



Performance of Ginger (*Zingiber officinale*) Varieties under Organic Nutrition.

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ABSTRACT

Krishi Vigyan Kendra, Kollam selected four ginger varieties Athira, Karthika, Aswathy and Varada for the trial. Number of replications were ten. Organic ginger production package developed by Kerala Agricultural University was followed for its cultivation. The trial revealed that ginger variety Varada recorded highest yield (18.5 t/ha) followed by Aswathy (16.7 t/ha), while local variety recorded lowest yield (10.0 t/ha). Highest B:C ratio (2.63) was obtained from Varada followed by Aswathy (2.38) and Athira (2.32). Highest disease incidence (25.0%) was reported from local variety followed by Karthika (8.0%) and lowest from Varada (5.2%). Pest incidence (15.4) was highest in local variety and lowest (4.3 %) in variety Varada. The rhizomes of ginger variety Varada and Athira were bold while that of variety Aswathy and Karthika medium bold. Varieties Varada, Athira and Karthika can be used for fresh and dry ginger purpose while variety Aswathy for fresh ginger purpose. It was concluded that ginger performed well under organic farming and helped in maintaining soil sustainability in long run. Ginger variety Varada reported highest yield and benefit cost ratio and less pest and disease incidence than other ginger varieties in Kollam district of Kerala under organic management practices.

Key Words : Amelioration, Ginger, Organic farming, Rhizome, Soil sustainability.

INTRODUCTION

Ginger (*Zingiber officinale* Rosc.) is an important spice crop of Kerala. Focus should be given to increase the productivity of ginger. Agroclimatic conditions and use of high yielding varieties play a major role in getting higher yields from ginger (Vadivel *et al*, 2006). In ginger cultivation, application of organic manures will increase the yield and quality of rhizomes. Ginger is a heavy feeder and it demands nutrients continuously in large amount and use of large quantity of chemically formulated fertilizer is not feasible as it results in progressive rise in multi-nutrients deficiency, nutrient imbalance, deteriorating soil health and productivity with time. Thus organic farming is the best known alternative. It is a crop that responds well to the application of organic manures (Sadanandan and Hamza, 2016). Application of biofertilizers also showed

significant yield increase in ginger (Sharma *et al*, 2017). Organic (ad hoc) package of practices has been given by KAU (KAU, 2009). Number of studies conducted on organic farming indicated that quality of agriculture produce was better than inorganically grown produce. Organic manure has the capacity to fulfill nutrient demands of the crops adequately and promotes the activity of macro and micro flora in the soil (Ramteke *et al*, 2018). Organic manures help to increase biological activity of soil microbes and improve soil structure, water holding capacity and other physico-chemical properties of soil (Singh and Kushwaha, 2018). Organic farming has been the outcome of concerns relating to the increased contamination of food and consequent negative effect on human health. Keeping this in view, the present study was initiated to find the response of ginger varieties to organic nutrition and popularization of best performing ginger variety in Kollam district in the non-traditional areas.

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Table 1. Growth attributes of different ginger genotypes under organic farming.

Treatment	Plant height (cm)	Number of leaves/plant	Number of tillers/plant	Stem girth (cm)
T ₁	35.41	128.25	8.2	3.29
T ₂	51.45	156.30	16.0	3.82
T ₃	46.45	135.44	11.2	3.55
T ₄	38.26	145.8	10.05	3.33
T ₅)	41.55	139.5	9.8	3.41
CD (0.05)	7.57	38.5	2.8	0.23

MATERIALS AND METHODS

On farm testing was conducted by Krishi Vigyan Kendra, Kollam for assessing the performance of high yielding ginger varieties in Kollam district under scientific crop management practices using organic manures. The experiment also aimed to popularize the best performing ginger variety for large scale cultivation in Kollam district under organic farming practices. The trial was replicated at ten farmer's field. Treatments tried were T₁ (local variety), T₂ (Varada), T₃ (Aswathy), T₄ (Athira) and T₅ (Karthika). Rhizome bits of 15g weight were planted in small pits at a spacing of 20 cm x 20 cm. Beds of 15 cm height, 1 m width and of convenient length were prepared giving 50 cm spacing between beds. Before planting seed rhizomes were soaked in a solution containing pseudomonas 20 g/l for 30 min. Trichoderma enriched organic manure 100 g/pit were applied at time of planting of rhizomes. In this trial various organic manures and biofertilizers were used. Farm Yard Manure

was applied at the rate of 25 t/ha as basal and 3 t/ha each at 60 and 120d after planting.

Neem cake was applied at the rate of 1.0 t/ha, Azospirillum 2.5 Kg/ha and PGPR Mix -I 2.5 Kg/ha Immediately after planting mulching was done with green leaves. Mulching the ginger beds with green leaves is an essential operation to enhance germination of seed rhizomes and to prevent washing off soil due to heavy rain. This also helped to add organic matter to the soil and conserve moisture during the later part of the cropping season. The first mulching was done with green leaves @15 t/ha at the time of planting. It was repeated at the rate of 7.5 t/ha at 45d and 90 d after planting. Cow dung slurry or liquid manure was poured on the bed after each mulching to enhance microbial activity and nutrient availability. Weeding was carried out depending on the intensity of weed growth. Such materials was used for mulching. Earthing up of the crop was done during first mulching. Farmers were trained for the organic crop management practices

Table 2 . Performance of selected ginger cultivars under organic farming

Treatment	Size of rhizome	Maturity (days)	Type of rhizome
T ₁	Medium	210	Dry ginger
T ₂	Bold	200	Fresh and dry ginger
T ₃	Bold	240	Fresh ginger
T ₄	Medium bold	240	Fresh and dry ginger
T ₅)	Medium bold	240	Fresh and dry ginger

Performance of Ginger

Table 3. Quality traits and pest and disease incidence of selected ginger cultivars.

Treatment	Crude fibre (%)	Dry recovery (%)	Disease incidence (%)	Pest incidence (%)
T ₁	5.6	15.0	25.0	15.4
T ₂	4.3	19.6	5.20	4.33
T ₃	3.5	19.5	6.50	5.81
T ₄	3.4	22.0	6.98	6.50
T ₅)	3.7	21.0	8.00	7.30
CD (0.05)			5.62	3.37

in ginger cultivation. Different biometric and yield parameters were recorded during the study period. Pest and disease incidence were also noted.

RESULTS AND DISCUSSION

The results revealed that ginger variety Varada recorded highest growth attributes under organic nutrition and also highest yield (18.5 t/ha) followed by variety Aswathy (16.7 t/ha), while local variety recorded lowest yield (10.0 t/ha). Highest B:C ratio (2.63) was obtained from Varada followed by Aswathy (2.38) and Athira (2.32) and lowest (1.43) from local variety. Highest disease incidence (25.0%) was reported from local variety followed by Karthika (8.0%) and lowest from Varada (5.2%). Pest incidence (15.4) was highest in local variety and lowest (4.3 %) in variety Varada. The rhizomes of ginger variety Varada and Aswathy were bold, while that of variety Athira and Karthika were medium bold. Maturity period for variety Varada was 200d, while that of varieties Athira, Karthika and Aswathy were 240d. Crude fibre content

was least in variety Athira followed by variety Aswathy and highest in local variety. Dry recovery percentage was highest in variety Athira (22%) followed by variety Karthika (21%) and lowest in local variety (15 %). Varieties Varada, Athira and Karthika can be used for fresh and dry ginger purpose while variety Aswathy is used for fresh ginger purpose.

CONCLUSION

It was concluded from the study that ginger performs well under organic farming. Ginger variety Varada reported highest yield and benefit cost ratio and less pest and disease incidence than other ginger varieties in Kollam district of Kerala under organic management practices. The rhizomes of ginger variety Varada and Aswathy were bold, while that of variety Athira and Karthika medium bold. Maturity period for variety Varada was 200d, while that of varieties Athira, Karthika and Aswathy were 240d. Crude fibre content was least in variety Athira followed by variety Aswathy and highest in variety

Table 4. Yield attributes and B:C Ratio of selected ginger cultivars under organic farming

Treatment	Yield (t/ha)	Fresh yield per plant (g)	Number of primary rhizomes	B:C Ratio
T ₁	10.0	180.5	3.70	1.43
T ₂	18.5	259.20	5.90	2.63
T ₃	16.7	235.80	5.10	2.38
T ₄	16.3	225.20	4.50	2.32
T ₅)	15.0	208.50	4.20	2.14
CD (0.05)	0.61	22.64	2.30	0.15

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Karthika (21%) and lowest in local variety (15%). Varieties Varada, Athira and Karthika can be used for fresh and dry ginger purpose while variety Aswathy is used for fresh ginger purpose.

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Received on 07/02/2019

Accepted on 15/03/2019