



EFFECT OF DIFFERENT SOURCES OF NUTRIENTS ON GROWTH, YIELD AND QUALITY OF NAGPUR MANDARIN

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INTRODUCTION

The organic manure plays a very important role in maintaining soil productivity. Oil cakes increased organic carbon, phosphorous content in soil. Edible oil cakes release more inorganic nitrogen from soil than non-edible cakes. Non-edible oil cakes liberated available phosphorus from soil in greater proportions than edible oil cakes. Karanj and neem cakes being non-edible are used exclusively as manure in fruit crops. Among these, neem cake is very popular with our farmers cultivating fruit crops. It is non-edible concentrated organic manure, easily available and contained high amount of nitrogen and organic carbon. They also retard nematode population in soil, if present in hazardous amount. Gandhi (1) has also recommended the utility of oil cakes in fertilizer mixtures. Citrus is a nutrient sensitive and responsive plant and it

RESULTS AND DISCUSSION

Table 2 revealed that, tree volume of Nagpur mandarin was not significantly influenced by different treatments of manuring. Numerically the maximum tree volume was recorded in treatment T1 (46.69) followed by T7 (46.32). But in respect of fruit yield during *ambia* and *mrig* bahar significantly higher fruit yield (395.6 and 356.5, respectively) was obtained from the trees with applied with T4 (50 Kg FYM +10 Kg 'N' Neem cake). These results confirm the findings of Rokba *et al* (3). The minimum fruit yield (298.6 fruits) was obtained in the treatment T7 where the fertilizer was applied of FYM + PSB of *ambia* bahar where as in *Mrig* bahar it was in treatment T5 and T7 where the FYM + PSB applied.

Physico-chemical characteristics of fruits:

Fruit weight, fruit size and juice percent were significantly influenced by various treatments of organic and inorganic fertilizers in *ambia* bahar (Table-3). The maximum fruit was found in treatment T4

required adequate nutrition for proper growth and development (Ghosh , 2).

MATERIAL AND METHODS

The present investigation was carried out on twelve years old Nagpur mandarin plants of uniform growth and vigor at Regional Fruit Research Station, Katol, Distt. Nagpur. The general characteristics of experimental soil and chemical properties of neem cake, FYM and sunhemp have been mentioned along with treatment details (Table 1). The finely ground well powdered neem cake was used. The PSB was applied 20g/tree. All the fertilizers and organic manures were applied in the month of June. The treatments were applied in randomized block design with three replications having two plants under each treatment. Growth of plant, number of fruits per plant were counted. Physico-chemical characters of fruits were measured.

where 50 Kg FYM and 10 Kg neem cake applied. The fruit size (height and diameter) was more in application of organic fertilizer i.e. 50 Kg FYM and 10 Kg neem cake. This may be due to enhanced merelization of organic nitrogen. The maximum juice percent was recorded in treatments T4 followed by T3. The TSS and acidity could not influenced by various treatments in *ambia* bahar, but maximum TSS and low acidity was recorded where organic fertilizer applied i.e. T4 .

During *mrig* bahar the fruit weight and fruit size could not be influenced by various treatments combination (table 4). The maximum fruit weight and more fruit size was observed in organic fertilizer application i.e. 50 Kg FYM + 10 Kg neem cake applied. The juice percent also more in this treatment. The TSS and acidity was significantly influenced by various treatments. The maximum TSS and minimum acidity was recorded in treatment T4 where 50 Kg FYM + 10 Kg neem cake applied. However, the desirable parameters

were exhibited by applying the organic fertilizer in the form of 50 Kg FYM + 10 Kg neem cake. The present investigation is in

the line of findings of Rokba *et.al.* (3) and Tiwarie/a/. (4).

Table 1: General characteristics of experimental soil

Sr. No.	Soil status	Initial	Final
1.	Bulk density g/cm ³	1.56	1.54
2.	pH	7.3	7.1
3.	EC dsm ^m 1	0.35	0.32
4.	Organic carbon (%)	0.52	0.54
5.	Available P ₂ O ₅ kg ha ^m 1	46	49
6.	Available K ₂ O kg ha ¹	430	439

Chemical analysis of FYM, neem cake and sunhemp

Sr.No.		N	P	K
1.	FYM	0.84	0.59	1.35
2.	Neem cake	4.48	0.85	1.85
3.	Sunhemp	2.24	0.87	0.85

Treatment details

T1	1200g N+400g P ₂ O ₅ +400 g K ₂ O+25 Kg FYM
T2	900 g N + 300 g P ₂ O ₅ + 300 g K ₂ O+50 Kg FYM
T3	SO Kg FYM
T4	50 Kg FYM+10 Kg neem cake
T5	50 Kg FYM+ Sowing of sunhemp around the basin (rainy and summer season)
T6	900 g N+300g P ₂ O ₅ +300 g K ₂ O+50 Kg FYM+PSB (20g/tree)
T7	50 Kg FYM + PSB (20g/tree)

Table 2: Tree volume and yield of Nagpur mandarin as influenced by different treatments of nutrients (Pooled results of 1999-2000 to 2005-2006)

Treatments	Tree volume (cu.m.)	Fruit yield (No) in ambia bahar	Fruit yield (No) in mrig bahar
T1	46.69	372.4	324.7
T2	45.57	344.8	306.6
T3	45.85	311.2	304.5
T4	44.73	395.6	356.5
T5	45.08	358.6	265.0
T6	44.18	324.0	312.0
T7	46.32	298.6	269.2
SE (m) ±	0.89	18.7	15.88
CD at 5%	N.S.	54.6	47.18

Table 3: Physico-chemical properties of Ambia bahar fruit of Nagpur mandarin as influence by different treatments of nutrients (Pooled results of 1999-2000 to 2005-2006).

Treatment	Wt. Of fruit (g)	Height (cm)	Diameter (cm)	Juice (%)	TSS (%)	Acidity (%)
T1	147.0	5.16	5.57	43.28	8.40	0.72
T2	145.3	5.21	5.70	43.96	8.38	0.72
T3	144.7	5.59	5.47	44.38	8.26	0.71
T4	159.8	5.57	5.71	45.68	8.58	0.54
T5	140.2	5.18	5.40	43.32	8.34	0.69
T6	140.8	4.85	5.29	42.44	8.40	0.60
T7	139.3	5.00	5.21	42.64	8.46	0.60
SE (m) +	2.9	0.09	0.09	0.61	0.085	0.014
CD at 5%	8.56	0.26	2.36	1.85	N.S.	N.S.

Table 4: Physico-chemical properties of Mrig bahar fruit of Nagpur mandarin as influence by different treatments of nutrients (Pooled results of 1999-2000 to 2005-2006).

Treatments	Weight of fruit (g)	Height (cm)	Diameter (cm)	Juice (%)	TSS (%)	Acidity (%)
T1	135.82	4.99	5.47	44.63	9.50	0.73
T2	121.22	5.05	5.50	46.56	9.47	0.75
T3	145.02	5.19	5.45	46.23	9.57	0.77
T4	151.95	5.26	5.90	47.26	9.60	0.57
T5	145.87	5.15	5.78	45.79	9.35	0.77
T6	122.30	5.11	5.62	46.15	9.42	0.72
T7	147.88	5.11	5.71	45.87	9.30	0.60
SE (m) ±	9.91	0.07	0.12	0.54	0.06	0.014
CD at 5%	N.S.	N.S.	N.S.	1.59	0.187	0.041

SUMMARY

A field experiment was conducted during 1999-2000 to 2005-2006 to study the effect of organic and inorganic nutrients with biofertilizers on Nagpur mandarin. Results indicated that, tree applied with 50 Kg FYM + 10 Kg neem cake influence the fruit yield during *ambia* and *mrig* bahar. Desirable parameters of physico-chemical characteristics' of fruits were also exhibited due to the application of organic manures, inorganic and bio-fertilizers.

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