

Effect of fertigation on quality in coriander

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ABSTRACT

The effect of fertigation on quality in coriander were carried out in two coriander genotypes Co CR-4 and CS 11 for two seasons. Drip fertigation with water soluble fertilizer at 125 %, 100 %, 75 % RDF along with recommended normal fertilizer were carried out in the year 2007. Application of 125 percent RDF (T_1) recorded the maximum calcium content, ascorbic acid content and essential oil content. The variety Co CR-4 (V_1) had maximum ascorbic acid content than CS 11(V_2). Application of 125 % RDF (T_1) recorded the maximum leaf protein content of leaves during first and second season respectively at 45 DAS

Key words : Coriander, Fertigation, Quality, Ascorbic acid content, Essential oil content

Coriander (*Coriandrum sativum* L.) is an annual herb with several branches and lacy leaves with jagged edges belonging to the family Apiaceae. It is native of Mediterranean region. This aromatic herb is found in many parts of the world. In India, coriander is mainly cultivated in Rajasthan and Gujarat with a sizeable acreage in Madhya Pradesh, Haryana, Punjab, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Bihar. The correct quantity of fertilizers application not only increases the yield but also improve the quality. Fertigation allows applying the nutrients exactly and uniformly only to the root volume, where the plants active roots are concentrated. Hence the present investigation was taken up to find out the influence of fertigation on quality of leafy types of coriander. The statistical analysis were done as per Panse and Sukatme (1985).

MATERIALS AND METHODS

The field experiment was conducted at the University orchard of Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore in the year 2007. Two genotypes (Co CR-4, CS 11) were selected for this study, as the genotypes proved well for use as leafy type. The experiment was laid out in FRBD design with 4 treatments replicated thrice. Drip fertigation with water soluble fertilizer at 75 %, 100 %, 125 % RDF along with the recommended normal fertilizer were applied to the soil with furrow irrigation. The experiment was laid out in FRBD design with 4 treatments replicated thrice

RESULTS AND DISCUSSION

In any production system, the primary goal is to achieve maximum yield per unit area without affecting

the quality.

The effect of fertigation on ascorbic acid content at harvest stage of coriander in two different varieties are furnished in the Table 1. The treatments had a significant influence on ascorbic acid content at harvest stage of observation.

Application of 125 per cent RDF (T_1) recorded the maximum ascorbic acid content of 151.08 and 136.00 mg/100g⁻¹ of leaves during first and second season, respectively at 45 DAS. The lowest ascorbic acid content was registered in the treatment applied with recommended NPK applied to soil with furrow irrigation (T_4) with values of 88.63 and 52.90 mg/100g⁻¹ of leaves during first and second season, respectively. The variety Co CR-4 (V_1) had maximum ascorbic acid content than CS 11(V_2).

Regarding the interaction effect, the maximum ascorbic acid content was recorded in Co CR-4 with 125 per cent of fertigation (T_1V_1) in harvesting stages of the crop growth followed by T_1V_2 in both two seasons.

The effect of fertigation on calcium content at harvest stage of coriander in varieties are furnished in the Table 2. The treatments had a significant influence on calcium content at harvest stage application of 125 per cent recommended dose fertilizers (T_1) recorded the maximum calcium content of 189.87 and 176.57 mg/100g⁻¹ of leaves during first and second season, respectively at 45 days. The lowest calcium content was registered in the treatment applied with recommended NPK applied to soil with furrow irrigation (T_4) with values of 129.81 and 135.40 mg/100g⁻¹ of leaves during first and second season, respectively. The variety Co CR-4 (V_1) had maximum calcium content than CS 11(V_2).

The interaction effect showed maximum calcium

Table 1 : Effect of fertigation on ascorbic acid content (mg 100 g⁻¹) on leaves at harvest

Treatments	Season I			Season II		
	V ₁	V ₂	Mean	V ₁	V ₂	Mean
T ₁	153.63	148.53	151.08	136.56	135.43	136.00
T ₂	145.26	132.60	138.93	123.33	122.33	122.83
T ₃	123.40	117.40	120.40	115.53	114.40	114.96
T ₄	98.60	78.66	88.63	98.36	70.43	52.90
Mean	130.22	119.30		118.45	94.90	
	S.E.±		C.D. (P=0.05)	S.E.±		C.D. (P=0.05)
V	0.10143		0.21757	0.12883		0.27634
T	0.14344		0.30768	0.18219		0.39081
V x T	0.20286		0.43513	0.25766		0.55269

Table 2 : Effect of fertigation on leaf calcium content (mg 100 g⁻¹) on leaves at harvest

Treatments	Season I			Season II		
	V ₁	V ₂	Mean	V ₁	V ₂	Mean
T ₁	198.33	181.41	189.87	194.34	158.80	176.57
T ₂	166.35	151.47	158.91	174.74	151.64	163.19
T ₃	151.19	132.14	141.66	167.52	150.54	159.03
T ₄	138.22	121.39	129.81	138.17	132.63	135.40
Mean	163.52	146.60		168.69	148.40	
	S.E. ±		C.D. (P=0.05)	S.E. ±		C.D. (P=0.05)
V	0.07590		0.16281	0.02091		0.04485
T	0.10734		0.23025	0.02957		0.06343
V x T	0.15180		0.32562	0.04182		0.08970

content was recorded in Co CR-4 with 125 per cent of fertigation (T₁V₁) in harvesting stages of the crop growth followed by T₁V₂ in both seasons.

The effect of fertigation on essential oil content at harvest stage of coriander in two different varieties are furnished in the Table 3.

The treatments had a significant influence on essential oil content at harvest stage.

Application of 125 per cent RDF (T₁) recorded the maximum essential oil content of 0.46 and 0.43 (%) during first and second season, respectively at 45 DAS. The lowest essential oil content was registered in the treatment applied with recommended NPK applied to soil with furrow irrigation (T₄) with values of 0.26 and 0.23(%) during first and second season, respectively. The variety Co CR-4 (V₁) had maximum essential oil content than CS 11(V₂).

Regarding the interaction effect, the maximum essential oil content was recorded in Co CR-4 with 125 per cent of fertigation (T₁V₁) in different harvesting stages of the crop growth followed by T₁V₂ in both seasons.

The effect of fertigation on leaf protein content at harvest stage of coriander in two different varieties are furnished in the Table 4.

The treatments had a significant influence on leaf

protein content at harvest stage of observation.

Application of 125 per cent RDF (T₁) recorded the maximum leaf protein content of 3.30 and 3.49 mg100g⁻¹ of leaves during first and second season, respectively at 45 DAS. The lowest leaf protein content was registered in the treatment applied with recommended NPK applied to soil with furrow irrigation (T₄) with values of 1.83 and 1.75 mg100g⁻¹ of leaves during first and second season, respectively. With regard to variety Co CR-4 (V₁) had maximum leaf protein content than CS 11(V₂).

Regarding the interaction effect, the maximum leaf protein content was recorded in Co CR-4 with 125 per cent of fertigation (T₁V₁) in harvesting stage of the crop growth followed by T₁V₂ in both two seasons.

In any production system, the primary goal is to achieve maximum yield per unit area without affecting the quality. In the present investigation, 125 per cent water soluble fertilizer registered highest ascorbic acid content (Fig. 14). This is in agreement with the findings of Prabhu (2007) in paprika. This led to higher concentration of NPK in leaves and resulted in better accumulation of assimilates. This in agreement with Brantley and Warren (1960) and Deswal and Patil (1984)). Fertigation induced the available soluble protein in the leaves. The findings of Valler and Wacker (1970) and Del Rio *et al.* (1978) have

Table 3 : Effect of fertigation on leaf protein content (mg 100 g⁻¹) on leaves at harvest

Treatments	Season I			Season II		
	V ₁	V ₂	Mean	V ₁	V ₂	Mean
T ₁	3.66	2.94	3.30	3.54	3.45	3.49
T ₂	3.22	2.10	2.69	3.21	3.14	3.18
T ₃	2.81	1.94	2.38	2.66	2.44	2.55
T ₄	2.33	1.34	1.83	1.86	1.63	1.75
Mean	3.00	2.09		2.82	2.67	
	S.E.±		C.D. (P=0.05)	S.E.±		C.D. (P=0.05)
V	0.01005		0.02157	0.01410		0.03024
T	0.01422		0.03050	0.01994		0.04276
V x T	0.02011		0.04313	0.02819		0.06047

Table 4 : Effect of fertigation on essential oil content (%) on leaves at harvest

Treatments	Season I			Season II		
	V ₁	V ₂	Mean	V ₁	V ₂	Mean
T ₁	0.48	0.44	0.46	0.45	0.41	0.43
T ₂	0.45	0.37	0.41	0.43	0.35	0.38
T ₃	0.37	0.33	0.35	0.35	0.31	0.33
T ₄	0.26	0.26	0.26	0.23	0.23	0.23
Mean	0.39	0.35		0.36	0.32	
	S.E.±		C.D. (P=0.05)	S.E.±		C.D. (P=0.05)
V	0.00664		0.01425	0.00402		0.00863
T	0.00940		0.02016	0.00569		0.01220
V x T	0.01329		0.02850	0.00804		0.01725

confirmed the above results. The RUBP carboxylase enzyme activity was indirectly measured by the estimation of protein content in the leaves. The RUBP carboxylase is a prime enzyme for carbon fixation in photosynthesis. Noggle and Fritz (1986) stated that RUBP carboxylase enzyme as the protein in the plant kingdom. The enzyme is found relatively at high concentration in soluble protein fractions of leaves. In the present investigation, application of 125 per cent water soluble fertilizer registered the highest soluble protein content at harvesting stages of crop growth. Higher N level could enhance the protein synthesis throughout the growth by direct participation as an ingredient of protein. High P level could also intensify the protein synthesis by way of supplying metabolic energy.

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