

Assessment of Olive Pomace and Chicken Manure Compared to Topsin-M70 in Controlling Fusarium Wilt of Lupine with Enhancement of some Yield Components

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Organic wastes, a primarily by-products of many industrial activities, include animal manures and olive pomace that were used as compost. The compost-amended soils are the highly induced suppression of numbers of soil-borne pathogens. Olive pomace and chicken manure were used in this study compared to Topsin-M70 for controlling lupine wilt disease caused by *Fusarium oxysporum* f.sp. *lupini* under greenhouse and field conditions, Ismailia, Egypt. In general, application of the two olive pomace and chicken manure amendments suppressed Fusarium activity in both seasons (2008/09 and 2009/10) in comparison with Topsin-M70. Under greenhouse conditions, the highest disease reduction (85.7%) and the highest percentage of healthy lupine plants (88%) were recorded due to treatment by olive pomace at the rate of 25% and chicken manure at the rate of 10%. On the other hand, olive pomace and chicken manure compared to the fungicide Topsin-M70 caused a significant increase in root length (RL), plant height (PH), number of branches/ plant (NB), number of pods/plant (NP), and single yield plant (SYP) over the control under green house conditions. The effect of olive pomace and chicken manure on lupine wilt diseases incidence under field conditions was positive, where, crop yields and its components, *i.e.* PH, NB, NP and 100-seed weight (HSW) were increased in amended plots. Generally, olive pomace and chicken manure enhanced fungal pathogens suppressiveness and reduced the diseases incidence as well as increased seed yield compared to the fungicide Topsin-M70.

Keywords: Chicken manure, damping-off, fungicides, Fusarium wilt, lupine, olive pomace and seed yield.

Lupines are annual or perennial herbs belonging to family Fabaceae. Lupine plants are susceptible to a number of plant diseases. *Fusarium oxysporum* Schlecht f.sp. *lupini* Snyder is a common fungal pathogen on lupine plants causing wilt disease resulting in serious economic losses. The main method of controlling crop diseases, which is followed in Egypt, is the direct application of fungicides. This management strategy is increasingly viewed as being ecologically undesirable and has led to an increased interest in the development and use of more ecologically sound integrated pest management practices such as biological control. In this respect, the current study describes a reduction in the use of chemical pesticide

through the use of disease-suppressive compost. White lupine (*Lupinus albus*) has many benefits for human and animal nutrition. Its seed have a nutritional quality similar to soybean seed and superior to other legumes seed (Raza and Jnsgard, 2005). Soilborne fungal diseases are among the most important factors limiting the yield production of legumes in many countries, resulting in serious economic losses. Pathogen such as *F. oxysporum* can has negative significant effects on the growth of lupine plants (Zian, 2005). Numerous studies have been published on the biological control of plant diseases (Hoitink and Fahy, 1986, El-Bramawy and El-Sarag, 2012) and on the use of composts to reduce disease in agricultural crops (Pera and Calvet, 1989 and Shaban *et al.*, 2009). Ammonia and volatile organic acids released by decomposing organic matter killed *Verticillium dahliae*, and the residual organic matter stimulated competitive and antagonistic microorganisms in the soil. While these mechanisms suppressed the growth of *V. dahliae*, they may also create phytotoxicity to the plant roots, making them less attractive to colonization by the pathogen (Lazarovits *et al.*, 2001). In this regard, Kotsou *et al.* (2004) found that addition of olive mill waste waters significantly suppressed growth of the root pathogen (*Rhizoctonia solani*). However, there is a lack of information on the long term effects of olive pomace and chicken manure compared to Topsin-M70 on crop yield and other populations of soil borne fungi under greenhouse/field conditions.

Therefore, this study aims to minimize the occurrence of lupine wilt as well as the possibility of measuring the extent of improvement and increase the yield and its components in the lupine plants by using two types of compost (olive pomace and chicken manure) compared to the fungicide Topsin-M70.

Materials and Methods

Fungal isolates:

Fusarium oxysporum was isolated from wilted lupine plants grown in Ismailia Governorate. It was microscopically identified on the basis of cultural and microscopic characteristics to the species level according to the descriptions of Nelson *et al.* (1983) and Lislle and Summerll (2006) and was confirmed in Assiut Univ., Mycol. Centre (AUMC). Pathogenicity of the isolate toward lupine plant was estimated (Sneh *et al.*, 1991). The isolate was maintained on PDA medium at 4°C. Artificial soil infestation by *F. oxysporum* grown on barley grain medium was carried out as described by Singleton *et al.* (1992).

Plant materials and experimental site:

Two lupine cultivars, *i.e.* Giza 2 (received from the Agric. Res. Centre, Food Legumes Res. Section, Giza, Egypt) and Mutant 7 (achieved by the Nuclear Res. Centre, Atomic Energy Authority in Egypt), were used as plant materials through this research. The category of both tested cultivars, Giza 2 and Mutant 7, as susceptible and resistance, respectively, was detected before in previous work carried out by Zian (2005). Greenhouse and field experiments were documented as experimental sites. These experiments were done at the Experimental Farm, Fac. of Agric., Suez Canal Univ. through two successive growing seasons (2008/09 and 2009/10).

Soil structure and compost analysis:

The soil of the experiments was sandy texture (94.8% sand, 2.62% silt and 2.58 clay) with pH value of 7.67, these figures were determined according to the method outlined by Kilmer and Alexander (1949). These estimates were carried out at the Soil and Water Department, Fac. of Agric., Suez Canal Univ., Ismailia. The chemical analysis of investigated soil after cropping included the chemical properties, electrical conductivity (EC), pH, cations, anions and availability of NPK. Surface soil samples (0-15cm) were taken prior to the application of treatments. The pretreatment samples comprised of a composite sample made up of 5 cores per experimental site. Soil samples were taken at the end of each planting season. The sample comprised of a composite sample of 2 cores per plot.

Treatments used in the experiment:

The effect of olive waste and chicken manure as natural substances compared to Topsin-M70 as chemical fungicide was investigated to test their effect on disease incidence under greenhouse and field conditions in both seasons.

Effect of olive waste, chicken manure and Topsin-M70 on the incidence of lupine wilt under greenhouse conditions:

Pots were prepared to study the effect of soil treatment with chicken manure and olive waste for controlling lupine wilt disease. A sterilized sorghum-seed medium was inoculated with the tested fungus, *F. oxysporum* and incubated at 25±2°C for 15 days. Chicken manure and olive waste were composted for five weeks before incorporation into the potting mix. Pots (30-cm-diam.) containing unsterilized soil were infested with the tested fungus at the rate of 3% (w/w) of soil weight (El-Barougy, 2008). The infested soil was mixed thoroughly with compost treatments (chicken manure or olive waste at the rate of 5, 10 and 25% (v/v), meanwhile, Topsin-M70 treatment was also prepared at the rate of 1 g/l. Topsin-M70 was applied in 50 ml aliquots at planting and every 3 wk, thereafter of the 14 wk experiment (Wilson and Williamson, 2008). The pots were watered and kept for one week to ensure even distribution of the inoculum. Five lupine seeds/pot, either susceptible (cv. Giza 2) or resistant to Fusarium wilt (Mutant-7), were sown. Two control treatments, *i.e.* control (1) which is untreated seeds sown in infested soil as well as control (2) that is untreated seeds sown in non-infested soil, were used. Five pots were used for each treatment as a replicates. Early wilt and late wilt percentages were recorded one and three months after sowing, respectively. Whereas, survived lupine plants (healthy and infected) and disease severity were examined for visual wilt symptoms and internal tissue four months after sowing according to the modified scale, based on 0-4 grades of Ishikawa *et al.* (2005).

This experiment was carried out in a piece of land naturally infested by the causal of lupine wilt and root rot diseases prepared by El-Barougy and El-Sayad (2003) using only the susceptible cultivar Giza 2. The treatments were arranged in a randomized complete block design with three replicates. The sowing date was on 7 and 8 November during 2008/09 and 2009/10 growing seasons, respectively. The field plot was 3 x 2 m² with four rows; each row contained 10 hills on the eastern side. A hundred seeds (cv. Giza 2) were sown in each plot. Four treatments were followed and implemented in the following order:

1. Olive waste (applied to the plot soil at the rate of 3 kg/ m² at sowing).
2. Chicken manure (applied to the plot soil at the rate of 1 kg/m² at sowing).
3. Topsin-M70 (mixed through the soil prior to planting at the rate of 1g/l as recommended in soil drenching).
4. Untreated control.

Percentages of the late wilted and root-rotted plants as well as survived plants were recorded 30, 90 and 120 days after sowing, respectively.

Agronomic plant characters:

At harvest date (nearly after four months of planting), some of agronomic lupine plant characters, *i.e.* plant height (cm), number of branches/plant, number of pods/plant, seed yield/plant (g) and root length/plant, were recorded. These characters were estimated, under greenhouse conditions, using the remained lupine plants in the pot. Meanwhile, under field conditions, characters of plants, *i.e.* plant height (cm), number of branches/plant, number of pods/plant, 100-seed weight (gm), single plant yield (gm) and seed yield/feddan (kg), were estimated using five randomly selected lupine plants per/plot. However, number of days to flowering character was recorded, when 50% of the lupine plants were blooming.

Statistical analysis:

Analysis of variance (ANOVA) of the obtained data was performed by using the SAS statistical software (Version 6.311, Co. Hort.), Berkeley, CA 94701 (Anonymous, 1997). Least significant difference (LSD) was used to compare among means of the treatments (chicken manure, olive waste and Topsin-M70) over the two seasons. Probability levels lower than 0.05 or 0.01 were held to be significant (Gomez and Gomez, 1984). Also, data for yield and its components considering work under both conditions (field and greenhouse) throughout pathogens infestation, were taken into a count. The relations between both conditions through the studied characters including infection percentage were also integrated as a hub of hubs study.

Results

Soil chemical analysis:

Chemical analysis of the soil after applying different concentrations of olive waste and chicken manure are presented in Tables (1 and 2). Chemical analysis showed an increasing in the soil content of salts, cations, anions, quantities of suitable nitrogen, phosphorus and potassium except sodium in the soil with the increasing of olive waste and chicken manure concentrations with different degrees.

Effect of olive pomace and chicken manure compared to the fungicide Topsin-M70 on controlling lupine wilt under greenhouse conditions:

Data in Table (3) indicate that all treatments (olive pomace, chicken manure and Topsin-M70) at any way concentrations decreased the percentages of wilted lupine plants after one and three months after sowing. While, the healthy survived plants were increased compared to the infested soil control (1). Data also pointed out that cv. Giza 2 grown in soil infested with *F. oxysporum* (control, 1) showed the highest disease severity score (2.8) and the lowest percentage of healthy survived plants

Table 1. Chemical properties (Cations) of the soil amended with olive waste and chicken manure under greenhouse conditions after cropping, average of 2008/09 and 2009/10 seasons

Treatment	EC dSm ⁻¹	pH	Cations meql ⁻¹			
			Ca	Mg	Na	K
Control	2.26	7.67	6.30	5.70	10.43	2.54
Olive waste 5%	3.01	7.62	7.80	6.30	12.50	2.65
Olive waste 10%	3.22	7.62	8.01	6.41	13.25	2.70
Olive waste 25%	3.84	7.60	8.69	7.91	15.98	3.21
Chicken manure 5%	4.26	7.60	12.25	8.32	11.44	3.25
Chicken manure 10%	6.28	7.55	16.85	10.64	11.21	4.16
Chicken manure 25%	15.85	7.51	22.15	13.81	1.84	5.91
Topsin-M70	2.26	7.67	6.30	5.70	10.43	2.54

Table2. Chemical properties (Anions and available NPK) of the soil amended with olive waste and chicken manure under greenhouse conditions after cropping, average of 2008/09 and 2009/10 seasons

Treatment	Anions meql ⁻¹			Available mgkg ⁻¹		
	HCO ₃	Cl	SO ₄	N	P	K
Control	5.83	9.73	9.29	3.14	1.86	11.73
Olive waste 5%	6.82	13.80	10.23	3.18	1.95	12.98
Olive waste 10%	7.22	15.23	11.59	4.12	2.11	13.80
Olive waste 25%	8.14	17.56	14.25	4.57	2.49	14.21
Chicken manure 5%	6.24	10.32	11.62	8.51	3.51	12.25
Chicken manure 10%	7.18	14.84	14.75	12.54	4.69	13.84
Chicken manure 25%	7.94	16.27	17.24	14.38	6.12	14.62
Topsin-M70	5.83	9.73	9.29	3.14	1.86	11.73

(20%) compared to the lowest disease severity score (0.4) due treatment with olive waste and chicken manure. However, the highest disease reduction (85.7%) was recorded when olive pomace at the rate of 25% and chicken manure at the rate of 10% were recorded, followed by chicken manure treatment at the rate of 5% (0.60 and 78.5%) for disease severity score and disease reduction, respectively. Moreover, the highest percentage of healthy lupine plants (88 %) was obtained due to treatment by olive pomace at the rate of 25% followed by each of chicken manure treatments/concentrations at the rate of 10 and 25% where both recorded 84% healthy survived lupine plants of cv. Giza 2, respectively. Meanwhile, the fungicide Topsin-M70 treatment recorded 60% healthy survived plants and disease reduction reached 64.3%. Concerning Mutant-7 in Table (4), olive pomace at the rate of 25% and chicken manure at the rate of 10% treatments were the most effective treatments, judged by the lowest disease severity score (0.40) and the highest increase in disease reduction (80%) compared to control-1 (Infested soil), which recorded disease severity score (2.0). In most cases, there were significant differences among the treatments and concentrations as well as soil infested with the wilt pathogen, *F. oxysporum* (control-1). Also, the same findings were observed between Topsin-M70 and the other treatments at the high rates.

Table 3. Effect of olive waste and chicken manure compared to Topsin-M70 on wilt disease of cv. Giza 2 lupine plants under greenhouse conditions, an average of the two seasons (2008/09 and 2009/10)

Treatment	Concentration (V/V)	cv. Giza 2 (Susceptible)					
		WP%*		SP%		DSS	DR%
		1 M	3M	IP%	HP%		
Olive waste	5 %	8	8	16	68	1.0	64.3
	10 %	8	4	8	80	0.6	78.5
	25 %	4	4	4	88	0.4	85.7
Chicken manure	5 %	8	4	12	80	0.6	78.5
	10 %	8	0	8	84	0.4	85.7
	25 %	4	8	4	84	0.6	78.5
Topsin-M70	1g/l (50 ml/pot)	0	8	32	60	1.0	64.3
Control (1)	-----	20	28	32	20	2.8	-
Control (2)	-----	8	8	12	72	1.0	-
L.S.D. at 0.05%	-----	3.30	3.05	9.68	10.29	0.74	-

* WP% = Wilted plants, SP% = Survived plants%, 1 M= One month after seeding, 3M= Three months after seeding, IP = Infected plants %, HP = Healthy plants %, DSS= Disease severity score, DR = Disease reduction%, Control (1)= Untreated seeds sown in infested soil and control (2)= Untreated seeds sown in uninfested soil.

Table 4. Effect of olive waste and chicken manure compared to Topsin-M70 on wilt disease of cv. Mutant 7 lupine plants under greenhouse conditions, an average of the two seasons (2008/09 and 2009/10)

Treatment	Concentration (V/V)	Mutant 7 (Resistant)					
		WP%*		SP%		DSS	DR%
		1 M	3M	IP%	HP%		
Olive waste	5 %	4	8	16	72	0.8	60
	10 %	8	4	8	80	0.6	70
	25 %	4	4	8	84	0.4	80
Chicken manure	5 %	8	4	12	76	0.8	60
	10%	0	8	8	84	0.4	80
	25 %	4	4	8	84	0.4	80
Topsin-M70	1g/l (50 ml/pot)	4	0	36	60	0.8	60
Control (1)	-----	8	8	28	56	2.0	-
Control (2)	-----	4	4	8	84	0.8	-
L.S.D. at 0.05%	-----	2.99	2.99	8.73	11.01	0.65	-

* As described in footnote of Table (3).

Effect of olive pomace and chicken manure compared to the fungicide Topsin-M70 on the characters of lupine plants:

Data presented in Table (5) reveal that the application of olive pomace, chicken manure compared to Topsin-M70 as a fungicide caused a significant increase in plant height (PH), number of branches/plant (NB), number of pods/plant (NP), seed yield/plant (SYP) and root length (RL) over the control with the pathogen.

Table 5. Effect of olive waste and chicken manure compared to Topsin-M70 on some characters of cv. Giza 2 exposed to wilt under greenhouse conditions, an average of the two seasons (2008/09 and 2009/10)

Treatment	Concentration (V/V)	Giza 2 cultivar (Susceptible)				
		PH*	NB	NP	SPY	RL
Olive waste	5%	65	6.6	13	10	45.5
	10%	72	6.8	13.2	13.5	44
	25%	77.4	8.9	16	17	46
Chicken manure	5%	70	7.8	12	15	50
	10%	72.5	7.5	15	17	46
	25 %	77.4	7.8	16	16.5	43.5
Topsin-M70	1g/l (50 ml/pot)	63.5	6.6	12	14	45
control (1)	-----	43.2	5.7	7.2	8.6	23.3
control (2)		56.5	6.9	9.6	11.2	26.2
L.S.D at 0.05%	-----	6.68	0.68	1.53	2.44	1.69

* PH= Plant height (cm), NB= Number of branches/plant, NP= Number of pods/plant, SPY= Single plant yield (gm) and RL = Root length (cm). Control (1)= Untreated seeds sown in infested soil and Control (2)= Untreated seeds sown in uninfested soil.

Also, results show that the lowest values of PH (cm), NB, NP, SPY (gm) and RL (cm) of the lupine cv. Giza 2 were obtained from control-1, being 43.2 cm, 5.7 branches/plant, 7.2 pods/plant, 8.6 gm/plant and 23.3 cm/plant, respectively, (as a mean of five plants). Meanwhile, the greatest values of PH (77.4 cm), NB (8.9), NP (16), SPY (17.0 gm) and RL (50.0) were recorded from lupine plants grown in infested soil by *F. oxysporum* and treated with olive pomace at the rate of 25% compared to the untreated lupine seeds, grown in uninfested soil, which recorded 56.5 cm (PH), 6.9 (NB), 9.6 (NP), 11.2 gm (SPY) and 26.2 cm (RL).

Concerning Mutant-7, data presented in Table (6) show that lupine plants grown in soil infested with *F. oxysporum* and treated with chicken manure at the rate of 25% recorded the highest values of plant height (80.4 cm), number of branches/plant (8.9), number of pods/plant (17), single plant yield (20.0 gm) and root length/plant (50.3 cm), followed by olive pomace treatment at the rate of 25% which recorded 78cm (PH), 7.9 (NB), 16.6 (NP), 18.6gm (SPY) and 46.5 cm/plant (RL). While, the lowest values were obtained in case of control-1, being 61.6 cm, 6.8 branches/plant, 10.4 pods/plant, 15gm and 40.4cm/plant for PH, NB, NP, SPY and RL, respectively.

Effect of olive pomace and chicken manure compared to the fungicide Topsin-M70 on controlling lupine wilt under field conditions:

The effect of olive pomace and chicken manure on lupine wilt and root-rot diseases complex incidence under field conditions through 2008/09 and 2009/10 growing seasons is shown in Table (7). Data show that the tested compost treatments reduced both of the lupine wilt and root-rot diseases. Meanwhile, the percentage of survived lupine plants was increased through season 2008/09 compared to the control (untreated). In the second season (2009/10), Topsin-M70 treatment recorded 95.7% survived plants, while it was 75.6% in control treatment. Generally, there were no significant differences among the treatments, but the differences were between the treatments and control, during both tested seasons.

Table 6. Effect of olive waste and chicken manure compared to Topsin-M70 on some characters of cv. Mutant 7 exposed to wilt under greenhouse conditions, an average of the two seasons (2008/09 and 2009/10)

Treatment	Concentration (V/V)	Mutant 7 (Resistant)				
		PH*	NB	NP	SPY	RL
Olive waste	5%	71.5	7.8	13	17	44
	10%	74	7.7	12	16.5	45
	25%	78	7.9	16.6	18.6	46.5
Chicken manure	5%	68	6.3	14.2	17.6	46
	10%	72	7.8	15	18	49.8
	25 %	80.4	8.9	17	20	50.3
Topsin-M70	1g/l (50 ml/pot)	73.5	7.5	15	16.5	50.3
control (1)	-----	61.6	6.8	10.4	15	40.4
control (2)	-----	75.4	7.6	13.2	19.3	45.5
L.S.D at 0.05 %	-----	7.81	0.74	1.78	2.14	3.19

* As described in footnote of Table (5).

Table 7. Effect of olive waste and chicken manure compared to Topsin-M70 on wilt and root rot diseases of cv. Giza 2 lupine plants grown under field conditions during 2008/09 and 2009/10 growing seasons

Treatment	Season 2008/09			Season 2009/10		
	Infected plants (%)		Survived Plants (%)	Infected plants (%)		Survived Plants (%)
	Root-rotted plants	Wilted plants		Root-rotted plants	Wilted plants	
Olive waste	2.0	3.3	94.7	3.0	1.3	95.7
Chicken manure	2.6	4.0	93.4	4.6	4.0	91.4
Topsin-M70	3.0	4.0	93.0	1.0	3.3	95.7
Control	10.4	18.3	71.3	8.0	16.4	75.6
L.S.D. at 0.05%	2.13	3.52	3.89	4.11	4.31	6.55

Effect of olive pomace and chicken manure compared to the fungicide Topsin-M70 on some characters of lupine plants under field conditions:

The effects of olive pomace and chicken manure compared to Topsin-M70 fungicide on days to flowering (DF), plant height (PH), number of branches /plant (NB), number of pods/plant (NP), 100-seed weight (HSW), single plant yield (SPY) and seed yield/feddan (SYF) of cv. Giza 2 lupine plants under field conditions through the two growing seasons, 2008/09 in Table (8) and 2009/10 in Table (9). All characters showed the highest values under the effect of olive pomace, followed by chicken manure, and at the same time exceeded the values of Topsin-M70 and control treatments. The corresponding values are 70.6, 73.3 and 70.1, 75.2 for DF; 98.3, 96.5 and 102.3, 100.1 for PH; 8.9, 8.1 and 8.9, 8.5 for NB; 20.3, 18.4 and 22.1, 19.1 for NP; 45.1, 43.5 and 47.3, 45.1 for HSW; 37.2, 34.1 and 39.1, 34.9 for SPY and 1716.7, 1700 and 1733.4, 1683.4 for SYF for olive pomace, and chicken manure treatments during 2008/09 and 2009/10 seasons, respectively. In most cases no significant differences were detected between olive waste and chicken manure treatments. Topsin-M70 treatment showed significant differences in comparison with control treatment.

Table 8. Effect of olive waste and chicken manure compared to Topsin-M70 on the characters of lupine plants cv. Giza 2 grown under field conditions during 2008/09 growing season

Treatment	Season 2008/09						
	DF*	PH	NB	NP	HSW	SPY	SYF
Olive waste	70.6	98.3	8.9	20.3	45.1	37.2	1716.7
Chicken manure	73.3	96.5	8.1	18.4	43.5	34.1	1700.0
Topsin-M70	77.2	86.3	7.1	15.6	39.2	30.2	1600.1
Control	79.3	72.6	5.3	10.5	30.2	19.6	600.1
L.S.D. at 0.05 %	1.5	4.5	0.6	1.6	2.5	2.9	206.1
L.S.D. at 0.01 %	4.6	13.9	1.8	5.1	7.8	9.1	633.6

* DF= Days to flowering, PH= Plant height (cm), NB= Number of branches/plant, NP= Number of pods/plant, HSW=100-seed weight (gm), SPY= Single plant yield (gm) and SYF= Seed yield/feddan (kg).

Table 9. Effect of olive waste and chicken manure compared to Topsin-M70 on the characters of lupine plants cv. Giza 2 grown under field conditions during 2009/10 growing season

Treatment	Season 2009/10						
	DF*	PH	NB	NP	HSW	SPY	SYF
Olive waste	70.1	102.3	8.9	22.1	47.3	39.1	1733.4
Chicken manure	75.2	100.1	8.5	19.1	45.1	34.9	1683.4
Topsin-M70	76.4	90.1	7.6	17.4	41.3	32.5	1666.7
Control	78.9	73.6	5.2	11.9	28.9	20.1	716.7
L.S.D. at 0.05 %	1.4	4.9	0.6	1.3	3.4	3.1	187.3
L.S.D. at 0.01 %	4.4	15.4	1.9	5.1	10.4	9.6	576.2

* As described in footnote of Table (8).

Discussion

Organic wastes, primarily by-products of many industrial activities, include animal manures and olive pomace. To reduce the environmental contamination, it is essential to use the organic wastes as an important resource in biological control programs. Possible utilization of organic wastes includes their use as a fertilizer and soil amendment. One of the beneficial properties of compost-amended soils is the highly induced suppression of numbers of soil-borne pathogens, such as *Pythium* spp., *Phytophthora* spp., *Rhizoctonia* spp. and *Fusarium* spp. In addition, D'Addabbo *et al.* (2003) studied the possibility of using olive pomace and chicken manure amendments for control of *Meloidogyne incognita* over two crop cycles. They found that the combination of olive pomace with chicken manure enhanced suppressiveness and increased crop yield compared to the single amendments alone.

Della Greca *et al.* (2001) and Isidori *et al.* (2005) reported the inhibition of plant and microbial growth by low-molecular-weight phenols present in olive mill wastes. Meanwhile, Aziz *et al.* (1998) observed that high-molecular-weight polyphenols

such as oleuropein or lignin-like polymers have shown a toxic activity produced in olive wastes. However, hydroxytyrosol has been identified as one of the major natural phenolics present in olive mill wastes (Fiorentino *et al.*, 2003). In addition, Del-Río *et al.* (2003) suggested that phenolic compounds were involved in the defence mechanisms of olive plants against *Phytophthora* sp., with tyrosol being the most active agent, followed by catechin and oleuropein and leading to greater suppression.

The results of the present investigation are in agreement with those obtained by Aryantha *et al.* (2000) who showed that the addition of fresh or composted chicken manure to potting mix significantly reduced the survival of *Phytophthora cinnamomi* and the development of disease in lupine seedlings. They also found that chicken manure increased soil organic matter, total biological activity and populations of antagonistic Actinomycetes, *Pseudomonas fluorescent* and fungi. However, chicken manure also stimulated the production of endospore-forming bacteria, which were positively correlated with lupine plant survival. Also, Bello *et al.* (2002) mentioned that olive remains as biofumigation material were as effective as conventional pesticides in the control of root-knot nematodes, fungi, insects and weeds.

Results of the present study indicated that soil chemical analysis, after amended with the olive waste and chicken manure, showed an increase in the content of salts, cations and anions quantities of suitable nitrogen, phosphorus and potassium except sodium in the soil with the increase of chicken manure concentration in the soil. In this regard, Adeleye *et al.* (2010) found that increasing rates of added plant residues and chicken may be due to increased concentration of calcium and magnesium is either to lower sodium concentration in the soil to the ability of calcium to the expulsion of sodium from the soil replacement and replaced it.

Application of olive pomace or chicken manure caused a significant increase in growth parameters of lupine cv. Giza 2 grown in infested soil with *F. Oxysporum*, compared to the fungicide Topsin-M70. The greatest values of plant height (PH), number of branches (NB), number of pods (NP), 100-seed weight (HSW) and root length (RL) were recorded from lupine plants grown in infested soil and treated with olive pomace at the rate of 25% (v/v) compared to untreated lupine seeds grown in non- infested soil (control 2). These results may be due to that the waste content of total dissolved salts was low compared to chicken residues which are relatively high. Chicken waste contained the high nitrogen, phosphorus and potassium contents compared to the olive residues. Also, it showed the high content of calcium and magnesium compared to the sodium concentration in the chicken waste. This finding and its inquiries depend on the chemical analysis of olive waste and chicken manure presented in Table (1 and 2). In this connection, D'Addabbo *et al.* (2003) reported that fresh and exhausted olive pomace as organic amendments had significant nematicidal effects on root-knot nematodes and increased tomato yields in Italy. In regarding to Mutant-7, chicken manure treatment at the rate of 25% (v/v) recorded the highest values of plant growth and yield components followed by olive pomace treatment. Many studies reported that fertilizing power of organic fertilizers is due to their content of stabilized organic matter and due to their component of

nutrient elements (Bevacqua and Mellano, 1993). These results are in accordance with those obtained by El-Morshedy (1997) who found that using chicken manure increased shoot growth rate, leaf area and percentage of leaves and dry weight of sour orange seedlings. Results are also agree with those of Helail *et al.* (2003) who reported that shoot on different growth cycles of Washington navel orange. Also, these findings are in harmony with those of by Igua *et al.* (2008) who reported that plant height, grain yield and selected yield components of maize gave positive responses to chicken manure application.

Data of field experiments showed that the tested compost treatments reduced lupine wilt and root-rot diseases and increased the percentage of the lupine survived plants compared to the control. The highest percentage of survived plants was recorded due to olive pomace treatment with the highest values of seed yield weight during the first and the second seasons. These findings, that resulted by applying organic fertilization, may be attributed to the stimulation effect of the absorbed nutrients on photosynthesis process, also, the slow release nutrients resulting from the biodegradation of manure by soil microorganisms could explain the present results (Cole *et al.*, 1987 and Bhangoo *et al.*, 1988). In this regard, the enhancement of decrease of wilt and root-rot diseases incidence with increasing the seed yield and its attributes characteristics could be attributed to the capability of soil microorganisms to produce growth regulators such as auxins, cytokinines and gibberellins which had a positive effect on flowering process and nutrients uptake (Martin *et al.*, 1989). Also, these results are in conformity with those obtained by Kotsou *et al.* (2004) who found that addition of olive mill waste significantly suppressed root rot disease incidence caused by *R. solani*. The increase in yield and its components might be attributed to the relatively high content of minerals and or elements in olive pomace and chicken manure in the lupine plants, which grown in the greenhouse and under field conditions. The same results were reported by El-Morshedy (1997), Hegazi *et al.* (2007), Fayed (2005 and 2010).

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تقييم دور تفل الزيتون وسماد مخلفات
مقارنة بمبيد التيسين -
الذبول الفيوزارمى فى نبات الترمس وزيادة

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المخلفات العضوية وبخاصة المنتجة من الانشطة الصناعية او الزراعية
مثل المخلفات الحيوانية وتفل الزيتون تستخدم كاسمدة زراعية.
مبوست للتربة يعتبر محفز قوى لتثبيت تعداد المسببات المرضية بالتربة.
فى هذه الدراسة تم استخدام تفل الزيتون وسماد مخلفات الدواجن مقارنة بمبيد
تيسين-

Fusarium oxysporum f.sp. *lupini*

محافظة الاسماعيلية. نجح كل من تفل الزيتون وسماد مخلفات الدواجن
ومبيد التيسين- فى خفض النسبة المئوية للاصابة بفطر الفيوزاريوم خلال
موسمين زراعيين / /

%

ليمة بنسبة % تم تسجيلها عند معاملات التسميد وبخاصة تركيز
% لتفل الزيتون و %

ومن جهة اخرى ادى تفل الزيتون وسماد مخلفات الدواجن مقارنة بمبيد
- لزيادة معنوية فى ارتفاع النباتات وعدد الافرع للنبات وعدد القرون

فقد ادت المعاملات الى حدوث تاثير
ايجابى فى مقاومة مرض الذبول وعفن الجذور بالاضافة لمكونات المحصول مثل
يستطيع تفل
الزيتون وسماد مخلفات الدواجن تثبيط الفطريات الممرضة بالتربة وخفض حدوث
المرض بالاضافة لزيادة