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Ocimum basilicum L. Production under Organic Farming

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Abstract: The effect of static compost (turned compost) (10.0, 15.0 and 20m³ per feddan), tea of static compost (tea of turned compost) and their interactions on the vegetative growth characters, essential oil, total flavonoides, and nutrient content of *Ocimum basilicum* L. were evaluated at two successive seasons of 2004 and 2005. The experiments were conducted at the Experimental Farm, National Research Center (NRC), Dokki, Cairo, Egypt. Applying static compost (turned compost) with tea of static compost (tea of turned compost) improved vegetative growth characters, essential oil, some chemical composition of essential oil, total flavonoides and phosphorous content, but nitrogen content was decreased. Addition of static compost or tea of static compost gave a better vegetative growth characters, essential oil, total flavonoides, nitrogen and phosphorous contents than addition of turned compost or tea of turned compost. It recommended, using static compost with tea of static compost because it increases the production (quantity and quality) and medicinal properties also it is very cheap and expressed cash money improving the income of farmer, in addition, uses this organic materials are safe for human health.

Key words: *Ocimum basilicum* L., compost, tea of compost, vegetative growth characters, chemical content

INTRODUCTION

The genus of *Ocimum*, of the family Lamiaceae (Labiatae), include at least 60 species and numerous varieties[1]. It represents an important source of essential oil, used in the food, perfumery and cosmetic industries. Some *Ocimum* spp. are used in traditional medicine for different applications, especially in many Asian and African countries[2]. The recurring polymorphism determines a large number of subspecies, different varieties and forms producing essential oils with varying chemical composition, some present a high camphor content others are characterized by citral, geraniol, methylchavicol, eugenol, thymol, etc[3].

Now a days medicinal and aromatic plants occupy a priming economic position because of the continuous and increase demands for their products from the local and foreign markets. Basil is one of the most important plants in this concern. The essential oil is extensively employed in several European countries and USA for flavoring and food stuffs, confectionery goods, condiments and toiletry products such as mouth washes and dental creams. It also finds a priming place in the flavoring of foods such as spices, meats sausages, tomato pasts, various kinds of souses, fancy, vinegars, pickles, ketchups, and beverages. In the perfuming industry the essential oil is used for compounding certain popular perfumes notably and jasmine blends. Various uses are attributed to different parts of the plants in endogenous system of medicine and homoeopathy. It is also recognized as a febrifuge and antimalarial plant. Thus infusion of the plant is used for cephalalgia, gouty joints and gargle for foul breath. The juice obtained from leaves gives relief in irrigation for throat, earache an ring worm. Seeds are used internally in constipation and piles[4].

Organic products, based on philosophical preference and conviction or in response to an increasing market opportunity, exclude or prohibit the use of conventional crop inputs common to modern farming. Synthetic pesticides and fertilizers are not allow able in current organic certification program. To achieve optimal quality and economic returns, organic farming system rely upon crop rotation, crop residues, animal manures, legumes, green manures, off farm organic wastes, and biological pest control. These components maintain soil productivity and tithes, supply nutrients and help control insects, weeds, and other pests.

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Application of organic fertilizer increased the biomass yield of the main crop and total essential oil yields of davana plant[5]. Marculescu *et al*[6] revealed that, the soil with its content in macro and microelements, enhanced by the use of organic fertilizers, plays an essential role in the plants growing and development, in the biosynthesis of the organic substances at, also it can be noted that, the vegetative mass is rich and the amount of essential oil is high in *Chrysanthemum balsamita* L. plant when using organic fertilizer. Treated plants with different combinations of organic fertilizers and its rates resulted in a significant increase in growth, yield characters, essential oil percentage and main components of essential oil extracted from dill plants[7].

Plant disease control is a common objective of foliar treatments. Compost teas and liquid manure have been evaluated for their efficacy in the control of foliar disease. Liquid manures are applied to establish and support biologically diverse and metabolically dynamic process during production and extending to long- term and stewardship. The various liquid treatments are intended to serve, primarily, as a source of soluble of plant nutrients, growth stimulants and disease suppressors. Foliar applied biotic extracts are believed to initiate a systemic response known as induced resistance, which may act as a repellant or reduce the severity or pest and disease activities on plants[8].

In this study the effect of static compost (turned compost), tea of static compost (tea of turned compost) and their interactions on the growth characters, essential oil, total flavonoides, and nutrient content of *Ocimum basilicum* L. were evaluated.

MATERIALS AND METHODS

Two field experiments were carried out during two successive seasons of 2004 and 2005. The experiments were conducted at the Experimental Farm, National Research Center (NRC), Dokki, Cairo, Egypt.

Mechanical and chemical properties of the soil used in this study were determined according to Jackson [9] and Cottenie *et al*[10] and are presented in Table (1).

Seedlings of basil (*Ocimum basilicum* L.) were kindly obtained from the Department of Medicinal and Aromatic plants, Ministry of Agriculture, Egypt.

The seedlings transplanted to the soil in 1st May in both seasons.

All agriculture practices operation other than experimental treatments were done according to the recommendation of Ministry of Agriculture, Egypt.

Three levels of added static compost or turned compost were tested i.e. 10.0, 15.0 and 20.0 m³ per feddan

Table 2: Chemical analysis of used compost.

Characters	Static compost	Turned compost
Bulk density (kg/m³)	510	502
Moisture content (%)	18.2	17.6
EC (ds/m)	9.65	10.2
pH	7.6	7.8
Total organic carbon (%)	24.6	236
Total organic matter (%)	42.41	35.9
Total Nitrogen (%)	1.35	1.1
C/N Ratio	18.22	18
NH4 –N (mg/kg)	880	760
No3 –N (mg/kg)	450	420
Total phosphorous (%)	1.6	0.9
Available phosphorous (mg/kg)	410	298
Total potassium (%)	2.3	1.65
Available potassium (mg/kg)	620	415
Fe (ppm)	960	816
Zn (ppm)	280	251
Mn (ppm)	320	298
Cu (ppm)	140	123
Nematodes	Nil	Nil
Weeds germination	Nil	Nil
Parasites	Nil	Nil
Radish germination test	98%	92
Pathogenic	Nil	Nil
Humus value	5	4.2

before transplant of seedlings as well as spraying the plants by tea of static compost with the treatments of static compost, also spraying the plants with tea of turned compost with the treatments of turned compost and recommended chemical fertilizers as a control treatment.

Spraying with tea compost: The plants were sprayed two times, the first time during the vegetative stage (after 45 days from enroot the seedlings) and the second time after 15 days from the first time.

Tea of compost preparation: 1compost :4 water, after 2-3 weeks, strained tea or slurry Sprayed on herb. The experimental design was complete randomized with five replicates. The experimental area (plot) was 2m² (2m x 1m) containing 4 rows, distance between hills was 25cm and

Table 1: Mechanical and Chemical properties of the soil.

Texture	Sand (%)	Silt (%)	Clay (%)
Clay	24	9	67

Available (mg/100gm)		Total (mg/100gm)	Soluble anions (meq/L)				Soluble cations (meq/L)			EC	pH
K	P	N	SO4	Cl	HCO3	CO3	Na	Mg	Ca		
3.5	0.4	111	5.8	1.5	3.7	-	5.4	1.1	4.0	1.1	7.4

Available micronutrients (ppm.)				
O.M (%)	CaCO3	Cu	Zn	Mn	Fe
1.42	1.4	15.7	20.6	27.5	87.5

Table 3: Chemical analysis of used tea of compost.

Characters	Tea of static compost	Tea of turned compost
EC (ds/m)	0.76	0.89
pH	6.7	6.5
N (ppm)	275	250
P (ppm)	8	6
K (ppm)	206	184
Ca (ppm)	91	87
Mg (ppm)	116	101
Fe (ppm)	66	48
Zn (ppm)	7	5

50 cm apart. Thinning for two plant/hill was made 45days after transplanting.

Chemical analysis of used compost and tea of compost are presented in Tables (2 and 3).

Harvesting: At full blooming, the plants were harvested 2 times (1st and 2nd cut) during the growing season by cut the plants and left 5cm above the soil, and the different vegetative growth parameters were recorded in both seasons as follows:

Herb fresh weight (g/plant), herb dry weight (g/plant), flower heads fresh weight (g/plant), flower heads dry weight (g/plant), shoot fresh weight (g/plant) and shoot dry weight (g/plant).

Chemical analysis:

The following chemical analyses were determined:

Essential oil:

A-Extraction of essential oil: Air dried herb in the first and second time of harvesting (100g) were subjected to hydro distillation for 3h using a Clevenger type apparatus[11].

B-Gas Chromatography-Mass Spectrophotometric (GC-MS) Analysis: The essential oil extracted from basil (*Ocimum basilicum* L.) herb were collected from the first and second time of harvesting, after that, collected the essential oil from the treatments of control= recommended chemical fertilizers, static compost with no tea of static compost, static compost with tea of static compost, turned compost with no tea of turned compost and turned compost with tea of turned compost. The component of essential oil were determined according to Adams[12].

The ADELSIGLC-MS system, equipped with a BPX5 Capillary Column (0.22mm idx25m, film thickness 0.25µm) was used. Analysis was carried out using helium as the carrier gas, with the flow rate at 1.0ml/min. The column temperature was programmed from 60°C to 240°C at 3°C/min. The sample size was 2µ1, the splitting ratio 1:20.The injection part temperature was 250°C.The ionization voltage applied was 70 eV, moss range m/z 41-400 a.m.u. The Kovat's indices were determined by co-injection of the sample with a solution containing a homologous series of n-hydrocarbons (C9-C22), in a temperature run identical to that described above. The separated components were identified by matching with the National Institute of Standards and Technology (NIST) mass-spectral library data, comparison of the Kovat's indices with those of authentic components. The quantitative determination was carried out based on peak area integration.

Total flavonoides determination: Total flavonoides were determined in dried herb (1st + 2nd cut) according to Zhishen *et al*[13].

Total nitrogen and phosphorous determination: Total nitrogen and phosphorous in herb (1st + 2nd cut), were determined according to the methods of the Association of Official Agricultural Chemistry (A.O.A.C.)[14].

Statistical analysis: The means of the obtained data were statistically analyzed for two successive seasons according to the procedure outlined by Snedecor and Cochran[15].

RESULTS AND DISCUSSIONS

Effect of static compost (or turned compost), tea of static compost (or tea of turned compost) and their interactions on the vegetative growth characters and

Table 4: Effect of static compost (turned compost) , tea of static compost (tea of turned compost) and their interactions on the vegetative growth characters of *Ocimum basilicum* L. plants at both successive seasons of 2004 and 2005.

Treatments		Herb fresh weight (g/plant)		Herb dry weight (g/plant)		Flower heads fresh weight (g/plant)		Flower heads dry weight (g/plant)		Shoot fresh weight (g/plant)		Shoot dry weight (g/plant)	
		1st Season	2nd Season	1st Season	2nd Season	1st Season	2nd Season	1st Season	2nd Season	1st Season	2nd Season	1st Season	2nd Season
Control (Recommended chemical fertilizers)		215.0	217.33	63.42	63.92	141.3	145.9	32.36	33.23	356.3	363.23	95.59	97.15
No tea of static compost	10 m³/fed. static compost	327	347	96.18	102.06	200.7	210.2	45.92	48.12	527.7	557.2	142.1	150.18
	15 m³/fed. static compost	440	453	129.41	133.24	251.18	258.1	57.43	59.05	691.18	711.1	186.84	192.29
	20 m³/fed. static compost	489.98	514.67	144.11	151.37	285.98	271.4	65.4	65.1	775.96	766.07	209.15	209.39
Mean static compost with no tea of static compost		418.99	438.22	123.23	128.89	245.96	246.5	56.25	57.42	664.95	678.12	179.48	183.95
with tea of static compost	10 m³/fed. static compost	342	365	100.59	107.35	211.2	259.5	48.59	59.24	553.2	624.5	149.18	166.59
	15 m³/fed. static compost	537	565	157.94	166.18	334.1	350.6	73.69	80.04	871.1	615.6	234.3	246.12
	20 m³/fed. static compost	554	595.2	163.03	170.94	352	362	76.69	95.95	876.3	943.5	236.71	296.89
Mean static compost with tea of static compost		477.8	508.4	140.52	148.16	299.1	324	66.21	78.41	766.87	727.87	206.73	236.65
No tea of turned compost	10 m³/fed. turned compost	267.7	289	78.74	85	191.3	187.9	44.02	43.19	459	476.9	122.75	128.19
	15 m³/fed. turned compost	357.45	376	105.13	110.59	222.2	222	50.98	51.08	579.65	598	156.11	161.66
	20 m³/fed. turned compost	394	379.4	115.88	115.82	272.8	256.6	62.34	58.78	666.8	596	178.23	158.6
Mean turned compost with no tea of turned compost		339.72	348.13	99.92	103.77	228.77	222.17	52.45	51.01	568.48	556.97	152.36	149.48
with tea of turned compost	10 m³/fed. turned compost	304.77	361	89.64	106.18	239	247.2	54.49	56.41	543.77	608.2	144.13	162.59
	15 m³/fed. turned compost	424.3	423.7	124.79	124.62	304.6	312.6	69.65	71.36	728.9	736.3	194.36	195.98
	20 m³/fed. turned compost	403.7	396.33	118.74	116.57	298.5	256	68.13	65.32	702.2	682.33	186.87	181.89
Mean turned compost with Tea of turned compost		377.59	393.7	111.06	115.79	280.7	281.93	64.06	64.37	658.29	675.61	175.12	180.15
L.S.D. at 0.05		16.94	13.46	2.71	3.66	7.6	6.46	2.71	2.57	19.62	17.56	8.79	10.69

chemical composition of *Ocimum basilicum* L. plants.

Vegetative growth characters: The effect of the different treatments of static compost (or turned compost), tea of static compost (or tea of turned compost) and their interactions on the vegetative growth characters i.e. herb fresh weight (g/plant), herb dry weight (g/plant), flower heads fresh weight (g/plant), flower heads dry weight

Table 5: Effect of static compost (turned compost) , tea of static compost (tea of turned compost) and their interactions on the essential oil (percentage and g/plant) extracted from *Ocimum basilicum* L. plants at both successive seasons of 2004 and 2005.

Treatments		Essential oil percentage		Essential oil (g/plant)	
		1st Season	2nd Season	1st Season	2nd Season
Control (Recommended chemical fertilizers)		0.28	0.26	0.18	0.17
No tea of static compost	10 m³/fed. static compost	0.29	0.30	0.28	0.31
	15 m³/fed. static compost	0.38	0.38	0.49	0.65
	20 m³/fed. static compost	0.42	0.45	0.61	0.68
Mean static compost with no tea of static compost		0.36	0.38	0.46	0.55
with tea of static compost	10 m³/fed. static compost	0.29	0.32	0.29	0.31
	15 m³/fed. static compost	0.39	0.39	0.61	0.65
	20 m³/fed. static compost	0.43	0.46	0.70	0.78
Mean static compost with tea static compost		0.37	0.39	0.53	0.58
No tea of turned compost	10 m³/fed. turned compost	0.30	0.32	0.26	0.27
	15 m³/fed. turned compost	0.34	0.35	0.36	0.39
	20 m³/fed. turned compost	0.35	0.37	0.41	0.43
Mean turned compost with no tea of turned compost		0.33	0.35	0.34	0.36
turned compost with tea of turned compost	10 m³/fed. turned compost	0.36	0.33	0.32	0.38
	15 m³/fed. turned compost	0.37	0.36	0.45	0.45
	20 m³/fed. turned compost	0.38	0.38	0.44	0.44
Mean turned compost with tea of turned compost		0.37	0.36	0.40	0.42
L.S.D. at 0.05		0.004	0.004	0.006	0.005

(g/plant), shoot fresh weight (g/plant) and shoot dry weight (g/plant) is presented in Table (4). Generally, increasing compost levels up to 20 m³/fed. progressively increased the vegetative growth characters compared with control treatment. The values of vegetative growth characters were significantly increased by the interaction between static compost (or turned compost) and tea of static compost (or tea of turned compost) compared with the treatments of static compost (or turned compost) only and control treatment in both seasons. The highest values of vegetative growth characters were resulted from the treatments of static compost + tea of static compost especially the treatment of 20 m³/fed. static compost with tea of static compost during both seasons.

Essential oil: Herbal essential oil percentage or g/plant was significantly increased by either increasing static compost (or turned compost) level or with tea of static compost (or tea of turned compost) (Table 5). Tea of static compost (or tea of turned compost) induced significant increase in the herbal essential oil percentage or g/plant than adding static compost (or turned compost) alone in both seasons. The highest values of herbal essential oil percentage or g/plant were resulted from the treatments of static compost+ tea of static compost especially the treatment of 20m³ static compost /fed. with tea of static compost in both seasons

Chemical composition of essential oil: Results in Table (6) showed that, the effect of the interaction between static compost & tea of static compost and the interaction between turned compost & tea of turned compost on the chemical composition of essential oil extracted from *Ocimum basilicum* L. herb. The main components were found to be Methyl chavicol (34.0 %),Linalool (32.5 %), 1,8 cineol (8.7 %) and Geraniol (5.1 %) for control treatment. All treatments increased the components of methylchavicol, linalool and 1,8 cineol but geraniol component was decreased compared with the control treatment, the highest percentage of

Table 6: Effect of static compost (turned compost) , tea of static compost (tea of turned compost) and their interactions on the chemical composition of essential oil extracted from *Ocimum basilicum* L. plants.

Compound	Treatments				
	Control= Recommended NPK	Mean static compost with no tea of static compost	Mean static compost with tea of static compost	Mean turned compost with no tea of turned compost	Mean turned compost with tea of turned compost
alpha-pinene	0.4	0.5	0.2	0.3	0.3
Camphene	0.1	0.1	0.3	0.2	0..2
Sabenene	0.28	0.6	0.4	0.1	0.2
beta-Pinene	1.6	0.7	0.6	0.7	0.8
Myrcene	1.3	0.3	0.4	0.2	0.1
Limonene	1.3	0.2	0.5	0.5	0.4
1,8 Cineol	8.7	10.1	11.1	9.7	9.9
Ocimene	1.2	0.3	0.2	1.3	0.1
Terpinolene	1.2	0.4	0.5	1.1	1.3
Linalool	32.5	37.0	45.0	34.0	35.0
Camphore	1.5	0.2	0.1	1.2	0.3
Methylchavicol	34.0	40.0	42.0	36.0	37.0
Geraniol	5.1	2.3	1.2	3.1	2.5
Eugenol	2.7	1.9	1.7	2.9	2.1
Methyl eugenol	3.2	3.6	1.2	3.4	3.5
beta-Caryphyelene	1.6	0.2	0.1	1.2	1.3
Germacrene D	1.0	1.8	0.2	2.1	2.0
Geranyl iso butyrate	1.01	0.01	0.01	2.0	3.0
alpha – Cadinol	1.3	1.7	0.3	2.2	2.0

methylchavicol, linalool and 1, 8 cineol resulted from static compost with tea of static compost treatments compared with other treatments and control treatment.

Total flavonoides content: Application of static compost (or turned compost) level or with tea of static compost (or tea of turned compost) increased total flavonoides content compared with the control treatment. Static compost (or turned compost) with tea of static compost (or tea of turned compost) induced significant increase in the total flavonoides content than adding static compost (or turned compost) alone in both seasons. The highest value of total flavonoides was resulted from the treatment of 20m³ static compost /fed. with tea of static compost compared with other treatments and the control treatment in both seasons (Table 7).

Total nitrogen content: Total nitrogen percentage was gradually increased by either static compost (or turned compost) level or with tea of static compost (or tea of turned compost) (Table 7). Tea of static compost (or tea of turned compost) + static compost (or turned compost) induced significant decrease in the total nitrogen content than adding static compost (or turned compost) alone in both seasons. The highest value of nitrogen content resulted from the treatment of 20m³ static compost /fed. at both seasons.

Phosphorus content: Phosphorus content was significantly increased by either increasing static compost (or turned compost) level or with tea of static compost (or tea of turned compost) (Table 7). Tea of static compost (or tea of turned compost) + static compost (or turned compost) induced significant increase in the Phosphorus content than adding static compost (or turned compost) alone in both seasons. The highest value of Phosphorus content resulted from the treatment of 20m³ static compost/fed. with tea of static compost during both seasons.

Table 7: Effect of static compost (turned compost) , tea of static compost (tea of turned compost) and their interactions on the chemical composition of *Ocimum basilicum* L. plants at both successive seasons of 2004 and 2005.

Treatments		Total flavonoides (mg/g)		Nitrogen percentage		Phosphorous percentage	
		1st Season	2nd Season	1st Season	2nd Season	1st Season	2nd Season
Control (Recommended chemical fertilizers)		9.0	8.65	1.96	2.03	0.86	0.94
No Tea of static compost	10 m³/fed. static compost	12.0	11.2	2.5	2.5	0.96	1.01
	15 m³/fed. static compost	14.3	13.6	3.9	2.51	1.20	1.56
	20 m³/fed. static compost	16.9	17.6	4.2	3.56	1.56	2.15
Mean static compost with no Tea of static compost		14.4	14.13	3.53	2.85	1.24	1.57
with Tea of static compost	10 m³/fed. static compost	14.9	12.9	2.4	2.46	1.56	1.19
	15 m³/fed. static compost	18.2	15.7	3.8	2.98	1.59	1.99
	20 m³/fed. static compost	20.9	22.4	3.9	3.5	2.01	2.18
Mean static compost with Tea static compost		18.0	17.33	3.37	2.83	1.72	1.79
No Tea of turned compost	10 m³/fed. turned compost	9.98	9.52	2.1	2.03	0.56	0.66
	15 m³/fed. turned compost	10.9	10.48	2.7	2.56	0.89	0.71
	20 m³/fed. turned compost	9.17	11.23	2.9	2.99	0.98	0.98
Mean turned compost with no Tea of turned compost		10.02	10.41	2.57	2.52	0.81	0.78
turned compost with Tea turned compost	10 m³/fed. turned compost	9.98	10.3	2.0	1.96	0.66	0.71
	15 m³/fed. turned compost	11.0	12.4	2.5	2.0	0.96	0.75
	20 m³/fed. turned compost	12.01	14.65	2.6	2.98	0.99	0.99
Mean turned compost with Tea of turned compost		11.0	12.45	2.36	2.31	0.87	0.82
L.S.D. at 0.05		1.02	1.01	0.13	0.02	0.023	0.01

Generally, increasing compost levels up to 20 m³/fed. progressively increased the vegetative growth characters, essential oil and total flavonoides content compared with control treatment, obtained results are agreed with those of Borin *et al*[16] and Brwaldh[17], they reported that, organic compost is a rich and a slow release fertilizer which using leads to a clean product of plants, continuous supply of nutrients, which improve some physical properties of soil, increase water retention than that for chemical fertilizers and improves the soil texture. The structural improvement can encourage the plant to have a good root development by improving the aeration in the soil, which leads to a higher plant vegetative growth.

Application of organic fertilizer increased the biomass yield of the main crop and total essential oil yields of davana plant[5]. Marculescu *et al*[6] revealed that, the soil with its content in macro and microelements, enhanced by the use of organic fertilizers, plays an essential role in the plants growing and development, in the biosynthesis of the organic substances at all level, also it can be noted that, the vegetative mass is rich and the amount of essential oil is high in *Chrysanthemum balsamita* L. plant when using organic fertilizer. Treated plants with different combinations of organic fertilizers and its rates resulted in a significant increase in growth, yield characters and essential oil content extracted from dill plants[7].

Using tea of compost increased the vegetative growth characters, essential oil content and total flavonoides, content compared with using compost only, these results are in accordance with those obtained by Weltzien[8] who reported that, plant disease control is a common objective of foliar treatments. Compost teas and liquid manure have been evaluated for their efficacy in the control of foliar disease. Liquid manures are applied to establish and support biologically diverse and metabolically dynamic process during production and extending to long- term and stewardship. The various liquid treatments are intended to serve, primarily, as a

source of soluble of plant nutrients, growth stimulants and disease suppressors. Foliar applied biotic extracts are believed to initiate a systemic response known as induced resistance, which may act as a repellant or reduce the severity or pest and disease activities on plants.

Addition of static compost or tea of static compost gave a better vegetative growth characters, essential oil, total flavonoides, nitrogen and phosphorous content than addition of turned compost or tea of turned compost, these results may be due to,the static compost or tea of static compost have a better characters (such as organic matter and nutrient content) than of turned compost or tea of turned compost (see Tables 2 and3).

The obtained constituents of essential oil extracted from *Ocimum basilicum* L. plant herb were also found by Bouzouita[18] on the same plant. The effect of different treatments on essential oil constituents may be due to its effect on enzymes activity and metabolism improvements.

It can be concluded that, P content significantly increased by either increasing static compost (or turned compost) level or with tea of static compost (or tea of turned compost) however N content significantly decreased, the decrease of N content due to application of tea of static compost (or tea of turned compost) could be attributed to the depletion of N nutrient in building new tissues[19].

REFERENCES

1. Sirvastava A.K., 1982, Farm Bull.(16) CIMAP. Lucknow, India.
2. Yusuf M., J.U. Chowdhury, M.A. Wahab and J. Begum, 1994. Medicinal Plants of Bangladesh. BCSIR, Dhaka, Bangladesh..
3. Lawrence B.M., R.H. Powell and D.M.Peele, 1980. 8th International Congress of Essential Oils, Fragrance and Flavors, Cannes.
4. Husain A., O.P. Virmani, A. Sharma, A. Kumara and L.N. Mirsa, 1988. Major essential oil – Bearing plants in india. Central institute of medicinal and aromatic plants. Lucknow, India.
5. Parakasa Rao, E.V.S., M.R. Naryana and B.R. Rajeswara, 1997. The effect of nitrogen and farm yard manure on yield and nutrient uptake in davana (*Artemisia pallens* Wall. ExD.C.). J. Herbs, Spices and Medicinal Plants, 5 (2): 39-48.
6. Marculescu, A., C. Sand, C. H. Barbu, D. Babit and D. Hanganu, 2002. Possibilities of influencing the biosynthesis and accumulation of the active principals in *Chrysanthemum balsamita* L. Specie Roum. Biotechnol. Lett., 7(1):577-548.
7. Khalid, Kh.A. and A.M. Shafei, 2005. Productivity of dill (*Anethum graveolens* L.) as influenced by different organic manure rates and sources. Arab Univ. J Agric.Sci., 13 (3): 901-913.
8. Weltzien H.C., 1990.The use of composted material for leaf disease suppression in field crop. Monograph Br crop prot Counc, 45: 115-121 (in the series analytic: crop protection in organic and low input agriculture /edited by R. unwin. Proceeding of symposium; 1990 Sept. 4-6, Cambridge, United Kingdom).
9. Jackson, M.L., 1973. Soil Chemical Analysis. PP. 200 -250. Published by prentice Hall of Indian Private Limited. M.97, Connght Citrus, New Delhi-1.
10. Cottenie, A., M. Verloo, L. Kiekens, G. Velghe and R. Camerlynck, 1982. Chemical Analysis of Plant and Soil. PP. 100-129. Laboratory of Analytical and Agrochemistry, State Univ. Ghent. Belgium
11. Clevenger, J.F., 1928. Apparatus for determination of essential oil. J.Amr. pharm. Assoc., 17: 346-349.
12. Adams, R.P., 1995. Identification Of Essential Oil Components By Gas chromatography/Mass Spectroscopy. pp. 1-29. Allured, Carol, Stream, Illinois, U.S.A.
13. Zhishen, J., T. Mengcheng and Wu. Jianming, 1999. The determination of flavonoides content in mulberry and their scavenging effects on superoxide radicals. Food Chemistry (64): 555-559.
14. Association of Official Agriculture Chemistry (A.O.A.C.), 1970. Official Methods Analysis, pp. 159-211. 10th Ed. Washington, D.C.
15. Snedecor,G.W. and W.G. Cochran., 1990. Statistical Methods. pp: 369-375. 11th Ed. Iowa State College Press. Ames, Iowa, U.S.
16. Borin, M., C. Giupponi and F. Osele, 1987. The effect of organic and mineral fertilizer and soil type on potato tuber formation. Information Agrario, 43 (9): 116-122.
17 Brwaldh, M., 1992. Influence of organic and inorganic fertilizer on common bean (*Phaseolus vulgaris* L.) grown in P-fixing. Malic Andosol. Biol. Agric. and Hort., 9 (8): 45-56.
18. Bouzouita N., F. Kachouri, M. Hamdi and M.M. Chaabouni, 2003. Antimicrobial activity of essential oil from Tunisian aromatic plants. Flavour and Fragrance J. 18: 380-383.
19. Nijjar, G.S., 1985. Nutrition of fruit trees. (Ed.) Mrs Usha Raj Kumar, Kalyani, New Delhi, India. Pp. 53-78.