Journal of Horticultural Science & Ornamental Plants 2 (2): 63-78, 2010
ISSN 2079-2158

Optimizing Yield, Fruit Quality and Nutrition Status of Roghiani Olives Grown in Libya Using Some Organic Extracts

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Abstract: This study had been carried out through two successive seasons (2007/2008 and 2008/2009) in Gherian region at El-Gabal El-Gharby's Highland, Libya. Twenty years-old Roghiani olive trees were submitted to soil and/or foliar applications in the two studied seasons. The soil applications were compost tea, chicken manure tea and control (with or without foliar applications of yeast, humic acid and yeast + humic acid extracts). Soil application of manure tea with yeast + humic acid gave better effect on all vegetative characteristics, increasing trunk diameter (cm/year), number of leaves/shoot and leaf area (cm^2). Also, the aforementioned treatment increased length, diameter, weight and size of fruits and shape index. Moreover it increased fruit moisture content and leaf and bud N content. Whereas, using compost tea to the soil with yeast + humic acid extracts gave better effect on all flowering characteristics (number of inflorescences per twig, flowering density, number of flowers per inflorescence, number of perfect flowers per inflorescence, sex ratio, fruit set percentage, fruit yield (kg/tree), fruit flesh oil and carbohydrates contents, leaf content of K, Ca, Mg, Fe, Zn, Mn, chlorophyll a and b, bud total carbohydrates content and C/N ratio. In addition, manure tea gave the highest oil peroxide and iodine values compared to the compost tea.

Key words: Olive · Organic · Compost tea · Manure tea · Yeast · Humic · Extracts

INTRODUCTION

Olive trees have a great international importance both from social and economic point of view [1]. The fruit olive production is generally low due to the poor soil fertility and low water holding capacity. Accordingly, it seems that trees need to organic fertilization [2]. Thus, the application of organic fertilizers avoided pollution and reduced the costs of fertilization. Also, it has drowned the attention of olive growers to use the organic and bio-fertilizers that would be healthy for human and safe for environment [3].

Leaf nutrient analysis is the best methods for diagnosing tree nutritional status and represents an important tool for determining future fertilization requirements. Presently, the use of leaf analysis as a guide for olive fertilization is still infrequent in Mediterranean countries [4].

Compost tea, in modern terminology is a compost extract, plant extracts, liquid manures and compost teas can be further understood in the context of their influences on the rhizosphere and phyllosphere. Also, manure and compost tea production is a brewing process that extracts microorganisms from compost or manure followed by microbial growth and multiplication including beneficial bacteria, fungi and protozoa [5]. Soil application of compost with compost tea gave better effect on all vegetative characteristics and leaves chemical constituents of pigments, macro and micro elements, total carbohydrates, C/N ratio and fruit yield compared to control of pear trees [6].

Furthermore, yeast extracts contains vitamins B1 (Thiamin), B6 (Pyridoxine) and glucine [7]. It aids in activating photosynthesis process through enhancing the released carbon dioxide [8]. Also, it contains proteins and cytokinen, application of yeast extract was very effective in improving vine growth, nutritional status and yield and fruit quality than untreated vines [9].

Humic substances are usually applied to the soil and favorably affect the soil structure and soil microbial population. Foliar sprays of these substances also promote growth in grapes [10]. Spraying with fulvic acid also increased yield of wheat grown under dry condition [11] suggesting the capability of the humic acid to reduce

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water stress. In addition, the low cost of the application of these products by foliar spraying has been indicated [12]. Also, foliar application of humic substances extracts on olive growth was effective to promote accumulation of nutrients in olive leaves [13].

This study was planned to optimize the growth, nutrient status, yield and fruit quality and oil properties of Roghiani Libyan olive trees by using some organic extracts.

MATERIALS AND METHODS

This study was conducted during two successive seasons, 2007/2008 and 2008/2009, on 20 years old Roghiani Libyan olive trees grown in a private orchard in Gherian district at El-Gabal El-Gharby's highland, Libya (835 m above sea level and about 149 Km from Tripoli). The trees spaced 10 × 10 meter apart (100 trees/hectare) in a sandy soil (Table 1). The farm is depending totally on rainfall in irrigation. The average annual rainfall in this area in the two studied seasons was about 472.5 and 335 mm, respectively, concentrated in the autumn and winter months.

Two sources of organic extracts were added to the soil in this study, compost tea and chicken manure tea. Four equal doses of each, 10 l/tree, were added in December, March, June and September during the two seasons beside control treatment (without organic extracts). The soil application treatments were done with or without four foliar spraying treatments at 10 l/tree of either active yeast 1% or humic acid 0.5% or active yeast 1% + humic acid 0.5% or water spraying (control of the foliar application) in the same time of the soil treatments. This study had contained 12 treatments, each treatment conducted 3 replicates and each tree considered as a one replicate. All of the thirty six trees conducted in this study were vigorous, healthy and similar in growth and canopy tree.

The tea of both compost and chicken manure was prepared from composted farm refuse and chicken manure. The composition of compost and chicken manure is listed in Table 2. Mature compost and chicken manure were soaked by tied each dose (1kg/10 L water) in a cotton tissue and left hanged for 48 hours and 7 days for manure and compost, respectively in a barrel, sized 50 l and attached by air pump to good solution aeration, to produce manure and compost extracts. Then, compost and manure were pulled out of solution extracts and contentiously aerated with air bubblers for 15 days to obtaine good tea of compost or manures [5].

Table 1: Some physical and chemical characteristics of sandy soil used for the present study

Parameters	Value	Parameters	Value
Particle- size distribution		Soluble cations, meq/l	
Sand (%)	81.7	Ca^{2+}	4.12
Silt (%)	15.8	Mg^{2+}	2.51
Clay (%)	2.5	Na^{+}	7.32
Textural class	Sand	K^{+}	0.85
Bulk density (mg/ m^3)	1.69	Soluble anions, meq/l	
Saturation water content (v/v)	0.378	CO_3^{-2}	-
Field capacity (cm^3/cm^3)	0.43	HCO_3^{-}	2.40
Paramount wilting point (cm^3/ cm^3)	0.064	CL^{-}	6.95
Available water (cm^3/ cm^3)	0.079	SO_4^{2-}	4.92
Organic matter (%)	1.33	Available nutrient (mg/kg soil)	
Calcium carbonates (%)	10.71	N	12.20
pH	8.8	P	16.30
EC (dS/m)	4.53	K	162.10
		Fe	4.30
		Mn	5.60
		Cu	0.80
		Zn	1.50

Table 2: Some chemical characteristics of the used organic sources

	Organic sources	
Parameters	Mature compost	Chicken manure
Cubic meter weight (Kg)	600.00	535.00
Moisture (%)	29.00	12.52
Organic matter (%)	30.70	52.60
Organic carbon (%)	31.25	34.70
pH	8.50	7.12
EC (dS/m)	6.50	5.61
C/N ratio	18.82	10.80
Total N (%)	1.66	3.21
Total P (%)	0.52	0.65
Total K (%)	1.12	1.19
Total Ca (%)	1.25	2.15
Total Mg (%)	1.21	0.95
Total Fe (ppm)	320.00	265.00
Total Mn (ppm)	45.00	51.00
Total Zn (ppm)	34.00	46.00
Total Cu (ppm)	42.00	46.00

Table 3: Some chemical characteristics of the used organic tea

	Organic tea	
Parameters	Compost tea	Manure tea
pH	8.57	7.82
EC (dS/m)	7.42	6.38
Total N (ppm)	227.00	425.00
Total P (ppm)	23.00	25.00
Total K (ppm)	16.00	14.00
Total Ca (ppm)	14.00	13.00
Total Mg (ppm)	7.00	6.00
Total Fe (ppm)	132.00	121.00
Total Mn (ppm)	23.00	27.00
Total Zn (ppm)	15.00	20.00
Total Cu (ppm)	17.00	19.00

The analysis of compost tea and manure tea are tabulated in Table 3. Yeast was brewed for 24 hours to prepare autolysates solution of active dry yeast, 10 g dry yeast + 10 cm molasses + 1000 cm water, according to Sommer [14]. Also, 0.5% net humic acid was prepared according to Fernandez-Escobar *et al.* [13].

The Following Parameters Were Recorded

Vegetative Characteristics: The growth rate of trunk diameter (GRTD) of each tree, at 20 cm above soil surface, was estimated according to the following equation:

GRTD = final trunk diameter in September (cm) – initial trunk diameter in March (cm). Then, 9 vegetative shoots one year old, were randomly chosen and marked per tree at the beginning of growth season (early March) to determine the number of newly formed shoots per twig, its length (cm) and number of leaves per shoot at the end of each season (first of September). Also, the average of leaf area (6 mature leaves sample for each replicate at sixth nodes from the base of current grown shoots) was estimated in July using Laser Area Meter CI-202, USA.

Leaf Contents of Macro and Micro Elements and Pigments: Macro and micro elements were determined in dry leaf samples collected at the 1st week of July of each season. Nitrogen (%) was determined by Micro-Kjeldahl according to Pregel [15], Phosphorus (%) as described by Chapman and Pratt [16] and potassium (%) as adopted by Brown and Lilleland [17]. Also, Ca and Mg percentages as well as Fe, Mn, Zn (ppm) were determined using Perkins Elmer Atomic Absorption Spectrophotometer (Model, Sepectronic 21 D) as described by Jackson [18]. In addition, chlorophyll a and b leaf content (mg/g FW) were colormetrically determined in fresh leaf samples according to Wettestien [19].

Buds Content of Total Carbohydrates, Nitrogen and C/N Ratio: Samples of buds and nodal tissues were taken at 1st week of July, in the two seasons and dried to determine the total nitrogen, according to Pregel [15] and total carbohydrates, as described in A.O.A.C. [20]. Finally, C/N ratio was calculated.

Flowering Characteristics: At full bloom stage (first week of April), average number of inflorescences per twig, flowering density (number of inflorescences per meter), average number of flowers per inflorescence, average number of perfect and imperfect inflorescence and sex ratio were estimated.

Fruits Calculations: Initial and final fruit set percentage were calculated in relation to the total number of flowers on the same twig after 21 and 60 days from full bloom, respectively [21]. The yield of tree was measured at maturity stage (second week of September). For fruit quality, thirty ripe fruits per replicate were randomly picked to determine fruit size (cm^3), fruit length (cm), fruit diameter (cm), fruit shape (L/D ratio), fruit weight (g) and flesh weight (g). Also, fruit flesh contents of oil, total carbohydrates, moisture (%), oil acidity value, oil peroxide value and oil iodine value were determined according to A.O.A.C. [20].

Statistical Analysis: The obtained data were tabulated and statistically analyzed as split plot design and the means of results were compared using LSD method at 5 % level [22]. The percentages were transformed to arcsine to find the binomial percentages according to Steel and Torrie [23].

RESULTS AND DISCUSSION

Vegetative Growth: Data presented in Tables 4 and 5 show vegetative growth parameters (growth rate of trunk diameter "GRTD" (cm/year), number of newly formed shoots/twig, new shoot length (cm), number of leaves /shoot and leaf area (cm^2)) significantly affected by soil applications, foliar applications and interactions between them in the two seasons. All vegetative growth parameters were higher in the second season than the first one. Concerning soil applications, chicken manure tea significantly raised all vegetative parameters compared to compost tea in the two seasons. In addition, foliar application of yeast plus humic gave the best results, in this respect, followed by humic or yeast comparing with control treatments. The tertiary interaction between soil, foliar applications and seasons had significantly increased vegetative growth parameters affected by manure tea with yeast plus humic acid in the second season compared to other interactions.

These results are confirmed with those of Mostafa [24], on Washington navel orange trees, who found that vegetative growth parameters were significantly increased by poultry manure applied at 375 g N/tree at mid of December. Likewise, Mansour *et al.* [25] on grapevine concluded that interaction between compost tea and chicken manure extracts at (1:10 x 1:10 v/w) gave the best results of leaf surface area. Also, Mostafa *et al.* [26] found that compost tea application, generally, gave significant increases in shoot length, leaf number/shoot and leaf

Table 4: Effect of some organic extracts on some vegetative growth characteristics of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Growth rate of trunk diameter "GRTD."(cm/year)			No. of new shoots / twig			New shoot length (cm)		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.24	1.61	1.42	4.42	6.52	5.47	8.02	10.81	9.41
	Humic	1.30	1.76	1.53	4.71	6.69	5.70	8.71	11.73	10.22
	Yeast + Humic	1.41	1.82	1.61	5.36	8.36	6.86	9.25	14.22	11.73
	Water (control)	1.18	1.46	1.32	4.62	5.77	5.19	8.04	9.51	8.77
Average		1.28	1.66	1.47	4.77	6.83	5.80	8.50	11.56	10.03
Manure Tea	Yeast	1.28	1.72	1.50	5.24	6.73	5.98	9.83	12.96	11.39
	Humic	1.38	1.79	1.58	5.83	7.81	6.82	8.96	14.45	11.70
	Yeast + Humic	1.53	1.95	1.74	6.61	9.02	7.81	9.45	15.75	12.60
	Water (control)	1.21	1.48	1.34	4.31	6.13	5.22	8.62	9.92	9.27
Average		1.35	1.73	1.54	5.50	7.42	6.46	9.21	13.27	11.24
Control	Yeast	1.16	1.36	1.26	3.32	4.62	3.97	7.78	8.53	8.15
	Humic	1.18	1.48	1.33	3.59	4.85	4.22	7.21	8.37	7.79
	Yeast + Humic	1.23	1.51	1.37	4.11	4.96	4.53	8.15	9.26	8.70
	Water (control)	1.02	1.09	1.05	3.43	3.51	3.47	7.24	7.28	7.26
Average		1.15	1.36	1.25	3.61	4.50	4.05	7.59	8.36	7.97
General Average		1.26	1.58	1.42	4.62	6.25	5.43	8.43	11.06	9.75
Average of treatment	Yeast	1.23	1.56	1.39	4.32	5.95	5.14	8.54	10.76	9.65
	Humic	1.29	1.67	1.48	4.71	6.45	5.58	8.29	11.51	9.90
	Yeast + Humic	1.39	1.76	1.57	5.36	7.45	6.40	8.95	13.07	11.01
	Water (control)	1.13	1.34	1.23	4.12	5.14	4.63	7.96	8.90	8.43
LSD at 5%										
Season (A)			0.020			0.33			0.13	
Soil (B)			0.030			0.42			0.22	
A x B			0.060			0.56			0.45	
Foliar (C)			0.040			0.53			0.26	
A x C			0.070			0.66			0.31	
B x C			0.070			0.66			0.31	
A x B x C			0.011			0.82			0.64	

Table 5: Effect of some organic extracts on some vegetative growth characteristics of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		No. of leaves / shoot			Leaf area (cm^2)		
		Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	8.57	12.21	10.39	3.70	4.82	4.26
	Humic	8.65	13.68	11.16	3.75	4.86	4.30
	Yeast + Humic	10.85	15.59	13.22	4.41	5.09	4.75
	Water (control)	8.51	11.49	10.00	3.59	3.61	3.60
Average		9.14	13.24	11.19	3.86	4.59	4.22
Manure Tea	Yeast	9.63	14.53	12.08	3.95	4.90	4.42
	Humic	9.71	14.25	11.98	3.97	4.95	4.46
	Yeast + Humic	11.92	16.52	14.22	4.59	5.20	4.89
	Water (control)	8.86	11.10	9.98	3.63	3.77	3.70
Average		10.03	14.10	12.06	4.03	4.70	4.36

Table 5: Continued

Control	Yeast	8.21	10.67	9.44	3.33	3.49	3.41
	Humic	7.63	9.71	8.67	3.41	3.50	3.45
	Yeast + Humic	8.92	11.36	10.14	3.48	3.52	3.50
	Water (control)	7.55	7.20	7.37	3.22	3.25	3.23
	Average	8.07	9.73	8.90	3.36	3.44	3.39
General Average		9.08	12.36	10.72	3.75	4.24	3.99
Average of treatment	Yeast	8.80	12.47	10.64	3.66	4.40	4.03
	Humic	8.66	12.55	10.60	3.71	4.43	4.07
	Yeast + Humic	10.56	14.49	12.52	4.16	4.60	4.38
	Water (control)	8.31	9.93	9.12	3.48	3.54	3.51
LSD at 5%							
Season (A)			0.22			0.11	
Soil (B)			0.29			0.12	
A x B			0.48			0.16	
Foliar (C)			0.32			0.15	
A x C			0.55			0.18	
B x C			0.55			0.18	
A x B x C			0.91			0.20	

Table 6: Effect of some organic extracts on some leaf minerals content of Roghiani olive trees (2007/08 and 2008/09)

		N %			P %			K %		
		Seasons			Seasons			Seasons		
Organic extracts										
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.146	1.545	1.345	0.161	0.180	0.170	0.897	1.003	0.950
	Humic	1.245	1.677	1.461	0.160	0.177	0.168	0.916	0.986	0.951
	Yeast + Humic	1.322	2.033	1.677	0.175	0.184	0.179	0.975	1.025	1.000
	Water (control)	1.149	1.359	1.254	0.145	0.170	0.157	0.808	0.947	0.877
	Average	1.215	1.653	1.434	0.160	0.177	0.169	0.899	0.990	0.944
Manure Tea	Yeast	1.305	1.853	1.579	0.146	0.173	0.159	0.813	0.947	0.880
	Humic	1.281	2.066	1.673	0.138	0.170	0.154	0.769	0.935	0.852
	Yeast + Humic	1.351	2.252	1.801	0.166	0.175	0.170	0.925	0.975	0.950
	Water (control)	1.232	1.418	1.325	0.135	0.148	0.141	0.752	0.824	0.788
	Average	1.292	1.897	1.594	0.146	0.166	0.156	0.814	0.920	0.867
Control	Yeast	1.112	1.219	1.165	0.139	0.168	0.153	0.774	0.936	0.855
	Humic	1.031	1.196	1.113	0.136	0.163	0.149	0.757	0.908	0.832
	Yeast + Humic	1.165	1.324	1.244	0.148	0.171	0.159	0.824	0.952	0.888
	Water (control)	1.035	1.041	1.038	0.122	0.128	0.125	0.679	0.713	0.696
	Average	1.085	1.195	1.140	0.136	0.157	0.146	0.758	0.877	0.817
General Average		1.197	1.581	1.389	0.147	0.166	0.157	0.820	0.929	0.874
Average of treatment	Yeast	1.187	1.539	1.363	0.148	0.173	0.160	0.828	0.962	0.895
	Humic	1.185	1.646	1.415	0.144	0.170	0.157	0.814	0.943	0.878
	Yeast + Humic	1.279	1.869	1.574	0.163	0.176	0.169	0.908	0.984	0.946
	Water (control)	1.138	1.272	1.205	0.134	0.148	0.141	0.746	0.828	0.787
LSD at 5%										
Season (A)			0.016			0.004			0.004	
Soil (B)			0.022			0.006			0.006	
A x B			0.041			0.013			0.007	
Foliar (C)			0.035			0.009			0.008	
A x C			0.056			0.044			0.011	
B x C			0.056			0.044			0.011	
A x B x C			0.077			0.064			0.024	

Table 7: Effect of some organic extracts on some leaf minerals content of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Ca %			Mg (ppm)			Fe (ppm)		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	0.759	0.849	0.804	37.33	41.66	39.50	122.33	145.00	133.66
	Humic	0.775	0.835	0.805	37.00	40.00	38.50	123.00	128.66	125.83
	Yeast + Humic	0.825	0.868	0.846	40.66	42.33	41.50	133.66	163.00	148.33
	Water (control)	0.684	0.802	0.743	27.00	39.00	33.00	122.00	127.33	124.66
Average		0.760	0.838	0.799	35.50	40.75	38.12	125.25	140.99	133.12
Manure Tea	Yeast	0.688	0.802	0.745	33.00	39.00	36.00	114.33	128.66	121.50
	Humic	0.651	0.808	0.729	31.66	39.66	35.66	111.66	114.00	112.83
	Yeast + Humic	0.783	0.825	0.804	38.33	40.00	39.16	122.00	133.33	127.66
	Water (control)	0.636	0.697	0.666	31.66	33.33	32.50	105.00	120.00	112.50
Average		0.689	0.783	0.736	33.66	37.99	35.83	113.25	123.99	118.62
Control	Yeast	0.655	0.792	0.723	31.00	38.33	34.66	107.33	122.66	115.00
	Humic	0.641	0.769	0.705	31.33	37.00	34.16	107.00	110.00	108.50
	Yeast + Humic	0.697	0.806	0.751	33.66	39.33	36.50	109.66	124.33	117.00
	Water (control)	0.482	0.603	0.542	23.33	23.66	23.50	103.00	100.66	101.83
Average		0.618	0.742	0.680	29.83	34.58	32.20	106.75	114.41	110.58
General Average		0.689	0.787	0.738	32.99	37.77	35.38	115.08	126.46	120.77
Average of treatment	Yeast	0.700	0.814	0.757	33.77	39.66	36.72	114.66	132.11	123.38
	Humic	0.689	0.804	0.746	33.33	38.88	36.10	113.88	117.55	115.72
	Yeast + Humic	0.768	0.833	0.800	37.55	40.55	39.05	121.77	140.22	130.99
	Water (control)	0.600	0.700	0.650	27.33	31.99	29.66	110.00	115.99	112.99

LSD at 5%			
Season (A)	0.005	0.42	1.09
Soil (B)	0.009	0.55	1.11
A x B	0.010	0.73	1.25
Foliar (C)	0.011	0.62	1.33
A x C	0.022	0.77	2.66
B x C	0.022	0.77	2.66
A x B x C	0.046	0.93	3.85

Table 8: Effect of some organic extracts on some leaf minerals content of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Zn (ppm)			Mn (ppm)		
		Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	28.33	40.00	34.16	17.00	24.33	20.66
	Humic	29.00	35.66	32.33	17.66	21.66	19.66
	Yeast + Humic	31.66	46.00	38.83	19.00	27.33	23.16
	Water (control)	26.00	31.33	28.66	15.33	19.00	17.16
Average		28.75	38.25	33.50	17.25	23.08	20.16
Manure Tea	Yeast	26.33	35.00	30.66	16.66	20.66	18.66
	Humic	26.66	32.00	29.33	16.33	19.33	17.83
	Yeast + Humic	28.00	37.66	32.83	17.00	21.66	19.33
	Water (control)	25.00	28.00	26.50	15.00	17.66	16.33
Average		26.50	33.16	29.83	16.25	19.82	18.03

Table 8: Continued

Control	Yeast	25.33	33.66	29.50	15.33	19.00	17.16
	Humic	25.00	30.00	27.50	15.00	17.33	16.16
	Yeast + Humic	26.00	35.33	30.66	16.66	20.66	18.66
	Water (control)	24.00	24.66	24.33	14.67	15.00	14.83
	Average	25.08	30.91	27.99	15.41	17.99	16.70
	General Average	26.77	34.10	30.44	16.30	20.29	18.29
Average of treatment	Yeast	26.66	36.22	31.44	16.33	21.33	18.83
	Humic	26.88	32.55	29.72	16.33	19.44	17.88
	Yeast + Humic	28.55	39.66	34.10	17.55	23.21	20.38
	Water (control)	25.00	27.99	26.50	15.00	17.22	16.10
LSD at 5 %							
Season (A)			0.31			0.20	
Soil (B)			0.42			0.25	
A x B			0.59			0.43	
Foliar (C)			0.54			0.36	
A x C			0.63			0.44	
B x C			0.63			0.44	
A x B x C			0.91			0.66	

Table 9: Effect of some organic extracts on some leaf pigments content of Roghiani olive trees (2007/08 and 2008/09)

		Chlorophyll a (mg/g FW)			Chlorophyll b (mg/g FW)		
		Seasons			Seasons		
Organic extracts							
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.715	1.905	1.810	1.825	2.115	1.970
	Humic	1.682	1.875	1.778	1.807	2.090	1.948
	Yeast + Humic	1.785	1.930	1.857	1.885	2.297	2.091
	Water (control)	1.592	1.627	1.609	1.642	1.773	1.707
	Average	1.693	1.834	1.763	1.789	2.068	1.929
Manure Tea	Yeast	1.695	1.833	1.764	1.831	2.103	1.967
	Humic	1.664	1.816	1.740	1.822	1.995	1.908
	Yeast + Humic	1.763	1.910	1.836	1.813	2.154	1.983
	Water (control)	1.595	1.616	1.605	1.625	1.695	1.660
	Average	1.679	1.793	1.736	1.772	1.986	1.879
Control	Yeast	1.645	1.752	1.698	1.641	1.834	1.737
	Humic	1.633	1.736	1.684	1.609	1.853	1.731
	Yeast + Humic	1.651	1.803	1.727	1.655	1.892	1.773
	Water (control)	1.517	1.503	1.510	1.600	1.603	1.601
	Average	1.611	1.698	1.654	1.626	1.795	1.710
	General Average	1.661	1.775	1.718	1.729	1.949	1.839
Average of treatment	Yeast	1.685	1.830	1.757	1.765	2.017	1.891
	Humic	1.659	1.809	1.734	1.746	1.979	1.862
	Yeast + Humic	1.733	1.881	1.807	1.784	2.114	1.949
	Water (control)	1.568	1.582	1.575	1.622	1.690	1.656
LSD at 5%							
Season (A)			0.003			0.006	
Soil (B)			0.006			0.009	
A x B			0.011			0.018	
Foliar (C)			0.009			0.015	
A x C			0.013			0.023	
B x C			0.013			0.023	
A x B x C			0.042			0.077	

surface area compared to control of grapevines. Also, the highest statistically vegetative growth values were recorded with soil adding compost tea (30kg/tree) plus bio-fertilization plus humic comparing to other organic treatments on Le Cont pear trees [6]. The stimulation effect of yeast on growth might be attributed to its own higher content of amino acids and cytokinins and minerals as well as its positive action on enhancing the biosynthesis of carbohydrates [27]. Improving growth effect of yeast was confirmed by the results of Gobara *et al.* [9] on Red Roomy grapevines. Foliar application of humic substances clearly stimulated vegetative growth of olive trees. These results are in agreement with those reported by Chen and Aviad [12] on a wide number of plants species.

Leaf Contents of Macro and Micro Elements and Pigments: Data depicted in Tables 6, 7, 8 and 9 indicate that leaf contents of macro and micro elements and pigments were significantly increased by successive soil application of organic teas, foliar applications or combination between them in the two seasons. Soil application of compost tea recorded higher leaf contents of l macro and micro elements and pigments, except N, compared to soil application of manure tea. Moreover, in such organic tea treatments, leaf macro and micro elements and pigments were higher in the second season than in the first one.

Concerning the foliar applications, spraying yeast + humic gave the highest results of leaf contents of macro and micro elements and pigments followed by spraying yeast or humic acid during both seasons. The interaction between soil and foliar application cleared that adding compost tea with spraying yeast + humic acid extracts recorded the highest leaf content of P, K, Ca, Mg, Fe, Zn, Mn and chlorophyll a and b in the second season. Whereas, adding manure tea with spraying yeast + humic acid recorded the significant higher leaf content of N.

Generally, compost tea or manure tea proved to be the most efficient in enhancing the mineral content in leaves of Roghiani olive trees. The important role of organic manures is due to the availability of nutrients through reducing soil pH, increasing the exchangeable capacity for mineral nutrients and reducing loss of them by leaching through drainage process.

These results are in agreement with Hegazi *et al.* [3] on olive trees, found that applying chicken manure markedly increased leaf N, P, K and pigments. Also, application of compost + compost tea + humic acid on Le Cont pear trees gave a positive effect on all chemical leaf constituents, leaf pigments, macro and micro leaf elements [6]. The beneficial effect of yeast on increasing the uptake of elements could explain the present results. These results are in agreement with those obtained by Abou-Zaid [7] ; Larson *et al.* [8] and Gobara *et al.* [9]. The stimulating effect of humic substances on tree growth has been related to enhancing mineral uptake. The increasing in macro and micro elements uptake as influenced by humic substances have been reported on a large number of publications in different plant species [12, 28, 29].

Buds Content of Total Carbohydrates (% of Dry Weight), N (%) and C/N Ratio: Buds and nodal tissues contents of total carbohydrates, N and C/N ratio were significantly affected by different treatments in both seasons (Table 10). Compost tea gave the best values of total carbohydrates and C/N ratio compared to manure tea. But, manure tea gave the highest nitrogen value compared to compost tea. Also, spraying yeast + humic acid produced the best results comparing to spraying humic acid or yeast treatments. On the other hand, soil addition of compost tea with spraying humic plus yeast were more effective in this concern than other interactions used.

These results are in parallel with those of Hegazi *et al.* [3] on olive trees and Mohammed *et al.* [6] on pear trees ; Gobara *et al.* [9] on Reed Roomy grapevines and Fernandez-Escobar *et al.* [13] on olive trees.

Flowering Characteristics: It is clearly noticed from Tables 11 and 12 that all the flowering parameters of olive trees have been positively responded to the organic fertilization treatments. The improvement was the highest with compost tea followed by manure tea comparing to control. However, spraying humic acid + yeast was more effective in this concern than other spraying used treatments. All flowering parameters in the second season were significantly increased due to treating with compost tea with spraying yeast + humic acid comparing to other interactions in this regard.

Referring to the previous results, almost all flowering measurements were significantly increased by organic fertilization (compost tea or manure tea) treatments compared to control. The improvement in flowering resulted by compost tea may be attributed to the stimulation effect of the absorped nutrients on photosynthesis process which certainly reflected positively on flowering characteristics [30]. Also, compost extract bruited with microbial food source, humic, fulvic acids and catalyst amendments promote the growth and

Table 10: Effect of some organic extracts on some bud chemicals content of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Total carbohydrate %			N %			C/N ratio		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	13.21	21.35	17.28	1.103	1.487	1.295	11.98	14.36	13.17
	Humic	14.04	21.24	17.64	1.198	1.608	1.403	11.72	13.21	12.46
	Yeast + Humic	15.98	29.75	22.86	1.273	1.922	1.597	12.56	15.48	14.02
	Water (control)	11.07	13.90	12.49	1.101	1.308	1.204	10.06	10.63	10.34
Average		13.57	21.56	17.56	1.168	1.581	1.374	11.58	13.42	12.50
Manure Tea	Yeast	13.62	21.67	17.64	1.256	1.784	1.520	10.85	12.15	11.50
	Humic	12.95	23.68	18.31	1.233	1.989	1.611	10.51	11.91	11.21
	Yeast + Humic	14.28	28.53	21.40	1.301	2.237	1.769	10.97	12.75	11.86
	Water (control)	11.68	14.08	12.88	1.186	1.365	1.275	9.85	10.32	10.08
Average		13.13	21.99	17.55	1.244	1.843	1.543	10.55	11.78	11.16
Control	Yeast	10.55	12.50	11.52	1.078	1.173	1.125	9.79	10.66	10.22
	Humic	10.04	11.79	10.91	1.030	1.151	1.090	9.75	10.25	10.00
	Yeast + Humic	11.37	14.62	12.99	1.155	1.275	1.215	9.85	11.55	10.70
	Water (control)	10.64	9.63	10.13	1.090	1.002	1.046	9.77	9.61	9.69
Average		10.65	12.13	11.38	1.088	1.150	1.119	9.79	10.51	10.15
General Average		12.45	18.56	15.50	1.166	1.524	1.345	10.64	11.90	11.27
Average of treatment	Yeast	12.46	18.50	15.48	1.145	1.481	1.313	10.87	12.39	11.63
	Humic	12.34	18.90	15.62	1.153	1.582	1.368	10.66	11.79	11.22
	Yeast + Humic	13.87	24.30	19.08	1.243	1.811	1.527	11.15	13.26	12.19
	Water (control)	11.13	12.53	11.83	1.125	1.225	1.175	9.89	10.18	10.03
LSD at 5%										
Season (A)			1.27			0.022			0.14	
Soil (B)			1.32			0.044			0.15	
A x B			1.44			0.053			0.16	
Foliar ©			1.42			0.055			0.16	
A x C			1.58			0.066			0.18	
B x C			1.58			0.066			0.!8	
A x B x C			1.78			0.081			0.29	

Table 11: Effect of some organic extracts on some flowering characteristics of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Av. No. of inflorescences. /twig			Flowering density No. inflorescences. /m			Av. No. of flowers / inflorescence		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	3.84	6.21	5.02	22.58	38.81	30.69	13.75	15.53	14.64
	Humic	3.92	6.28	5.10	23.05	39.25	31.15	13.41	16.62	15.01
	Yeast + Humic	4.49	6.33	5.41	26.41	39.56	32.98	14.22	18.42	16.32
	Water (control)	3.66	6.11	4.88	21.52	38.18	29.85	12.29	14.12	13.20
Average		3.97	6.23	5.13	23.39	38.95	31.16	13.41	16.17	14.79
Manure Tea	Yeast	3.41	5.53	4.47	20.05	34.56	27.30	11.33	12.30	11.81
	Humic	3.33	5.66	4.50	19.58	35.37	27.47	11.20	12.46	11.83
	Yeast + Humic	3.65	5.82	4.73	21.47	36.37	28.92	12.25	14.81	13.53
	Water (control)	3.27	4.89	4.08	19.23	20.56	19.89	11.22	11.45	11.33
Average		3.41	5.47	4.44	20.08	31.71	25.89	11.50	12.75	12.12

Table 11: Continued

Control	Yeast	3.21	4.56	3.88	18.88	28.50	23.69	11.25	11.83	11.54
	Humic	3.25	4.63	3.94	19.11	28.93	24.02	11.19	11.45	11.32
	Yeast + Humic	3.52	4.75	4.14	20.70	29.68	25.19	11.29	12.05	11.67
	Water (control)	2.91	2.97	2.94	17.11	18.56	17.83	11.17	11.20	11.18
Average		3.22	4.23	3.72	18.95	26.42	22.68	11.22	11.63	11.42
General Average		3.53	5.31	4.42	20.80	32.36	26.58	12.04	13.51	12.77
Average of treatment	Yeast	3.48	5.43	4.45	20.50	33.95	27.22	12.11	13.22	12.66
	Humic	3.50	5.52	4.51	20.58	34.51	27.54	11.93	13.51	12.72
	Yeast + Humic	3.88	5.63	4.75	22.86	35.20	29.03	12.58	15.09	13.84
	Water (control)	3.28	4.65	3.96	19.28	25.76	22.52	11.53	12.25	11.89

LSD at 5%			
Season (A)	0.03	0.32	0.33
Soil (B)	0.06	0.41	0.41
A x B	0.08	0.62	0.55
Foliar (C)	0.09	0.77	0.52
A x C	0.12	1.03	0.73
B x C	0.12	1.03	0.73
A x B x C	0.64	1.33	0.96

Table 12: Effect of some organic extracts on some flowering characteristics of Roghiani olive trees (2007/08 and 2008/09)

		No. of perfect flowers / inflorescence			Sex ratio %		
		Seasons			Seasons		
Organic extracts							
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	8.81	13.66	11.23	64.07	87.95	76.01
	Humic	8.66	12.95	10.80	64.57	77.91	71.24
	Yeast + Humic	9.92	16.70	13.31	69.76	90.66	80.21
	Water (control)	7.85	10.81	9.33	63.87	76.55	70.21
Average		8.81	13.53	11.16	65.56	83.26	74.41
Manure Tea	Yeast	6.76	9.56	8.16	59.66	77.72	68.69
	Humic	6.53	8.63	7.58	58.30	69.26	63.78
	Yeast + Humic	7.81	11.98	9.89	63.75	80.89	72.32
	Water (control)	6.20	8.35	7.27	55.25	72.92	64.08
Average		6.82	9.63	8.22	59.24	75.19	67.21
Control	Yeast	6.33	8.75	7.54	56.26	73.96	65.11
	Humic	6.37	7.53	6.95	56.92	65.76	61.34
	Yeast + Humic	6.45	8.95	7.70	57.13	74.27	65.70
	Water (control)	6.02	6.52	6.27	53.89	58.21	56.05
Average		6.29	7.93	7.11	56.05	68.05	62.05
General Average		7.30	10.36	8.83	60.28	75.50	67.89
Average of treatment	Yeast	7.30	10.65	8.97	59.99	79.87	69.93
	Humic	7.19	9.70	8.44	59.93	70.95	65.44
	Yeast + Humic	8.06	12.54	10.30	63.54	81.94	72.74
	Water (control)	6.69	8.56	7.62	57.67	69.22	63.44

LSD at 5 %			
Season (A)	0.29	0.52	
Soil (B)	0.36	0.74	
A x B	0.53	0.93	
Foliar (C)	0.48	0.81	
A x C	0.55	1.02	
B x C	0.55	1.02	
A x B x C	0.77	1.66	

Table 13: Effect of some organic extracts on fruit set and yield of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Initial fruit set %			Final fruit set %			Yield (Kg/tree)		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	17.71	22.95	20.33	6.22	7.25	6.73	34.32	42.25	38.29
	Humic	17.63	20.82	19.22	6.17	7.09	6.63	34.51	40.62	37.56
	Yeast + Humic	18.49	23.61	21.05	6.75	7.39	7.07	35.93	51.86	43.89
	Water (control)	16.81	17.31	17.06	5.61	6.83	6.22	30.46	33.14	31.80
Average		17.66	21.17	19.41	6.18	7.14	6.66	33.80	41.96	37.88
Manure Tea	Yeast	16.92	19.47	18.19	5.62	6.95	6.28	32.23	38.09	35.16
	Humic	16.74	18.19	17.46	5.33	6.81	6.07	31.95	35.41	33.68
	Yeast + Humic	17.58	20.35	18.96	6.41	7.03	6.72	32.61	43.25	37.93
	Water (control)	16.45	16.62	16.48	5.22	5.92	5.57	31.58	33.33	32.45
Average		16.92	18.65	17.78	5.65	6.67	6.17	32.09	37.52	34.80
Control	Yeast	16.71	17.83	17.27	5.37	6.73	6.05	28.52	33.67	31.09
	Humic	16.50	17.54	16.97	5.25	6.52	5.88	27.81	30.18	28.99
	Yeast + Humic	16.93	18.69	17.81	5.73	6.85	6.29	29.33	35.25	32.29
	Water (control)	15.26	15.48	15.37	4.52	4.33	4.42	26.71	27.02	26.86
Average		16.35	17.38	16.85	5.21	6.10	5.66	28.09	31.53	29.81
General Average		16.97	19.06	18.01	5.68	6.63	6.16	31.32	37.00	34.16
Average of treatment	Yeast	17.11	20.08	18.59	5.73	6.97	6.35	31.69	38.00	34.84
	Humic	16.95	18.85	17.90	5.58	6.80	6.19	31.42	35.40	33.41
	Yeast + Humic	17.66	20.88	19.27	6.29	7.09	6.69	32.62	43.45	38.03
	Water (control)	16.17	16.47	16.32	5.11	5.69	5.40	29.58	31.16	30.37
LSD at 5%										
Season (A)			0.35			0.13			1.41	
Soil (B)			0.40			0.24			1.62	
A x B			1.22			0.25			1.71	
Foliar (C)			0.55			0.15			1.33	
A x C			0.33			0.17			1.95	
B x C			1.33			0.17			1.95	
A x B x C			1.45			0.35			2.23	

multiplication of microbes in tea of compost [31]. However, the enhancement of flowering characteristics due to inoculation with N fixing bacteria could be attributed to the capability of these organisms to produce growth regulators such as auxins, cytokinins and gibberellins which had a positive effect on flowering process and nutrients uptake [32]. These findings are in agreement with the studies reported by Hegazi *et al.* [3], Mohammed *et al.* [6] and Mostafa *et al.* [33].

Fruit Set and Yield: Table 13 shows that initial and final fruit set and yield were significantly affected by different treatments of soil and spraying applications in both seasons. Fruit set percentage and yield (kg/tree) were increased in the second season than in the first one, which might be due to accumulation effects of organic treatments. Soil application of compost tea gave the highest fruit set and yield in the two seasons, followed by manure tea comparing to control trees. However, foliar application of yeast + humic acid gave the highest fruit set and yield followed by spraying yeast, humic acid and control, respectively, in the two seasons.

Concerning interaction between soil and foliar applications during the two seasons, the highest initial and final fruit set and yield was observed with trees treated with compost tea and sprayed with yeast + humic acid than the other interactions used. Such findings could be explained on the basis of the beneficial effect of micronutrients and has the high useful amount of needed bacteria, fungi and actinomycetes.

These results are in line with Hegazi *et al.* [3] on olive trees, Mohammed *et al.* [6], on pear trees, who found that using compost tea with spraying humic acid recorded the highest values of fruit set and yield. Likewise, Mostafa *et al.* [33], on orange, reported that the combination between compost tea and chicken manure extracts at concentration (1:10 x 1:10 w/v) gave significant increase in yield/tree.

Table 14: Effect of some organic extracts on some physical fruit characteristics of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Fruit length (cm)			Fruit diameter (cm)			Fruit shape index L/D ratio		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.618	1.719	1.668	1.217	1.306	1.261	1.329	1.316	1.322
	Humic	1.610	1.711	1.660	1.135	1.300	1.217	1.418	1.316	1.367
	Yeast + Humic	1.627	1.803	1.715	1.251	1.322	1.286	1.300	1.363	1.331
	Water (control)	1.539	1.635	1.587	1.120	1.235	1.177	1.374	1.327	1.350
Average		1.598	1.717	1.657	1.180	1.290	1.235	1.355	1.330	1.342
Manure Tea	Yeast	1.623	1.752	1.687	1.236	1.325	1.280	1.313	1.322	1.317
	Humic	1.615	1.733	1.674	1.222	1.314	1.268	1.321	1.318	1.319
	Yeast + Humic	1.652	1.891	1.771	1.293	1.351	1.322	1.277	1.399	1.338
	Water (control)	1.561	1.628	1.594	1.159	1.282	1.220	1.346	1.269	1.307
Average		1.612	1.751	1.681	1.227	1.318	1.272	1.314	1.327	1.320
Control	Yeast	1.473	1.632	1.552	0.875	1.193	1.034	1.683	1.367	1.525
	Humic	1.402	1.624	1.513	0.789	1.175	0.982	1.776	1.382	1.579
	Yeast + Humic	1.511	1.695	1.603	0.964	1.214	1.089	1.567	1.396	1.481
	Water (control)	1.252	1.330	1.291	0.722	0.770	0.746	1.734	1.727	1.730
Average		1.409	1.570	1.489	0.837	1.088	0.962	1.690	1.468	1.578
General Average		1.539	1.679	1.609	1.081	1.232	1.156	1.453	1.375	1.414
Average of treatment	Yeast	1.571	1.701	1.636	1.109	1.275	1.192	1.441	1.335	1.388
	Humic	1.542	1.689	1.615	1.048	1.263	1.155	1.505	1.338	1.422
	Yeast + Humic	1.596	1.796	1.696	1.169	1.295	1.232	1.381	1.386	1.383
	Water (control)	1.451	1.531	1.491	1.000	1.096	1.048	1.484	1.441	1.462
LSD at 5%										
Season (A)			0.013			0.015			0.013	
Soil (B)			0.014			0.018			0.014	
A x B			0.026			0.019			0.015	
Foliar (C)			0.025			0.019			0.015	
A x C			0.029			0.012			0.025	
B x C			0.029			0.012			0.025	
A x B x C			0.035			0.073			0.033	

Table 15: Effect of some organic extracts on some physical fruit characteristics of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Fruit weight (g)			Fruit volume (cm^3)			Flesh weight (g)		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.106	1.175	1.140	0.938	1.008	0.973	0.884	0.924	0.904
	Humic	1.101	1.170	1.135	0.934	1.003	0.968	0.878	0.966	0.922
	Yeast + Humic	1.112	1.233	1.172	0.944	1.057	1.000	0.872	0.970	0.921
	Water (control)	1.052	1.121	1.086	0.893	0.961	0.927	0.830	0.898	0.864
Average		1.092	1.174	1.133	0.927	1.007	0.967	0.866	0.939	0.902
Manure Tea	Yeast	1.110	1.198	1.154	0.949	1.031	0.990	0.879	0.927	0.903
	Humic	1.104	1.185	1.144	0.943	1.020	0.981	0.870	0.923	0.896
	Yeast + Humic	1.129	1.239	1.184	0.965	1.066	1.015	0.882	0.940	0.911
	Water (control)	1.067	1.113	1.090	0.912	0.958	0.935	0.832	0.881	0.856
Average		1.102	1.183	1.143	0.942	1.018	0.980	0.865	0.917	0.891

Table 15: Continued

Control	Yeast	1.007	1.116	1.061	0.838	0.956	0.897	0.795	0.883	0.839
	Humic	0.958	1.118	1.038	0.798	0.958	0.878	0.757	0.888	0.822
	Yeast + Humic	1.033	1.159	1.096	0.860	0.993	0.926	0.810	0.918	0.864
	Water (control)	0.856	0.909	0.882	0.733	0.779	0.756	0.645	0.688	0.666
Average		0.963	1.075	1.019	0.807	0.921	0.864	0.751	0.844	0.797
General Average		1.052	1.142	1.097	0.892	0.982	0.937	0.827	0.900	0.863
Average of treatment	Yeast	1.074	1.163	1.118	0.908	0.998	0.953	0.852	0.911	0.882
	Humic	1.054	1.157	1.105	0.891	0.993	0.942	0.835	0.926	0.880
	Yeast + Humic	1.091	1.210	1.150	0.923	1.038	0.980	0.854	0.943	0.898
	Water (control)	0.991	1.047	1.019	0.846	0.899	0.872	0.769	0.822	0.795
LSD at 5%										
Season (A)			0.013			0.012			N.S	
Soil (B)			0.016			0.011			N.S	
A x B			0.017			0.014			N.S	
Foliar (C)			0.018			0.015			N.S	
A x C			0.024			0.016			N.S	
B x C			0.024			0.016			N.S	
A x B x C			0.037			0.022			N.S	

Table 16: Effect of some organic extracts on flesh chemical contents of Roghiani olive trees (2007/08 and 2008/09)

		Total carbohydrates			Oil percentage %			Moisture %		
		Seasons			Seasons			Seasons		
Organic extracts										
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	13.06	15.50	14.28	47.86	56.81	52.33	70.60	50.21	64.40
	Humic	13.16	13.73	13.44	48.23	50.32	49.27	69.69	53.58	61.63
	Yeast + Humic	14.22	18.52	16.37	52.11	58.56	55.33	66.48	51.51	58.99
	Water (control)	13.02	13.53	13.27	47.71	49.58	48.64	61.14	52.94	57.04
Average		13.36	15.32	14.34	48.97	53.81	51.39	66.97	54.06	60.51
Manure Tea	Yeast	12.16	13.70	12.93	44.56	50.20	47.38	72.31	67.12	69.71
	Humic	11.88	12.21	12.04	43.55	44.74	44.14	71.68	61.56	66.62
	Yeast + Humic	13.00	14.26	13.63	47.62	52.25	49.93	67.98	67.37	67.67
	Water (control)	11.26	12.85	12.05	41.27	47.10	44.18	63.70	50.73	57.21
Average		12.07	13.25	12.66	44.25	48.57	46.40	68.91	61.69	65.30
Control	Yeast	11.47	13.04	12.25	42.02	47.77	44.89	55.36	51.30	53.33
	Humic	11.60	11.79	11.69	42.51	42.48	42.49	54.58	50.59	52.58
	Yeast + Humic	11.64	13.09	12.36	42.67	47.97	45.32	52.94	50.67	51.80
	Water (control)	10.98	10.53	10.75	40.25	38.60	39.42	50.02	50.45	50.23
Average		11.42	12.11	11.76	41.86	44.20	43.03	53.22	50.75	51.98
General Average		12.29	13.56	12.92	45.02	48.86	46.94	63.03	55.50	59.26
Average of treatment	Yeast	12.23	14.08	13.15	44.81	51.59	48.20	66.09	58.87	62.48
	Humic	12.21	12.57	12.39	44.76	45.84	45.30	65.31	55.24	60.27
	Yeast + Humic	12.95	15.29	14.12	47.46	52.92	50.19	62.46	56.51	59.48
	Water (control)	11.75	12.30	12.02	43.07	45.09	44.08	58.26	51.37	54.82
LSD at 5%										
Season (A)			0.14			1.21			1.19	
Soil (B)			0.16			1.48			2.23	
A x B			0.18			2.55			0.40	
Foliar (C)			0.17			2.52			1.26	
A x C			0.19			2.71			2.53	
B x C			0.19			2.71			2.53	
A x B x C			0.23			3.92			3.74	

Table 17: Effect of some organic extracts on some oil chemical properties of Roghiani olive trees (2007/08 and 2008/09)

Organic extracts		Oil acidity %			Peroxide value (mg/ kg oil)			Iodine value		
		Seasons			Seasons			Seasons		
Soil applications	Foliar applications	2007/08	2008/09	Av.	2007/08	2008/09	Av.	2007/08	2008/09	Av.
Compost Tea	Yeast	1.058	1.329	1.193	8.61	9.56	9.08	81.24	83.57	82.40
	Humic	1.149	1.442	1.295	8.27	10.38	9.32	81.18	82.63	81.90
	Yeast + Humic	1.221	1.749	1.485	8.79	10.59	9.69	82.16	84.32	83.24
	Water (control)	1.074	1.169	1.121	8.37	8.41	8.39	81.09	81.48	81.28
Average		1.125	1.422	1.273	8.51	9.73	9.12	81.41	83.00	82.20
Manure Tea	Yeast	1.297	1.594	1.445	9.33	10.47	9.90	82.33	84.31	83.32
	Humic	1.182	1.777	1.479	8.51	10.79	9.65	81.25	82.56	81.90
	Yeast + Humic	1.247	1.937	1.592	8.97	10.94	9.95	83.81	85.43	84.62
	Water (control)	1.137	1.221	1.179	8.18	8.79	8.48	81.36	81.64	81.50
Average		1.215	1.632	1.423	8.75	10.24	9.50	82.18	83.49	82.83
Control	Yeast	1.026	1.049	1.037	8.16	8.36	8.26	81.28	81.53	81.40
	Humic	0.951	1.029	0.990	8.49	9.18	8.83	81.57	81.82	81.69
	Yeast + Humic	1.075	1.138	1.106	8.59	10.16	9.37	82.41	82.61	82.51
	Water (control)	0.955	0.895	0.925	8.02	8.18	8.10	81.95	81.75	81.85
Average		1.001	1.027	1.014	8.31	8.97	8.64	81.80	81.92	81.86
General Average		1.113	1.360	1.236	8.52	9.65	9.08	81.79	82.80	82.29
Average of treatment	Yeast	1.127	1.324	1.225	8.70	9.27	8.74	81.61	83.14	82.37
	Humic	1.094	1.416	1.255	8.42	10.11	9.26	81.33	82.33	81.83
	Yeast + Humic	1.181	1.608	1.394	8.78	10.56	9.67	82.79	84.12	83.45
	Water (control)	1.055	1.095	1.075	8.19	8.46	8.32	81.46	81.62	81.54
LSD at 5%										
Season (A)			N.S.			0.12			0.15	
Soil (B)			N.S.			0.25			0.19	
A x B			N.S.			0.34			0.26	
Foliar (C)			N.S.			0.29			0.20	
A x C			N.S.			0.45			0.31	
B x C			N.S.			0.45			0.31	
A x B x C			N.S.			0.62			0.48	

Fruit Quality:

Fruit Physical Characteristics: As shown in Tables 14 and 15, the weight, volume, length, diameter and flesh of Roghiani olive fruits were affected significantly by different organic treatments during both seasons. The highest values of all parameters were recorded by the soil application of manure tea followed by compost tea comparing to control in both seasons. Also, the highest values of fruit physical parameters were obtained by spraying yeast + humic acid followed by yeast, humic acid, control. All fruit physical parameters except shape index were the highest in the second season compared to the first one under study.

On the other hand, control trees produced the highest shape index value comparing with trees treated by compost tea or manure tea in a descending order. Also, spraying humic acid gave the highest value of shape index followed by yeast, yeast plus humic and control (water spraying). In other words, fruits of higher shape index values were oblong shape, whereas those of lower shape index values appeared to be round shape. Generally, soil application with manure tea with foliar application of yeast + humic acid had increased fruit physical parameters compared to other interactions under study.

These observations are in accordance with those obtained by Hegazi *et al.* [3] who observed that poultry manure provided to be one of the most efficient manure sources in enhancing fruit physical properties of olive trees. However, soil application of compost tea on Le Cont pear trees with humic acid and / or biofertilizers gave the highest level of improving all fruit physical properties "fruit weight, size, L/D ratio" [6]. Also, Mostafa *et al.* [33] reported that compost tea gave highly significant value of Washington navel orange fruit quality.

Fruit Chemical Characteristics

Flesh Oil, Total Carbohydrates and Moisture Contents: Data depicted in Table 16 indicate that flesh oil and total carbohydrates contents were significantly increased by successive organic soil and foliar application especially in the second season of the study. Soil application of compost tea recorded higher flesh contents of oil and total carbohydrates in comparable to manure tea. Also, foliar application by spraying yeast + humic acid gave the highest flesh oil and total carbohydrates contents compared to spraying yeast or humic acid extract in both seasons. Soil application of compost tea with foliar application of yeast + humic acid in the second season gave the best results compared with other used interactions. Fruit moisture and flesh oil contents were affected significantly by different applications treatments.

These results are in agreement with that mentioned by Hegazi *et al.* [3] on olive trees, showed that using 100% poultry manure gave the highest fruit total carbohydrates content compared with 75% poultry manure plus 25% chemical fertilization. Also, the presented results are in agreement with Mohammed *et al.* [6] who found that soil application of compost tea plus humic acid gave better effects on fruit chemical properties compared to control Le Cont pear trees. Also, Fayed [34] on Anna apple trees, indicated that chicken manure or compost with bio-fertilizers gave the best chemical fruit properties compared to other organic sources (Town refuse and cattle manure).

Oil Chemical Properties: Results tabulated in Table 17 show the effect of some organic extracts on oil peroxide, iodine and acidity values. All treatments increased significantly the peroxide and iodine values. Also, all treatments increased insignificantly acidity % as compared with the control in the two seasons. The highest oil acidity %, peroxide and iodine values were obtained by using soil application of manure tea compared with compost tea. Also foliar application of spraying yeast + humic acid gave the highest oil acidity, peroxide and iodine values compared with spraying yeast or humic and control (water spraying).

Generally, soil application of manure tea with foliar application of spraying yeast + humic acid extracts in the second season gave the highest oil acidity, peroxide and iodine values compared with other used interactions.

Similar results were obtained by Hegazi *et al.* [3] found that olive organic fertilization gave the lowest oil peroxide and iodine values compared to 100 % mineral fertilization. Also, Salvador *et al.* [35] on fifteen olive cultivars. They found that final oil content or properties in the fifteen olive cultivars were dependent on both genetic and environmental factors; while the pattern of oil accumulation was determined by cultural and environmental condition.

Furthermore, yeast contains vitamin B1 (Thiamin), B6 (Pyridoxine) and glycine [7]. Activating photosynthesis process can be done by enhancing the release of carbon dioxide [8]. In addition, the present findings may be due to the presence of cytokinin precursors in yeast autolysis [36].

Finally, under conditions of this experiment it can be concluded that using compost tea as a soil application with humic acid + yeast as a foliar spraying had maximized Roghiani olive yield, fruit quality and nutrition status.

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