

Effect of integrated nutrient management on yield and economics of Kalmegh (*Andrographis paniculata* Wall. Ex. Nees.)

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ABSTRACT

Investigations were carried out on Effect of integrated nutrient management on yield of kalmegh (*Andrographis paniculata* Wall. Ex. Nees.) at the Instructional Farm, Navsari Agricultural University, Navsari during the late kharif season of 2013-14. The experiment was conducted in Randomized Block Design with nine treatments viz., T_1 (100 % RDN from Vermicompost), T_2 (100 % RDN from Bio-compost), T_3 (100 % RDN from Neem cake), T_4 (100 % RDN from Castor cake), T_5 (50 % RDN from Vermicompost + 50 % RDN), T_6 (50 % RDN from Bio-compost + 50 % RDN), T_7 (50 % RDN from Neem cake + 50 % RDN), T_8 (50 % RDN from Castor cake + 50 % RDN), T_9 [100 % RDF (75:40:40 NPK kg/ha)] and all treatments were replicated thrice. All the yield attributes were found maximum in T_3 treatment (100 % RDN from Neem cake) fresh weight per plant (33.97 g), fresh weight per plot (4.14 kg), total herb yield (8511.7 kg), dry weight per plant (14.85 g), dry weight per plot (1.35 kg) and total dry matter production (2778.8 kg). From the economic point of view, maximum net realization of Rs. 36,289.95 per hectare was recorded in T_3 treatment (100 % RDN from Neem cake) while in case of BCR it was maximum of 2.5 was in T_2 treatment (100% RDN from Bio-compost). Thus, it can be concluded that for obtaining higher profitable yield kalmegh be fertilized with 100 % RDN (75 kg) from Neem cake under South Gujarat condition.

Keyword : Kalmegh, vermicompost, biocompost, neem cake, castor cake

INTRODUCTION

Kalmegh belongs to family Acanthaceae is one of the nineteen species of the genus *Andrographis* which is indigenous to India and has been in Indian systems of medicine since time immemorial. Kalmegh is a bitter annual (perennial, if maintained) herb, erect, 50 cm to 1m. in height, stem quadrangular, much branched; leaves opposite, short petioled; flowers in racemes. Fruit capsule, linear, oblong or elliptic; seeds about 12 in number, subquadrate, brownish or creamy yellow. Yield of the plant is greatly affected by environmental conditions which mainly affects the physiology of plants. The other species of the genus, kalmegh is of common occurrence in most places in India, including the plains and hilly areas up to 500 m, which accounts for its wide use. Since time immemorial, village and ethnic communities in India have been using this herb for treating a variety of ailments. The present experiment is planned to study "Effect of integrated nutrient management on yield of kalmegh" during late

Kharif season of 2013-14 at Instructional Farm, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari.

MATERIALS AND METHODS

A field experiment entitled Effect of integrated nutrient management on yield of Kalmegh was conducted in randomized block design with nine treatments (Table 1) replicated thrice during the late Kharif season of 2013-14 at Instructional Farm, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India. Local variety of Kalmegh was selected for experiment. Frequent irrigation was given (once in 4-5 days) during the first month till plant establishment, and once in 10 to 12 days during subsequent period.

Fresh weight/plant

After the harvesting, the weights of each individual tagged plant were taken and mean value was recorded in gram (g).

Fresh weight/plot

Fresh weight of all the plants was taken from each plot as a whole and was expressed in kilograms (kg).

Total fresh weight

Total fresh weight was calculated by converting the yield of fresh weight per plot into hectare (kg/ha).

Dry weight/plant

Harvested tagged plants were allowed to sun dry and then dry weight was taken after drying at few days interval until the value of dry weight was found constant and mean value was recorded in gram(g).

Total dry weight (per plot)

The total dry weight was taken after complete sun drying of all the plants of each plot and expressed in kilograms (kg).

Total dry matter production

Total dry matter production was calculated by converting the yield of total dry weight per plot into hectare (kg/ha).

Economics

The gross realization in terms of rupees per hectare was worked out on the basis of dry weight of plant yield for each treatment and the prices of the produce prevailing in the market. The cost of cultivation for each treatment was worked out by taking into consideration the cost of all the operation right from preparatory tillage to harvesting including cleaning as well as the cost of inputs, *viz.*, seeds and fertilizer etc. The net realization was worked out by subtracting the total cost of cultivation from the gross realization for each treatment and recorded in rupees per hectare accordingly. The benefit cost ratio was also calculated for each treatment.

$$\text{BCR (Benefit cost ratio)} = \frac{\text{Net realization}}{\text{Total cost of cultivation}}$$

RESULTS AND DISCUSSION

Fresh weight per plant

The maximum fresh weight per plant 33.97 g was recorded with treatment T₃ (100% RDN from neem

cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN), T₄ (100% RDN from castor cake), T₅ (50% RDN from vermicompost + 50% RDN), T₁ (100% RDN from vermicompost) and T₉ (100% RDF {75:40:40 NPK kg/ha}) (Table 1).

Fresh weight per plot

The maximum fresh weight per pot 4.14 kg was recorded with treatment T₃ (100% RDN from neem cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN) and T₄ (100% RDN from castor cake) (Table 1).

Fresh weight per hectare

The maximum herb yield 8511.7 kg was recorded with treatment T₃ (100% RDN from neem cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN) and T₄ (100% RDN from castor cake) (Table 1).

Dry weight per plant

The maximum dry weight per plant 14.85 g was recorded with the treatment T₃ (100% RDN from neem cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN), T₄ (100% RDN from castor cake) and T₅ (50% RDN from vermicompost + 50% RDN) (Table 2).

Dry weight per plot

The maximum dry weight per pot 1.35 kg was recorded with treatment T₃ (100% RDN from neem cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN), T₄ (100% RDN from castor cake), T₅ (50% RDN from vermicompost + 50% RDN) and T₁ (100% RDN from vermicompost) (Table 2).

Dry weight per ha

The maximum dry weight 2778.8 kg was recorded with the treatment T₃ (100% RDN from neem cake) which was at par with T₈ (50% RDN from castor cake + 50% RDN), T₄ (100% RDN from castor cake), T₅ (50% RDN from vermicompost + 50% RDN) and T₁ (100% RDN from vermicompost) (Table 2).

Economics

The maximum BCR 2.5 was recorded with the treatment T₂ (100% RDN from bio-compost) which

Table 1: Effect of integrated nutrient management on fresh weight of Kalmegh

Treatments	Fresh weight		
	per plant (g)	per plot (kg)	per hectare (kg)
T1= 100% RDN from VC	31.33	3.33	6858.7
T2= 100% RDN from BC	26.73	2.81	5788.8
T3= 100% RDN from NC	33.97	4.14	8511.7
T4= 100% RDN from CC	31.47	3.70	7620.0
T5= 50% RDN from VC + 50% RDN	31.33	3.52	7242.8
T6= 50% RDN from BC + 50% RDN	27.80	3.12	6412.9
T7= 50% RDN from NC + 50% RDN	27.73	2.98	6131.7
T8= 50% RDN from CC + 50% RDN	32.00	3.80	7812.8
T9= 100% RDF (75:40:40 NPK kg/ha)	31.20	3.12	6426.6
S.Em. ±	1.41	0.17	341.01
C.D. at 5 %	4.23	0.50	1022.35
C.V. %	8.04	8.46	8.46

VC = Vermicompost

BC = Bio-compost

NC = Neem cake

CC = Castor cake

RDN = Recommended dose of nitrogen

RDF = Recommended dose of fertilizer

Table 2: Effect of integrated nutrient management on dry weight of Kalmegh

Treatments	Dry weight		
	per plant (g)	per plot (kg)	per hectare (kg)
T1= 100% RDN from VC	12.30	1.11	2276.8
T2= 100% RDN from BC	9.53	0.90	1851.9
T3= 100% RDN from NC	14.85	1.35	2778.8
T4= 100% RDN from CC	13.25	1.17	2400.5
T5= 50% RDN from VC + 50% RDN	13.27	1.13	2332.0
T6= 50% RDN from BC + 50% RDN	12.07	0.93	1920.4
T7= 50% RDN from NC + 50% RDN	11.60	0.94	1927.0
T8= 50% RDN from CC + 50% RDN	13.35	1.24	2544.9
T9= 100% RDF (75:40:40 NPK kg/ha)	12.10	1.03	2126.2
S.Em. ±	0.66	0.09	193.12
C.D. at 5 %	1.99	0.28	578.96
C.V. %	9.22	14.93	14.93

Table 3: Effect of integrated nutrient management on economics of Kalmegh

Treatments	Yield (kg/ha)	Gross realization (Rs./ha)	Cost of production (Rs./ha)	Net realization (Rs./ha)	Benefit : Cost ratio
T1	2276.7	45535.3	30282.6	15252.7	0.5
T2	1851.8	37037.0	10482.7	26554.2	2.5
T3	2778.8	55576.5	19286.5	36289.9	1.9
T4	2400.5	48011.0	22203.1	25807.9	1.2
T5	2331.9	46639.2	23381.8	23257.5	1.0
T6	1920.4	38408.8	12495.3	25913.4	2.1
T7	1926.9	38539.4	17883.7	20655.7	1.2
T8	2544.9	50898.8	19342.0	31556.8	1.6
T9	2126.1	42524.0	16481.0	26043.0	1.6

was followed by the treatment T₆ (50% RDN from bio-compost + 50% RDN) with the BCR of 2.1 (Table 3).

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