Response of Kadotta Fig Trees to Using Some Organic Manures Enriched with Em_1 As A Partial Substitution of Mineral N Fertilizers

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Abstract: During 2013 and 2014 seasons, Kadotta fig trees received the suitable N(400 g N/ tree /year) as 100% inorganic, 37.5 to 87.5 % inorganic N plus 12.5 + to 62.5 % organic manures namely farmyard manure, compost or chicken manure enriched with EM_1 at 20 to 50 ml/ tree / year. The study focused on the effect of these N management treatments on the growth and fruiting of Kadotta fig trees. Generally, the results showed that using the suitable N as 50 to 87.5 % inorganic plus 12.5 to 50% farmyard manure, compost or chicken manure enriched with EM_1 at 20 to 40 ml/ tree effectively enhanced growth characters, tree nutritional status, yield and fruit quality relative to using N as 100% inorganic or when N was added as inorganic N at percentage 37.5 % of the suitable N even with the application of organic and biofertilization. The best organic manures in this respect was chicken manure followed by compost and farmyard manure occupied the last position in this respect. An obvious promotion on fruit quality was observed with reducing percentages of inorganic N as well as increasing percentages of organic manure and EM_1 levels. Using N as 37.5 % inorganic N plus 62.5% farmyard manure + 50ml EM/ / tree gave the worst results on the yield. Supplying Kadotta fig trees with N (400 g N/ tree/ year) as 50% inorganic N plus 50% chicken manure enriched with EM at 40 ml/ tree was responsible for improving yield and fruit quality.
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1. Introduction

Pollution occurred in fig orchards due to the excessive application of different chemicals is considered an important problem facing the marketing of fig fruits to local and foreign markets as well as resulted in adverse effects on health of human being. Many attempts and efforts may be accomplished for avoiding such pollution by using organic and biofertilization for producing organic fruits. Previous studies showed that using the suitable N mostly through organic and biofertilizers as a partial replacement of mineral N nutrition can solve the problem of pollution and at the same time was accompanied with improving yield and fruit quality of fruit crops (**Abdelrahman- Amira, 2013; Filipp *et al.*, 2013; Mir *et al.*, 2013; Mordogan *et al.*, 2013; Duhaky *et al.*, 2014; El Zebieta *et al.*, 2014; Fayek, 2014; Kakehzadeh *et al.*, 2014 and Toselli *et al.*, 2015)**.

The target of this study was examining the effect of organic manures and biofertilization with EM as a partial replacement of inorganic N fertilizers on fruiting of Kadotta fig trees.

2. Material and Methods

This study was carried out during two consecutive experimental seasons 2013 and 2014 on thirty – nine uniform in vigour 14- years old Kadotta fig trees (produced from stem cuttings). The selected trees are grown in an orchard of Sides Horticultural Research Station, Beba district, Beni Suef Governorate. The selected trees planted at spacing of 3.5 x 3 m meters apart. The soil of the orchard is clay in texture well drained with a water table not less than two meters deep. Surface irrigation system was followed using Nile water.

Physical and chemical properties of the tested soil at 0.0 – 90 cm depth are presented in Table (1). Analysis was done according to the procedures that outlined by **Wilde *et al.*(1985)**.

Table (1): Analysis of the tested soil

Constituents	Values
Sand %	6.7
Silt %	13.8
Clay %	79.5
Texture	Clay
Organic matter %	2.35
pH (1: 2.5 extract)	8.06
E.C. (1: 2.5 extract) (mmhos/ 1 cm/ 25 ^{o}C)	0.91
$CaCO_3$%	1.18
Available N %	0.11
Available P (ppm)	6.1
Available K (ppm)	492

The selected trees were subjected to the normal horticultural practices that already applied in the orchard.

This experiment included the following thirteen inorganic, organic and biofertilization treatments:

1- Using the suitable N (400 g N/ tree/ year) completely via inorganic N (1941.7 g / tree ammonium sulphate, 20.6 % N)
2- Using the suitable N via 87.5% inorganic N (1699.0 g ammonium sulphate / tree/ year) + 12.5% organic N (20.0 kg / farmyard manure tree/ year, 0.25% N) + EM at 20 ml / tree.
3- Using the suitable N via 87.5% inorganic N +12.5 % organic N (2.5 kg / poultry manure / tree/ year, 2% N) + EM at 20 ml/ tree.
4- Using the suitable N via 87.5% inorganic N +12.5 % organic N (2.5 kg / plant compost/ tree/ year, 2% N) + EM at 20 ml/ tree.
5- Using the suitable N via 75 % inorganic N (1456.3 g / tree ammonium sulphate, 20.6 % N) + 25 % organic N (40.0 kg farmyard manure/ tree/ year, 0.25 % N) + EM at 30 ml/ tree/ year.
6- Using the suitable N via 75 % inorganic N + 25 % organic N (5.0 kg poultry manure / tree/ year, 2 % N) + EM at 30 ml/ tree.
7- Using the suitable N via 75% inorganic N + 25 % organic N (5.0 kg plant compost/ tree/ year, 2 % N) + EM at 30 ml/ tree/ year.
8- Using the suitable N via 50 % inorganic N (970.0 g ammonium sulphate / tree, 20.6 % N) + 50 % organic N (80 kg farmyard manure/ tree / year, 0.25 % N) + EM at 40 ml/ tree/ year.
9- Using the suitable N via 50 % inorganic N + 50 % organic N (10 kg poultry manure / tree/ year, 2 % N) + EM at 40 ml/ tree/ year.
10- Using the suitable N via 50% inorganic N + 50 % organic N (10 kg plant compost/ tree/ year, 2 % N) + EM at 40 ml/ tree/ year.
11- Using the suitable N via 37.5 % inorganic N (728.2 g / ammonium sulphate/ tree, 20.6 % N) + 62.5 % organic N (100 kg farmyard manure/ tree year, 0.25 % N) + EM at 50 ml/ tree/ year.
12- Using the suitable N via 37.5% inorganic N +62.5 % organic N (12.5 kg poultry manure / tree/ year, 2 % N) + EM at 50 ml/ tree/ year.
13- Using the suitable N via 37.5 % inorganic N + 62.5 % organic N (12.5 kg plant compost / tree/ year, 2 % N) + EM at 50 ml/ tree/ year.

Each treatment was replicated three times, one tree per each. The three organic manures namely farmyard manure, poultry manure and plant compost were added once at the first week of January after winter pruning and were placed in a hole about 50 cm far from tree trunk. Chemical analysis of the tested organic manures are presented in Table (2). These organic manures were enriched with EM_1 before application. Each ml of EM_1 contains 0.6 x 10^6 cells. EM_1 is a commercial biostimulant produced by EMRO corporation. Okinawa, Japan, marked locally by Ministry of Agriculture and Land reclamation, Egypt and contains more than 60 selected strains of "Effective microorganisms", viz, photosynthetic bacteria, lactic acid bacteria, yeasts. actinomyces and various fungi.

Table (2): Chemical analysis of the tested organic manures:

Character	Poultry manure	Plant compost	Farmyard manure
pH (1 : 5)	10.25	8.5	8.7
E.C. (mmhos / 1 cm/ 25°C)	15.5	6.5	5.7
Organic matter %	28.56	3.7	24.0
Organic carbon	27.90	31.25	21.0
C/N	13.95	15.82	17.5
Total N %	2.0	2.0	0.25
Total P%	1.12	0.25	0.32
Total K %	1.21	1.12	0.92
Fe (ppm)	18.50	320	1490
Mn (ppm)	37.55	45	500
Cu (ppm)	17.40	42	4.14
Zn (ppm)	43.22	34	55.0

Ammonium sulphate (20.6 % N) as a source of inorganic N was divided into three equal batches and applied at the first week of March, April and May during both seasons.

Randomized complete block design was followed where the experiment included thirteen treatments and each treatment was replicated three times one tree per each.

During both seasons the following measurements were recorded:

1- Some vegetative growth characters namely main shoot length(cm.), number of leaves / shoot and leaf area $(cm)^2$ (**Ahmed and Morsy, 1999**).

2- Plant pigments namely chlorophylls a & b and total chlorophylls (mg/ 100 g F.W.) (**Von-Wettstein, 1957 and Hiscox and Isralstam, 1999**).
3- Percentages of N, P and K in the leaves on dry weight basis **(Brown and Lilleland 1995; Peach and Tracey, 1968 and Balbaa, 1976 and Wilde *et al.*, 1985**).
4- Yield expressed in weight (kg.) and number of fruits / tree in the first and second crops and total yield per year.
5- Some Physical and chemical characteristics of the fruits in both crops namely fruit weight (g.) and dimensions (height and diameter in cm.), T.S.S. %, reducing sugars % (**Lane and Eynon, 1965 and A.O.A.A., 2000**) and total acidity % as a citric acid / 100 g pulp (**A.O.A.C., 2000**).

Statistical analysis was done and treatment means were compared using New L.S.D. test at 5% (**Snedecor and Cochran, 1967 and Mead *et al.*, 1993)**.

3. Results

1- Growth characters:

Data in Table (3) clearly show that using the suitable N as 50 to 87.5% inorganic + 12.5 to 50 % organic manures (farmyard manure, compost or chicken manure) enriched with EM at 20 to 40 ml/ tree significantly stimulated all growth character namely main shoot length, number of leaves / shoot and leaf area relatively to the application of N as 100% inorganic or when N was added as 37.5% inorganic + 62.5% organic manures enriched with EM_1 at 50 ml /tree. The stimulation was significantly depended on reducing inorganic N percentages from 100 to 50% organic manure from 0.0 to 50% and EM from 0.0 to 40 ml / tree. The best organic manures was chicken manure. The maximum values were recorded on the trees that treated with N as 50% inorganic + chicken manure at 50 % + 40 ml EM_1/ tree. The trees received N as 37.5 % inorganic N + farmyard manure at 62.5% + EM_1 at 50 ml tree gave the lowest values. These results were true during both seasons.

2- Leaf chemical composition:

Data in Tables (4 & 5) clearly show that using the suitable N via 37.5 to 87.5 % inorganic N + 12.5 to 62.5% organic manures enriched with EM_1 at 20 to 50 ml / tree significantly enhanced all plant pigments (chlorophylls a & b and total chlorophylls) and percentages of N, P and K in the leaves comparing to using N as 100% inorganic N. The promotion on these plant pigments and nutrients was significantly associated with reducing percentages of inorganic N from 100 to 37.5%, and increasing percentages organic manures from 0.0 to 62.5 % and levels of EM_1 from 0.0 to 50 ml / tree. The promoting effect of organic manures on these plant pigments and nutrients could be arranged as follows, in descending order, chicken manure, compost and farmyard manure. The maximum values were recorded on the trees that received N as 37.5 % inorganic + 62.5 % chicken manure enriched with EM_1 at 50 ml / tree. The lowest values were recorded on the trees that supplied with N as 100% inorganic. These results were true during both seasons.

Table (4): Effect of inorganic, organic and biofertilization of N on the main shoot length, number of leaves / shoot and leaf area of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Main shoot length (cm.)		No. of leaves/ shoot		Leaf area $(cm.)^2$	
	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	76.3	82.0	12.0	10.0	210.2	213.8
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	80.0	85.2	13.0	14.0	215.2	219.0
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	86.2	93.9	14.0	15.0	226.2	231.0
87.5 % inorg. N + 12.5 % compost + 20 ml EM	83.1	88.9	14.0	14.0	221.2	225.0
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	90.1	97.0	14.0	15.0	233.2	238.0
75 % inorg. N + 25 % C.M. + 30 ml EM	98.0	103.6	16.0	16.0	244.3	248.0
75 % inorg. N + 25 % Compost + 30 ml EM	93.9	100.2	15.0	16.0	238.2	242.0
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	101.0	108.0	16.0	16.0	247.3	244.3
50 % inorg. N + 50 % C.M. + 40 ml EM	108.0	114.0	17.0	16.0	258.0	263.7
50 % inorg. N + 50 % Compost + 40 ml EM	104.0	111.3	16.0	16.0	251.6	255.0
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	65.0	70.0	9.0	10.0	189.2	193.1
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	72.0	77.2	11.0	12.0	195.6	198.5
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	68.3	73.6	9.0	11.0	192.1	196.1
New L.S.D. at 5%	1.0	1.1	1.0	1.1	1.3	1.1

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

Table (5): Effect of inorganic, organic and biofertilization of N on chlorophylls a & b and total chlorophylls in the leaves of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Chlorophylls a (mg/ 100 g F.W.)		Chlorophylls b (mg/ 100 g F.W.)		Total chlorophylls (mg/ 100 g F.W.)	
	2013	2014	2013	2014	2013	2014
100 % inorganic N(inorg.)	8.1	8.2	2.3	2.1	10.4	10.3
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	9.1	9.0	2.5	2.3	11.5	11.3
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	10.5	10.7	3.0	2.7	13.5	13.4
87.5 % inorg. N + 12.5 % compost + 20 ml EM	9.7	9.8	2.8	2.5	12.5	12.3
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	11.2	11.5	3.2	2.9	14.5	14.4
75 % inorg. N + 25 % C.M. + 30 ml EM	12.7	13.4	3.8	3.2	16.5	16.6
75 % inorg. N + 25 % Compost + 30 ml EM	12.0	12.5	3.5	3.0	15.5	15.5
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	13.4	14.5	4.0	3.5	17.4	18.0
50 % inorg. N + 50 % C.M. + 40 ml EM	14.8	16.6	4.5	4.0	19.3	20.6
50 % inorg. N + 50 % Compost + 40 ml EM	14.1	15.5	4.2	3.7	18.3	19.2
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	15.7	17.9	4.8	4.2	20.5	22.1
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	17.3	19.5	5.1	4.7	22.4	24.2
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	16.5	18.5	4.9	4.5	21.4	23.0
New L.S.D. at 5%	0.4	0.5	0.4	0.4	0.5	0.6

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

Table (6): Effect of inorganic and biofertilization of N on the percentages of N, P and K in the leaves of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Leaf N %		Leaf P %		Leaf K %	
	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	1.47	1.52	0.16	0.17	1.41	1.44
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	1.53	1.59	0.18	0.19	1.47	1.51
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	1.66	1.75	0.22	0.23	1.60	1.64
87.5 % inorg. N + 12.5 % compost + 20 ml EM	1.60	1.67	0.20	0.21	1.54	1.58
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	1.73	1.82	0.23	0.25	1.66	1.70
75 % inorg. N + 25 % C.M. + 30 ml EM	1.86	1.96	0.28	0.30	1.77	1.82
75 % inorg. N + 25 % Compost + 30 ml EM	1.80	1.90	0.25	0.27	1.72	1.76
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	1.92	2.03	0.29	0.32	1.82	1.88
50 % inorg. N + 50 % C.M. + 40 ml EM	2.04	2.18	0.33	0.36	1.93	2.01
50 % inorg. N + 50 % Compost + 40 ml EM	1.98	2.10	0.31	0.34	1.87	1.95
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	2.11	2.30	0.33	0.38	2.00	2.09
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	2.25	2.45	0.36	0.42	2.13	2.22
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	2.18	2.37	0.34	0.40	2.06	2.16
New L.S.D. at 5%	0.05	0.06	0.02	0.02	0.05	0.04

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

Table (7): Effect of inorganic and biofertilization of N on the number of fruits and yields (kg.) and fruit weight in the first crop of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Number of fruits in the 1st crop		Yield/ tree in the 1st crop		Fruit weight ion the 1st crop	
	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	14.0	14.0	0.69	0.67	49.0	48.0
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	15.0	15.0	0.76	0.74	50.5	49.0
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	18.0	18.0	1.04	0.94	57.5	52.0
87.5 % inorg. N + 12.5 % compost + 20 ml EM	17.0	16.0	0.88	0.82	51.5	51.0
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	21.0	21.0	1.17	1.13	55.9	54.0
75 % inorg. N + 25 % C.M. + 30 ml EM	25.0	26.0	1.50	1.51	59.8	58.0
75 % inorg. N + 25 % Compost + 30 ml EM	23.0	23.0	1.33	1.33	57.8	58.0
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	27.0	29.0	1.66	1.74	61.5	60.0
50 % inorg. N + 50 % C.M. + 40 ml EM	31.0	36.0	2.00	2.27	64.5	63.0
50 % inorg. N + 50 % Compost + 40 ml EM	29.0	32.0	1.82	1.95	62.9	61.0
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	9.0	9.0	0.59	0.59	65.0	65.0
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	11.0	9.0	0.74	0.59	67.0	66.0
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	10	9.0	0.66	0.59	66.0	66.0
New L.S.D. at 5%	1.0	1	0.06	0.05	0.9	0.9

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

Table (8): Effect of inorganic and biofertilization of N on some physical and chemical characteristics of the fruits in the first crop of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Fruit height in the 1st crop (cm.)		Fruit diameter in the 1st crop (cm.)		T.S.S. % in the 1st crop		Reducing sugars % in the 1st crop		Total acidity % in the 1st crop	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	6.00	6.05	6.11	6.20	11.00	10.90	10.0	10.0	0.371	0.392
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	6.20	6.15	6.30	6.30	11.30	11.20	10.5	10.3	0.350	0.372
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	6.60	6.41	6.70	6.70	12.00	11.70	11.5	10.8	0.310	0.33
87.5 % inorg. N + 12.5 % compost + 20 ml EM	6.40	6.25	6.50	6.50	11.60	11.50	11.0	10.5	0.330	0.35
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	6.69	6.64	6.80	6.80	12.30	11.90	11.7	11.1	0.290	0.308
75 % inorg. N + 25 % C.M. + 30 ml EM	6.90	6.81	7.00	7.00	12.70	12.50	12.1	11.7	0.251	0.266
75 % inorg. N + 25 % Compost + 30 ml EM	6.80	6.71	6.90	6.90	12.50	12.10	11.5	11.4	0.271	0.286
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	6.95	6.51	7.06	7.06	13.00	12.70	12.4	11.7	0.231	0.240
50 % inorg. N + 50 % C.M. + 40 ml EM	7.07	7.04	7.17	7.17	13.60	13.00	12.5	12.4	0.190	0.196
50 % inorg. N + 50 % Compost + 40 ml EM	7.00	6.97	7.11	7.11	13.30	12.90	12.6	12.0	0.211	0.218
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	7.17	7.10	7.25	7.29	13.90	13.20	13.1	12.3	0.180	0.176
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	7.30	7.20	7.40	7.40	14.30	13.60	13.5	12.9	0.151	0.139
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	7.25	7.15	7.35	7.35	14.10	13.40	13.3	12.6	0.160	0.155
New L.S.D. at 5%	0.03	0.03	0.03	0.03	0.3	0.3	0.3	0.3	0.017	0.018

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

3- Yield/ tree in the two crops and total yield/ tree/ year:

Data in Tables (7 & 9) clearly show that supplying Kadotta fig trees with N as 50 to 87.5% inorganic + 12.5 to 50 % organic manures enriched with EM_1 at 20 to 40 ml/ tree significantly improved the yield in both crops and total yield/ tree comparing with application of N via inorganic N at 100 % or when N was added as 37.5 % inorganic N even with the application of organic manures at 62.5% enriched with EM_1 at 50 ml/ tree. A significant reduction on the yield expressed in number of fruits/ tree and yield (kg.) in the two crops as well as total yield/ tree was observed when inorganic N percentage reached 37.5% even with the application of organic and biofertilization. Using farmyard manure, compost and chicken manure, in ascending order was significantly very effective in improving yields. The maximum first (2.0 & 2.30 kg) and second crops (32.0 & 32.1 kg) were observed on the trees that received N as 50% inorganic + 50% poultry manures enriched with 40 ml EM_1/ tree/ year during 2012 & 2014 seasons, respectively. Under such promised treatment total, yield/ tree reached 34.00 and 34.73 kg during both seasons, respectively. The trees received N as 37.5 % inorganic + 62.0 % farmyard manure enriched with 50 EM_1/ tree produced first (0.59 & 0.59 kg) and second crops (18.8 & 18.8 kg) and total yield/ tree (18.59 & 19.39 kg) during both seasons, respectively. These results were true during both seasons.

4- Physical and chemical characteristics of the fruits in the first and second crops:

Data in Tables (7, 8, 9 & 10) clearly show that using the suitable N via 37.5 to 87.5 % inorganic N plus 12.5 to 62.5 % organic manures enriched with EM_1 at 20 to 50 ml/ tree/ year significantly improved both physical and chemical characteristics of the fruits in terms of increasing fruit weight and dimensions (height and diameter), T.S.S. % and reducing sugars % and decreasing total acidity % rather than using N completely via inorganic N. The promotion was significantly associated with reducing inorganic N percentages from 100 to 37.5 % and at the same time increasing both percentages of organic manures form 0.0 to 62.5% and EM_1 levels from 20 to 50 ml/ tree. The best organic manures was chicken manures followed by compost. Farmyard manure occupied the last position in this respect. The best results with regard to fruit quality were obtained due to using the suitable N via 37.5 % inorganic + 62.5% chicken manure + EM_1 at 50 ml/ trees. Unfavourable effects on fruit quality were attributed to using N completely via inorganic N. These results were true during both seasons.

Table (9): Effect of inorganic and biofertilization of N on number of fruits and yield (kg.)% and fruit weight in the second crop and total number of fruits and total yield / tree of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Number of fruits in the 2nd crop		Yield in the 2nd crop (k.)		Total number of fruits / year		Total yield / tree (kg.)		Fruit weight in the 2nd crop	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	341.0	345.0	15.0	15.4	355.0	359.0	15.69	16.07	44.0	44.5
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	352.0	362.0	16.0	16.7	367.0	377.0	16.76	17.44	45.5	46.0
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	381.0	391.0	18.6	19.2	400	409.0	19.64	20.14	48.9	49.0
87.5 % inorg. N + 12.5 % compost + 20 ml EM	366.0	376.0	17.1	17.9	383.0	393.0	17.98	18.72	46.7	47.5
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	410.0	422.0	20.9	21.5	431.0	443.0	22.07	22.63	51.0	51.0
75 % inorg. N + 25 % C.M. + 30 ml EM	450.0	462.0	24.3	25.0	475.0	488.0	24.81	26.51	54.0	54.1
75 % inorg. N + 25 % Compost + 30 ml EM	430.0	441.0	22.6	23.3	453.0	464.0	23.93	24.63	52.6	52.5
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	490.0	510.0	27.4	28.1	517.0	539.0	29.06	29.84	56.0	55.0
50 % inorg. N + 50 % C.M. + 40 ml EM	551.0	562.0	32.0	32.1	582.0	598.0	34.00	34.37	58.0	57.2
50 % inorg. N + 50 % Compost + 40 ml EM	520.0	540.0	29.6	30.2	549.0	572.0	31.42	32.15	57.0	56.0
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	310.0	320.0	18.0	18.8	319.0	529.0	18.59	19.39	58.0	58.9
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	336.0	339.0	19.8	20.6	347.0	348.0	20.54	21.19	59.0	60.9
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	322.0	334.0	18.7	19.8	332.0	343.0	19.36	20.39	58.0	59.3
New L.S.D. at 5%	8.0	7.1	0.9	0.8	8.1	9.0	0.7	0.6	0.9	1.0

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms.

Table (10): Effect of inorganic and biofertilization of N on some physical and chemical characteristics of the fruits in the 2nd crop of Kadotta fig trees during 2013 and 2014 seasons.

Inorganic, organic and biofertilization treatment	Fruit height in the 2nd crop (cm.)		Fruit diameter in the 2nd crop (cm.)		T.S.S. % in the 2nd crop		Reducing sugars % in the 2nd crop		Total acidity % in the 2nd crop	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
100 % inorganic N (inorg.)	4.61	4.49	4.72	4.6	13.3	13.4	12.5	12.1	0.33	0.371
87.5 % inorg. N + 12.5 % F.Y.M. + 20 ml EM	4.69	4.60	4.8	4.71	13.7	13.7	12.7	12.4	0.312	0.35
87.5 % inorg. N + 12.5 % C.M. + 20 ml EM	4.81	4.79	4.92	4.9	14.3	14.2	13.5	13.1	0.270	0.310
87.5 % inorg. N + 12.5 % compost + 20 ml EM	4.76	4.7	4.87	4.81	14.0	14.0	13.0	12.8	0.290	0.331
75 % inorg. N + 25 % F.Y.M. + 30 ml EM	4.88	4.9	5.00	5.0	14.5	14.5	13.5	13.4	0.249	0.28
75 % inorg. N + 25 % C.M. + 30 ml EM	5.0	5.11	5.11	5.22	15.1	14.9	14.3	13.8	0.209	0.246
75 % inorg. N + 25 % Compost + 30 ml EM	4.95	5.0	5.05	5.11	14.8	14.7	14.0	13.7	0.229	0.266
50 % inorg. N + 50 % F.Y.M. + 40 ml EM	5.06	5.16	5.16	5.27	15.5	15.2	12.6	14.3	0.193	0.22
50 % inorg. N + 50 % C.M. + 40 ml EM	5.22	5.29	5.28	5.40	16.1	15.6	15.1	14.8	0.151	0.176
50 % inorg. N + 50 % Compost + 40 ml EM	5.16	5.22	5.26	5.33	15.9	15.6	14.8	14.5	0.173	0.197
37.5 % inorg. N + 62.5 % F.Y.M. + 50 ml EM	5.31	5.36	5.41	5.46	16.3	15.8	15.5	15.1	0.160	0.156
37.5 % inorg. N + 62.5 % C.M. + 50 ml EM	5.49	5.40	5.61	5.55	16.8	16.2	15.9	15.7	0.120	0.119
37.5 % inorg. N + 62.5 % Compost + 50 ml EM	5.41	5.40	5.51	5.51	16.6	16	15.7	15.4	0.140	0.139
New L.S.D. at 5%	0.04	0.04	0.04	0.04	0.3	0.3	0.3	0.3	0.020	0.018

F.Y.M.= Farmyard manure (0.25% N), C.M. = Chicken manure (2%), E.M. = Effective microorganisms

4. Discussion:

The enhancement of plant growth and fruiting by the application of organic manures enriched with EM_1 may be attributed to the profound effect of plant growth regulation substances produced by organic manures and EM_1 or in improving the availability and acquisition of nutrients from the soil which promoted growth. Bacteria in EM_1 produced adequate amounts of IAA and cytokinins which increase the leaf area per unit root length and cytokinins which increase the surface area per unit root length and hence enhanced the root hair branching with an eventual increase in acquisition of nutrients form the soil. The beneficial effects of these biostimulants on reducing soil pH and enhancing organic matter, water retention and N fixation could give another explanation (**David, 2002 and Kannaiyan, 2002**).

These results are in agreement with those obtained by **Mordogan *et al.*, (2013); Mir *et al.*, (2013); Abdelrahman – Amira (2013); Duhaky *et al.*, (2014); El- Zbieta *et al.*, (2014), Fayek (2014); Kakehzadeh *et al.*, (2014) and Toselli *et al.*, (2015)**.

Conclusion:

Fertilizing of Kadotta fig trees grown under Bani Suef conditions with the suitable N (400 g N/ tree) as 50% inorganic N plus 50% chicken manure enriched with EM_1 at 40 ml/ tree gave an economical yield and improving fruit quality.

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