schw) are a serious diseases of grape in moist temperature climates worldwide (Weltzein, *et al.,*1989). The disease can cause severe damage to leaves, potentially resulting in defoliation, and it render the fruit. Although resistant varieties are being planted more extensively, control still hinges on fungicides for the industry as whole. We have screened extracts from compost and evaluation as biocontrol candidates. Compost tea prepared by extracted compost in water for limited period and added molase, were the most effective in reducing diseases in orchards or outdoor.

Our objective were partially evaluated the compost and characterize the compost tea and, more specifically, (to determine whether the reduction in diseases is biological chemical or both) whether anaerobic conditions are required for production of an effective extract.

MATERIALS AND METHODS

-Compost preparation:

Five mixtures of animal manure (caw dung) and poultry manure at different ratios were mixed with constant ratio of bagasse at C/N ratio of about 30:1.Some of the physical and chemical characteristics of composting materials were described as organic matter, organic carbon, total nitrogen, C/N ratio, total phosphorus and total potassium were evaluated. Pathogenic indicators (total coli from bacteria, fecal coli from bacteria and salmonella & shigella), acid producing bacteria and nematode were determined.

Aerobic composting of the organic wastes (animal manure (cow dung, and poultry manure) were mixed at different ratios with constant rate of bagasse to give a C/N ratio of about 30:1. Mixtures were moistened for about 60% of its water holding capacity and performed in five Gonya (plastic perforated bags to provide aeration and prohibit anaerobic fermentation). Each mixture was turned weekly and moistened to reach 60% of its water holding capacity and performed in five Gonya (plastic perforated bags to provide aeration and prohibit anaerobic fermentation). Each mixture was turned weekly and moistened to reach 60* F of its water holding capacity. Physical and chemical properties were monitored during the composting period extended for ten weeks, including maturation time. These analyses were pH value, electric conductivity (EC), organic matter (OM), organic carbon (OC), total nitrogen (TN), ash, C/N ration, total phosphorus, total potassium, acid producing bacteria, total coli-from bacteria, fecal coli-from bacteria, salmonella, shigella bacteria and nematode (Stentiford, et al.,1984), the physical and chemical characteristics of the raw materials used for compost were shown in (Table 1).

Animal manure (cow dung) and poultry manure were collected and subjected to analysis. Bagasse is a bio-product of sugar industry was used to adjust the C/N ratio during composting. Compost extracts were prepared by using 10gm compost to 90cm water diluted to 1/100 and 1/1000 concentrations.

Bulk density was determined according to (Nell,*et al*., 1983) Moisture content, PH value, organic matter, organic carbon and total nitrogen, ammonical nitrogen, nitrate nitrogen were determined according to the standard methods of Page *et al*., (1982).

Table (1): Physical and chemical characteristics of the raw materials used for compost.

Character	Animal manure (cow dung)	Poultry manure	bagsse
Density (Kg/m^3)	502	450	145
pH(1:10) d/Sm	9.35	8.43	--
Ec(1:10) d/Sm	3.57	3.63	--
Total nitrogen %	1.56	3.45	0.56
Ammonical	346	980	--
Nitrate nitrogen/ppm	216	87	--
Organic matter %	68.36	68.10	96.59
Organic carbon %	39.65	39.50	56.02
Ash %	31.64	31.4	3.41
C/N ratio	25.4:1	11.4:1	100:1
Total phosphorus %	0.4	0.72	0.06
Total potassium %	1.78	1.44	0.02
Parasites	*Gardia lambial+ Entemobia hostiltica*	*Gardia lambial+ Entemobia hostiltica*	--
Fecal coliform cfu.	700X10^3	181X10^4	--
Salmonella	65X10^3	130X10^4	--

Total potassium and soluble potassium were determined by flame photometrically (Chapment and Pratt, 1961). Soluble and total phosphorus were determined colour metrically according to (Olsen and Dean, 1965).

Populations of total and fecal coli-from bacteria and salmonella and shigalla were counted according to (American Public Health Association, 1989).

The values of C/N ratios showed higher reduction during the composting process.This finding was true for all mixtures under this study,where the C/N ratios narrowed from initial values about 30:1 to final values of 14.2,13.1,13.0,12.3 and11.5:1 for compost products for mix1,2,3,4 and5,respectively(Table2).C/N ratio is traditionally used to determined the degree of compost maturaty and its quality.Many authors reported that aC/N ratio below 20 is indication of acceptable maturity (Cardenas&Wang,1980 and Jimenez&Garcia,1991).

Increasing the ratio of poultry manure from0.0 to 80.0%, increased organic matter from 27.2 to 35.35%, total nitrogen from

1.11 to1.79%, total phosphorus from 0.95 to 1.61% and total potassium.

Table (2): Physical and Chemical Properties of Produced Compost.

Treatment		Bulk density kg/ m3	Moisture content%	pH	Electric conductiviety (EC)	Organic matter (OM)%	Organic carbon(OC)%	Total nitrogen(TN)%	Ash%	C/N ration	Total phosphorus	Total potassium%
Animal manure%	poultry manure%											
80	0.0	810	32.06	5.80	2.01	27.20	15.77	1.11	72.8	14.2:1	0.95	0.63
60	20	805	32.73	6.26	4.04	31.25	18.12	1.38	68.75	13.1:1	1.18	0.81
40	40	792	33.23	6.19	2.17	33.50	19.43	1.50	66.5	13.0:1	1041	0.84
20	60	715	33.12	7.10	4.20	33.85	19.63	1.60	66.15	12.3:1	1.38	0.86
0.0	80	712	34.52	7.05	3.69	33.35	20.50	1.79	64.65	11.5:1	1.61	0.90

-Physical and chemical properties of produced compost and compost tea:

Changes of pathogenic indicators (total coli-form bacteria, fecal coli-form bacteria, salmonella of shigella bacteria and nematode are present in Table (3 and 4). Total coli-form bacteria was found in the organic mixture at initial time by number ranged from $1015X10^4$ to $2930X\ 10^4$ cfu compost products. Fecal coli-form bacteria were found in the mixtures of organic manure by number ranged from $627X10^3$ to $1712X10^3$ cfu and not detected at the end composting period. Salmonella and shigella were found at initial time by number ranged from $635X10^2$ to $2515X10^2$ cfu and not detected at the end of composting period. Nematode was found at initial time by number ranged from 31500 to 625000 and not detected at the end of composting period. The reduction in the coli-form group bacteria and probably most of the pathogenic microorganisms may be due to the high temperature during the thermophilic stage (Nell *et al*., 1983) and /or to the antagonistic effects of other microorganisms found in compost material.

Table (3): Physical and chemical properties of produced-compost.

Treatment		Total coli-form bacteria cfu countX10^7		Fecal coli-form bacteria cfu countX10^7		Salmonella and Shigella bacteria cfu		Nematode	
Animal manure %	Poultry manure %	Initial	End	Initial	End	Initial	End	Initial	End
80	0.0	1.5	nd	.627	nd	6.3X10^5	nd	3.15X10^5	nd
60	20	3.83	nd	1.412	nd	7.8X10^5	nd	3.55X10^5	nd
40	40	1.47	nd	1.30	nd	1.7X10^5	nd	4.6X10^5	nd
20	60	2.51	nd	1.254	nd	1.6X10^5	nd	5.8X10^5	nd
0.0	80	2.43	nd	1.712	nd	2.5X10^5	nd	6.2X10^5	nd

nd = not detected.

Table (4) Selected chemical properties of the compost tea extract (1:10) used in this study.

Treatment		Ammonical nitrogen ppm	Nitrate nitrogen ppm	Soluble phosphorus ppm	Soluble potassium ppm	Soluble calcium ppm	Soluble magnesium ppm
Animal manure %	Poultry manure %						
80	0.0	142	698	232	228	222	70
60	20	277	754	336	276	256	86
40	40	310	962	363	282	194	99
20	60	310	943	534	296	262	93
0.0	80	492	1152	565	308	224	110

Preparation of compost tea:

Compost was understood to be largely degraded organic materials with the original organic structures no longer recognizable. Compost was used after 8 – 12 months.

(1) Fill the bucket half – full with water.

(2) Bubble air through the water for 10 to 20 minutes before adding the compost.

(3) Add compost to fill bucket to nearly the top with enough space for bubbling [don't Compact the compost or extraction will be poor and the tea may also go anaerobic].
(4) Add molasses as food source for bacteria or fungi, as desired but realize that the amount needs to be kept minimal, or growth of bacteria and fungi will use oxygen in the air faster than the aquarium pump can replace it.
(5) The aerator Provides continuous Flow of air and creates enough turbulence to provide mixing.

Still, in most cases, an occasional brisk stir helps the quality of the tea, by removing the organisms from the surface of the organic matt.

Brew for 2 to 3 days, minimum. Longer is ok. Then turn the aerator off and let the brew settle for a half – hour until most of the solids are on the bottom of the bucket. The soluble portion of the tea can be decanted from the top, leaving the insoluble solids to be returned to the compost pile. If the tea is used in aback pack sprayer. Preparation compost under laboratory or outdoor conditions, with temperatures usually ranging between 15 and 20° C. The period, during which the compost was covered with water, was called "extraction time" It may be necessary to strain the tea through cheese cloth, or affine mesh tea sieve to prevent plugging the sprayer nozzles.

The time span between application and inoculation of pathogen was called "induction time" (Ingham, *et al*., 1985). Analyses of compost tea are present in Table (5).

Table (5): Analysis of compost tea.

Ailments	Quantity
PH	**8-42**
Ammonical nitrogen (ppm)	**8.0**
Nitrate nitrogen (ppm)	**4-0**
Total nitrogen (ppm)	**200-0**
Total phosphorus (ppm)	**20**
Total Potassium (ppm)	**12**
BOD mg/l	**751**
Chemical oxygen Demand	**164**

BOD mg/1 oxygen Demand**:**

Biological oxygen demand .Total count of bacteria, funji and actinomycetes of compost tea just before application were $2X10^6$cfu/ml, and $1x10^5$ cfu/ml and$64x10^3$ cfu/ml respectively

-Efficacy of compost tea on disease of grape vines (*Vitis vinifere*):

A- Downy mildew, *Plasmopara viticola*.

Fully grown leaves from grape vines plants were placed in Petri – dishes, treated with compost tea and later inoculated with sporangia suspension of $7\text{-}9X10^4$ sporangia m1-$^{1.}$

Incubation followed at 18 - 20 ° C with 16h light l day of 1700 lux (Weltzien *et al* 1987). Under outdoor condition we used avineyared in khatattba (Beehera country). As no artificial inoculation could be used there, and spontaneous leaf infections did not occur, we were limited to the evaluation of infected berries (Ketterer and Weltzier, 1987).

B- Powdery mildew (*Uncinula necator*).

Results with the host – pathogen system were achieved under outdoor conditions. The compost tea was prepared as mentioned before were compared with untreated checks (control) and commercial fungicides (Wettable sulfur).

-Field experiments

- The effect of compost tea and one fungicide wettable sulphur on disease incidence:

Experiments were conducted in two successive seasons (2007 and 2008),at the beginning of April in field at khatattba (Beehera country), governorate, to study efficiency of using compost tea as we prepared as mentioned in controlling grape downy mildew with compost tea and compost tea + sulphuric wettable for powdery mildew diseases on Flam seedless cultivar. This grove has aback history of heavy natural infection by the disease.

A complete randomized block design with five replicates (trees) for each treatment was used.

Grape vine sprayed with any of the previously mentioned substances until the run off point three times within fourteen days between. Control treatments were left without spraying with any of substances . Percentage of downy or powdery mildew was determined at three intervals, 15th march, 1st April and 15th April. Meanwhile

percentage of infection on fruits was calculated at 1st May, 15th May and 1st June. The efficiency of using the sprayed compost tea and wettable sulphur in controlling the disease was determined according to the following equation (Ghoneim 1985):

$$\% \text{ Efficiency} = \frac{\% \text{ Infection in control} - \% \text{ inflection in the treatment}}{\% \text{ Infection in control}} \times 100$$

RESULTS AND DISCUSSION

Results

-Effect of compost tea on downy mildew, (*Plasmopara viticola*).

The results in Table (6) Indicated, that downy mildew can be largely suppressed by prophylactic compost tea treatment. Data revealed that compost tea caused significant reduction in leaf area covered with downy mildew or no of diseased berries it reduced to 1.6 from (/ of 500 berries) and 3.2 from (/ of 500)when leaves sprayed weekly. Further laboratory and outdoor experiments are being performed to confirm and improve the results obtained so far. .

Table (6): Effect of compost tea application on grape vine against *Plasmopara viticola* attack on leaves and barriers.

Application	Induction time	Leaf area covered / of 10 leaves		No. of berries / of 500 berries	
		Treated	Check	Treated	Check
- Leaves dipped	3h	2.2*	83	--	--
- Leaves sprayed	3h	1.6*	90	--	--
- Plants sprayed weekly	Spontaneous infection	--	--	3.2*	10.5*

* Different from check ≤ 0.1 statistical significance.

-Effect of compost tea on Powdery mildew (*Uncinula necator*).

Results in Table (7) with host – pathogen systems were achieved under orchard and outdoor conditions; using compost tea was compared with untreated checks (control) and commercial fungicides (wettable sulfur). Data indicated that the highest effect treatment in reduced disease was compost tea + wettable sulfur were reduced disease incidence of (powdery mildew) to 85%, while treatment with compost tea only caused 76.5% reduction in powdery mildew.

Table (7): Effect of compost extracts application on grape vine against *Uncinula necator* (powdery midew).

Treatments	Disease incidence %	Reduction %
- Compost tea, every 2weeks, orchard	8*	76.5
- Compost tea, every 2weeks, orchard + wettable sulphur orchard	5*	85.3
- Wettable sulphur, every 2 weeke orchard.	12	64.7
- Check (non treated).	34.0	--

All differences significant against check at 5% level.

Incidence if compared with check (control) Treatment, meanwhile the least effect it was for wettabe sulfur.

The effect against powdery mildew under heavy infection pressure in the orchards was remarkable and compared favorably with wettable sulphur treatment.

Field experiments:

- The effect of compost tea and wettable sulphur on disease incidence:

The spraying with compost tea in 15th of March of two successive seasons (2007 - 2008) exhibited good results in controlling downy and powdery mildew during season 2007 was obtained by using compost tea.

The corresponding percentage of efficiency was 76.12% in leaves and 76.5 for berries, in downy mildew.

Meanwhile, during season 2007 spraying with compost tea gave the highest percentage of efficiency in controlling downy mildew, reaching 79.8% on leaves and 73.3% on berries. It also evident (Table, 3) that the percentages of natural infection with the disease on grape vine leaves were ranged between 53.0%, 58.0% during season 2007 and 48.0% and 56.0% during season 2008.

Regarding to the effect of spraying with any of compost tea data in Table (8) clearly show that compost tea surpassed compost tea in controlling downy mildew either in season 2007 or 2008. The highest percentage of efficiency in controlling the disease by compost tea was obtained during season 2007, being.79.8% on leaves, meanwhile, that resulted from control at the same season mentioned before. The latter

percentage of efficiency was increased, reaching. 76.5% on berries at 2007 whereas, that resulted from spraying by compost tea.

Data in Table (8) revealed that in general, compost tea was the best in controlling downy mildew disease of grape Berries during the two application seasons.

Table (8): Control of downy mildew of grape leaves and berries on Flame seedless cv. using compost tea.

Treatments	Percentage of downy mildew during season.									
	Leaves				2007	berries				
	15th March	1st April	15th April	Mean	% Efficiency	15th May	1st May	15th June	Mean	% efficiency
Compost tea	18. 0^{c}	14.0^{c}	8. 0^{c}	13.3	76.12	13.8^{b}	8.5^{c}	5.0^{d}	9.1	76.5
Control	56.0^{a}	58.0^{a}	53.0^{a}	55.7		46.0^{a}	34.0^{a}	36.0^{a}	38.7	
2008										
Compost tea	15.0^{b}	8.5^{c}	6.7^{c}	10.1	79.8	14.5^{c}	18.0^{bc}	8.0^{c}	13.3	73.3
Control	46.0a	56.0a	48.0a	50.0		68.6	45.8	35.0	49.8	

Figures with the same letter in the same are not significant differed (p = 0.05). During the two application seasons.

Result in Table 8)showed that spraying with any of the compost tea or compost tea + wettable sulphur and wettable sulphur only caused noticeable decreases in percentage of diseased leaves and barries of Flame seedless cv. determined at any interval during seasons 2007 and 2008. The highest percentage of efficiency (83.0%) in controlling the disease was obtained by spraying with compost tea + wettable sulphur during 2007 season followed by using compost tea and wettable sulphur, respectively. The corresponding calculated values of efficiency were 33.0% and 42.5% respectively. It is also obvious (Table 8) that the percentage of infection was generally higher when determined at 1st May than that recorded at the two intervals, *i.e* 15th May and 1st June. In control, it was 61.5% in the 1st June.

As to the effect of compost tea and compost tea + wettable sulphur on downy mildew disease incidence data (Table, 9) also reveal that they exhibited best control results, than the tested fungicid the lowest average percentage of infection (15.7) was resulted from compost tea + wettable sulphur application with 63.7% in berries disease control efficiency during season 2007.

Table (9) Control of powdery mildew of grape of grape leaves and berries on (Flame seedless) cv. Using compost tea and wettable sulphur.

Treatments	Percentage of powdery mildew during season. Leaves 2007 berries									
	15th March	1st April	15th April	Mean	% Efficiency	1st May	15th May	1st June	Mean	% efficiency
Cmpost tea	32.5[b]	35.7[b]	33.0[c]	33.7	44.5	33.0[b]	32.5[b]	34.0[c]	33.2	45.7
Wettable sulphur	50.0[b]	40.7[a]	40.4[a]	43.0	28.0	42.5[c]	38.3[a]	37.0[a]	39.3	35.7
Cmpost tea + Wettable sulphu	20.7[b]	20.4[b]	24.9[b]	22.0	63.7	21.0[b]	15.0[c]	11.0[c]	15.7	75.5
Control	60.0[b]	62.0[b]	60.0[b]	60.7		60.0[b]	60.6b	63.2[b]	61.1	53.2
2008										
Cmpost tea	28.5[b]	30.0[b]	32.0[c]	30.2	49.8	28.0[b]	30.0[b]	28.5[b]	28.8	52.8
Wettable sulphur	43.5[a]	35.8[a]	35.9[a]	38.4	36.1	40.0[a]	43.7[a]	38.0[a]	40.6	33.4
Cmpost tea +Wettable sulphur	30.0[a]	20.5[b]	20.5[b]	23.7	60.6	22.0[b]	17.0[bc]	12.0[c]	10.3	83.0
Control	58.0[b]	61.5[a]	60.7[b]	60.1		62.0[a]	58.5[b]	61.5[a]	61.0	

Figures with the same letter in the same letter in the same are not significant differed p- 0.05

The corresponding values of the same treatment during season 2008 were 15.7% and 75.5% respectively.

Finally, we conclude that through the application, compost tea was the best in controlling downy mildew, while the best application

was compost tea and wettable sulphur for controlling powdery mildew in grape vine.

Discussion

Compost tea from compost which exposed to high temperature while it'was preparation, reduced disease incidence of downy and powdery mildew, microbial activity played a major role in the reduction. Compost tea is an aerated solution that teeming with billions of beneficial microorganisms that can be applied directly to the leaf surface of plant as a foliar spray or used as soil drench to improve root systems. Stentiford *et al*. (1984) mentioned that the production of antibiotics within the pile is probably involved in the inactivation of pathogens. Similar studies proved the disappearance of pathogenic bacteria during composting process, due to production of antibiotics (Golueke, 1982 and El-Housseini *et al*., 2000).

Though the compost had some inherent inhibitory properties, compost includes substantially enhanced activity within 5 days and lasted at least 14 days.

In inhibitory properties, the extract behaved like alchemical when diluted. The results indicated, that downy mildew can be largely suppressed by prophylactic compost tea treatment. Further laboratory and outdoor experiments are being performed to conform and improve the results obtained so far (Weltzien *et al* 1986). Compost tea effective also in controlled powdery mildew on grape leaves Ketterer and Weltzien, 1988).

Compost tea proved to be effective against various fungal diseases of leaves and fruits, if applied prophylactically. The effects were significant and reproducible under varying conditions in the laboratory, the orchards, and outdoors (open field). In formation on the mechanisms involved is still scarce. It has been shown, that after sterile filtration as well as heat disinfection of the compost tea the broth remains rather ineffective. It seems that the presence of microorganisms, especially, is prerequisite for its biological activity (Stindt and Weltzien, 1988). If leaves are rinsed 2 days after treatment and before inoculation with powdery mildew spores, the inhibitory effect remains.

Elad and Shtienberg, 1994 have shown pasteurized extracts from 14days incubations to be as effective as extracts without pasteurization for control of gray mold on grape leaves. In contrast,

McQuilken *et al*., (1993) stated that house manure – based compost extract sterilized by filtration or autoclaving lost their antagonistic activity toward *B. cinerea*. (Weltzien, 1991) reported results similar to Mc Quilken *et al*., (1993) with *Phytophthora infestans* infection of tomato leaves. However, the compost we used is different from those assessed by Mc Quilken *et al*., (1993). and Weltzien (1991) in compostion and probably also microbial populations. With *Phytophthora* spp., inhibition varied among isolates and species for different leachates sterile and non – sterile (Hardy and Sivasithamparam. 1991). Inhibition in the case of *B. cinerea* my directly mediated by the presence of microorganisms in their system (Ketterer *et al*., 1992) the same caveats apply when attempting to reconcile our results with those of (Malathrakis *et al*., 1993). They produced extracts from several composts, which were effective in controlling *Alternaria alternata* by incubating slurries on an orbital shaker for 2 days at 200 rev min $^{-}$1 .Their conditions were presumably aerobic, though O_2 tens in values were not reported. Anaerobic conditions our experiments developed rapidly in the spent mushroom substrate (SMS) slurries and were associated with increased inhibition of conidial germination, while aeration during incubation reduced inhibition. When aeration was discontinued the inhibition was restored. Thus, an aerobics was required for inhibitor to be produced to any significant degree.

In conclusion, we infer from our aggregate results that induced resistance is at least partly responsible for the effect in this host - pathogen system (Samerski and Weltzien, 1988). Compost tea works by putting the aerobic beneficial biological diversity that your plant needs onto the leaf surface of plant. Others use compost tea as foliar spray to reduce disease. Whatever you're particular needs. Compost tea will help you on the path towards a healthier, natural, organic culture.

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تأثير سماد الشاى العضوى (organic compost tea) على مرض البياض الزغبي والبياض الدقيقي على كرمات العنب

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- تم تطبيق إستخدام سماد الشاى العضوى (منقوع السماد العضوى) المأخوذ من أسمده عضوية تامة التخمر ومستمد من مصادر حيوانيه (سماد ماشيه- سماد دواجن)و مصدر نباتى + Molasse مضافاً لسماد الشاى ، وذلك لإختبار قدراتهم للحد من الإصابه بمرض البياض الزغبي في العنب المتسبب عن الفطر(*Plasmopora viticola*) ومرض البياض الدقيقي فى العنب المتسبب عن فطر (*Uncinula necator*). كان للسماد المستخدم أثر فى خفض الإصابه بالبياض الزغبي بنسبة 97,3% وذلك عند غمر الأوراق، بينما كانت النسبه 22, 88% عندما تم رش أوراق النباتات، وإنخفضت نسبة الإصابه فى الثمار الى 5, 69% .

- سماد الشاى العضوى كان له أثر فعال فى خفض الإصابه بالبياض الدقيقي الى 76,5% وزادت هذه النسبه الى 83,3 % عند إضافة الكبريت القابل للبلل الى سماد الشاى العضوى ..

عندما تم تقليل فترة التخمر للسماد العضوى أثناء تحضير كمبوست الشاى، كان غير كافى لعمل سماد الشاى العضوى ولم يتم السيطرة على المرض عموماً – لذا فإن فترة التخمر أثناء النقع مهمة جداً ، كما أن بسترة سماد الشاى العضوى تفقده كفاءته، كما لوحظ أيضاً ان المحتوى الجرثومى المعزول من سماد الشاى العضوى كان له تأثير مضاد. من الدراسات التى أجريت على إستخدام الشاى العضوى تبين أنه له أثر فعال في خفض الأمراض الأكثر خطورة على كرمة العنب (مرض البياض الزغبي أنخفض بشكل ملحوظ حتى 0,1 %) مقارنة بالكنترول . أعطى سماد الشاى العضوى أيضاً نتائج جيدة في السيطرة على البياض الزغبي في الحقل بنسبة 12, 76% على الأوراق بينما كانت 67,5% على العنيبات ، في حين أن سماد الشاى العضوى + الكبريت القابل للبلل كان أفضل في السيطرة على مرض البياض الدقيقي فى العنب ووصلت نسبة الفاعليه الى 83% على العنيبات .

- نستنتج أن الفعل الأساسي لسماد الشاى العضوى يسمح لجزيئات المواد الغذائيه ذات الوزن الجزيئي الصغير جداً بالنفاذ الى خلايا النبات الى جانب إحدى الآليات في أمكانية رفع درجة الحرارة فوق سطح النبات علاوة على إنتاج جزء غير بروتيني metabolic تم إنتاجه بواسطة كائنات anaerobic الحيه بصورة مجهريه في سماد الشاى العضوى على مقاومة الأمراض النباتيه.