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Effect of fertigation on quality of curry leaf (*Murraya koenigii* Spreng)

Abstract

A field experiment on effect of high density planting on quality of curry leaf was conducted at Department of Spices and Plantation Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Periyakulam during 2011-13. The experiment was layed out in randomized block design with six treatments. Biometrical observations were made from randomly selected five plants and were subjected to statistical analysis. The result reveled that, among the six levels of fertilizers the highest essential oil (0.187 percent), ascorbic acid content (3.8mg/100g), crude protein content (5.7 percent), Iron content (3.48 percent) and Shelf life (3.21days) was recorded T_6- application of 100 % RDF through fertigation respectively.

Keywords: Curry leaf, quality, essential oil, protein

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Introduction

Curry leaf (*Murraya koenigii* Spreng.) belongs to the family Rutaceae. It is an attractive medium sized tree and maintained as a small shrub reaching a height of 1.0 to 1.5m. It is grown commercially for its aromatic spicy green leaves and it is propagated through seeds from selected mother plants.[1] In Tamil Nadu, as there is no released variety in curry leaf, farmers prefer the popular local variety *viz.,* 'Senkaampu' an ideotype grown in different parts of Tamil Nadu especially in Karamadai tract of Coimbatore district. The petiole is purplish red in colour. The leaves have good aroma and flavour due to high essential oil content. Presently it is largely cultivated under organic manures.[2] However, inorganic fertilizers are applied at the rate of 100g of NPK mixture per plant after every pruning which is generally followed before supplemental irrigation after monsoon showers. In general, three crops are harvested in a year with 3–4 months interval. The winter season generally fetches very good market price since the leaf production is very limited in this season. Umesha et al.[3] reported that P had no significant effect on either growth or yield parameters of clocimum. The results of six croppings over a period of two years showed that nitrogen and potassium significantly influenced the leaf area, dry matter accumulation and leaf yield. While application of 150 kg nitrogen per hectare significantly influenced the essential oil (114.30kg/ha) and eugenol yield (92.28kg/ha), and the application of 75 kg K2O per hectare improved the yield and yield parameters significantly. But P_2O_5 had no significant effect on growth and yield of clocimum.

Materials and methods

A field experiment on effect of fertigation on quality of curry leaf was conducted at Department of Spices and Plantation Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Periyakulam during 2011-13 (Table 1).

Data on leaf quality as essential oil (per cent), ascorbic acid content (mg/100g), crude protein content (per cent), Iron content (per cent) and Shelf life (days) was recorded. The data were subjected to statistics analysis as the method suggested by Panse and Sukhatme.[4]

Table 1 The experiment was laid out in a randomized block design with six treatments as follows

Treatments	Treatment details
T_1	Without fertilizer application
T_2	100% of N, P, K as soil application
T_3	75% of N, P, K as soil application + 25% of fertigation
T_4	50% of N, P, K as soil application + 50% of fertigation
T_5	25% of N, P, K as soil application + 75% of fertigation
T_6	100% of fertigation

Result and discussion

The application of nutrients through fertigation significantly influenced the essential oil content. The maximum essential oil content was recorded T_6-application of 100% RDF through fertigation (0.187%) it was closely followed by T_5 –25% of N,P,K as soil application+75 % of fertigation (0.171%) compared to minimum recorded in T_1–without fertilizer application (0.134%) followed by T_2 –100 %of N,P,K as soil application (0.136%) and T_3-75% of N,P,K as soil application+25% of fertigation (0.137%).

The application of nutrients through fertigation significantly influenced the ascorbic acid content. It ranged from 2.5 mg/100g to 3.8 mg/100g. The maximum ascorbic acid content was recorded T_6-application of 100% RDF through fertigation (3.8 mg/100g) it was closely followed by T_5–25% of N,P,K as soil application +75% of fertigation (3.5 mg/100g) compared to minimum recorded in T_1–without fertilizer application (2.5 mg/100g) followed by T_2 –100% of N, P, K as soil application (2.8 mg/100g).

The application of nutrients through fertigation significantly influenced the crude protein content. It ranged from 4.2 % to 5.7%. The

maximum crude protein content was recorded T_6 - application of 100% RDF through fertigation (5.7%) it was closely followed by T_5–25% of N,P,K as soil application +75% of fertigation (5.4%) compared to minimum recorded in T_1–without fertilizer application (4.2%) followed by T_2–100% of N,P,K as soil application (4.4%).

The effect of fertigation on Iron content of the curry leaf are furnished. The application of nutrients through fertigation significantly influenced the Iron content.. The maximum iron content was recorded T_6- application of 100% RDF through fertigation (3.48%) it was closely followed by T_5–25% of N,P, K as soil application +75% of fertigation (3.31%) and T_4-50% of N,P,K as soil application +50% of fertigation (3.28%) compared to minimum recorded in T_1–without fertilizer application (3.16%) followed by T_2–100% of N,P,K as soil application (3.17%) and T_3-75% of N,P,K as soil application +25% of fertigation (3.21%). The application of nutrients through fertigation significantly influenced on the shelf life of fresh curry leaves both unpacked and packed condition. shelf life of curry leaves under unpacked condition significantly varied from 1.56 days to 3.21 days. The maximum shelf life was recorded T_6-application of 100% RDF through fertigation (3.21 days) it was closely followed by T_5–25% of N,P,K as soil application+75% of fertigation (2.65 days) compared to minimum recorded in T_1 –without fertilizer application (1.56days) followed by T_2–100% of N,P,K as soil application (2.12 days) (Table 2-4).

Table 2 Effect of fertigation on essential oil (per cent) and ascorbic acid content (mg/100g) in curry leaf

Treatments	Essential oil (per cent)	Ascorbic acid content (mg/100g)
T_1	0.134	2.5
T_2	0.136	2.8
T_3	0.137	3.1
T_4	0.165	3.3
T_5	0.171	3.5
T_6	0.187	3.8
Mean	0.1546	3.1654
SEd	0.0036	0.0467
CD (0.05)	0.0076	0.0996

Table 3 Effect of fertigation on crude protein content (per cent) and Iron content (per cent) in curry leaf

Treatments	Crude protein content (per cent)	Iron content (per cent)
T_1	4.2	3.16
T_2	4.4	3.17
T_3	4.9	3.21
T_4	5.2	3.28
T_5	5.4	3.31
T_6	5.7	3.48
Mean	4.96	3.26
SEd	0.07	0.04
CD (0.05)	0.15	0.09

Table 4 Effect of fertigation on Shelf life (days) in curry leaf

Treatments	Shelf life unpacked condition (days)	Shelf life with five per cent ventilation
T_1	1.56	2.50
T_2	2.12	2.90
T_3	2.21	3.00
T_4	2.51	3.50
T_5	2.65	3.67
T_6	3.21	3.98
Mean	2.375	3.257
SEd	0.033	0.047
CD (0.05)	0.071	0.1006

The effect of fertigation on essential oil content of fresh leaves showed that it was highly influenced by the treatments. Application of 100% RDF through fertigation were found to record the highest values of essential oil content. The possible reason for quality improvement due to drip fertigation might be due to supply of sufficient quantity of nitrogen, which was essential compound in many amino acids and lipids associated with oil production. Increased the essential oil content of fresh curry leaf and the quality improvement might be due to more number of leaves, increased leaf area and specific leaf weight which consequently would have increased the number of oil glands resulting in higher oil content. Similar influences were also reported by Panduranga shenoy[5] in davana (*Artemisia pallens* Wall.). Krishnamoorthy,[6] Arularasu[7] in *Ocimum sanctum*.

In any production system, the primary goal is to achieve maximum yield per unit area without affecting the quality. In the present investigation 100% RDF through fertigation registered highest ascorbic acid content. This is in agreement with the findings of Prabhu[8] in paprika. This led to higher concentration of NPK in leaves and resulted in better accumulation of assimilates. This in agreement with Balakrishnan et al.[9] The shelf life of curry leaves was recorded to be the highest in the curry leaf plants 100% RDF through ferigation under unpacked condition. The curry leaves packed in polythene bag with five per cent ventilation was found to be remaining the same in the best treatment of 100% RDF through fertigation. Possible reason for the improvement of shelf life of fresh curry leaves harvested from crop subjected to drip fertigation might have higher and continuous uptake of potassium nutrients from fertigation throughout the crop season. It would have led to long shelf life through increased dry matter content. Optimum level of potassium helped in greater translocation of metabolites to storage organs and enhanced thickening of leaves. Thus efficient metabolism and better source sink relationship might have contributed on improved storage life of curry leaves. These results were in accordance with findings of Madan & Sandhu[10] in white onion. Potassium nutrition imparts sturdiness to the leaf tissues by increasing thickness of cell wall and helped in getting healthy leaves. Further, the strong peel of leaf would have protected them against decay and the reduced rate of respiration during storage.[11]

Ryall & Lipton[12] reported that the use of plastic films for packaging the produce provides a high relative humidity around the commodity and results in lower water losses from it. The use of polythene films had been studied in asparagus and beneficial effects were obtained,

especially, when small perforated areas were allowed for minimal ventilation as reported by Lill.[13]

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Conflicts of interest

Author declares that there is no conflicts of interest.

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