J. Hortl. Sci.
Vol. 13(2) : 188-191, 2018

Short Communication

Quality in Coriander leaves as influenced by growing conditions

R. Surya[1]*, T. Geethumol[1] and P. Anitha[2]
[1]College of Horticulture, Department of Plantation crops and spices
[2] College of Horticulture AICVIP, Dept. of Olericulture
E-mail: suryavavahorti8.sr@gmail.com

ABSTRACT

A study was conducted in the plains of Kerala to investigate the performance of coriander leaf for its quality aspects in open and rain shelter conditions. The study suggested that significantly higher herbage and biomass yield (g/ plant) was observed from plants grown in rain shelter (9.21 and 12.78) compared to the open field (8.41 and 11.34). Among the varieties, Arka Isha recorded the highest herbage and biomass yield (10.46 and 14.13g/plant) followed by CO-1 (8.97and 12.70).There was a significant higher vitamin C content (mg/100g) in open field (189.72) compared to rain shelter (124.55) and volatile oil ranging from 0.05-0.06 % in both the growing conditions and were on par. Total chlorophyll content was recorded more in open field (1.98) than in rain shelter (1.92) Among the varieties, total chlorophyll was more in CO-4(2.33). However, this need to be confirmed by further studies.

Keywords: Coriander leaves, uses, vitamin C, volatile oil, *chlorophyll*

INTRODUCTION

Coriander (*Coriandrum sativum* L.), belongs to the family Apiaceae, is an important annual spice herb, mainly cultivated for its fruits as well as for its tender green leaves. The crop, indigenous to Southern Europe and the Mediterranean region, is the most important seed spice grown in India. Its name has been derived from Greek word "Koris", meaning bed-bug, because of unpleasant, foetid bug like odour of the green unripened fruits. It is one of the finest aromatic and culinary herbs and is considered as a delighters' choice. India is the largest producer, consumer and exporter of coriander seeds in the world accounting approximately 80 per cent of total world production. The herb is grown for its grain in 44,700 hectares in India and as a herb it is grown in nearly 20,000 to 25,000 ha. During the year 2014, 37.5 lakh metric tonnes of coriander leaves were traded through various agricultural markets indicating the commercial importance of the herb (Giridhar *et al*., 2015). Recent understanding of the neutraceutical and medicinal properties of leaves elevated the status of this herb. The leaves and stem tips are rich in numerous anti-oxidant polyphenolic flavonoids such as quercetin, kaempferol, rhamnetin and epigenin. It is one of the richest herbal sources for vitamins especially Vitamin A, C and K (Girenko, 1982). Leaves are also rich in β-carotene, water, dietary fiber, fats, protein and minerals like calcium, phosphorus, manganese, zinc, iron and magnesium. The quality of coriander leaves is affected by growing conditions, especially Vitamin C, Chlorophyll content and Volatile oil. However, there is limited research on management aspects for the efficient utilization of coriander leaves for its various end uses.

The present study entitled" Performance evaluation of coriander genotypes in different growing conditions" was laid out during *rabi s*eason (October 2016- December 2016) in two different growing conditions viz. rain shelter and open field by following Randomized Complete Block Design (RBD) with five treatments (genotypes/varieties) namely, CO-1, CO-2, CO-3, CO-4 and Arka Isha and four replications. Herbage yield from tagged plants in each replication was recorded and the biochemical analysis for estimation of volatile oil, vitamin- C and chlorophyll content of each variety was done by using standard procedures recommended by Clevengers (1982) and Sadasivam and Manickam (1992). The data was statistically analyzed by using OPSTAT Online Package software, to find out the effect of growing conditions on the quality of the varieties.

The results of the herbage, biomass yield and various quality parameters are presented in the **Table 1 and Table 2**. Significantly higher herbage yield (g/ plant) was observed from plants grown in rain shelter (9.21) compared to the open field (8.41). Among the varieties, Arka Isha recorded the highest herbage yield (10.46) followed by CO-1 (8.97), CO-3 (8.68) and the performance of CO-2 (8.19) and CO (Cr-4) (7.75) were on par with each other. The interaction effect of growing conditions varieties with respect to herbage yield was not significant. Similarly, biomass yield (g/plant) was significantly higher in rain shelter (12.78) than the open field (11.34). Arka Isha was significantly superior (14.13) followed by CO-1(12.70) with respect to biomass yield. The varieties CO-2(11.56) and CO-3 (11.37) were on par with each other. CO (Cr-4) was significantly inferior (10.52) to all of the varieties and the interaction effect was not significant.

In general, the growing conditions and the varieties did not have any effect in the volatile oil content (%). The volatile oil ranged from 0.05 -0.06 percentage. The mean value (mg/100g) for vitamin C in coriander leaves was observed significantly higher in open field (189.72) compared to the rain shelter (124.55). Also among the varieties, CO-3 (190.80) and CO-1(166.95) recorded significantly higher Vitamin C followed by Arka Isha (165.63), CO-2 (147.08) and CO-(Cr-4) with 115.23. In general, growing conditions had no significant effect on total chlorophyll content of leaves. However, chlorophyll 'b' was recorded maximum in rain shelter condition (0.60) compared to the open field (0.47). Total chlorophyll content was recorded more in open field (1.98) than rain shelter (1.92). Among the varieties, the total chlorophyll content ranged from 1.55(CO-2) to 2.33 in CO (Cr-4). Similar results were reported by Varalakshmi *et al.,* (2012) and Palanikumar and Rajamani (2012).

Table 1. Effect of growing conditions on herbage and biomass yield of coriander

Treatments	Herbage yield (g) /plant			Biomass yield (g)/plant		
Varieties	Rain shelter	Open field	Mean	Rain shelter	Open field	Mean
CO-1	9.48	8.46	8.97	13.50	11.89	12.70
CO-2	8.56	7.82	8.19	12.03	11.09	11.56
CO-3	8.84	8.53	8.68	11.93	10.80	11.37
CO(Cr-4)	8.10	7.40	7.75	11.86	9.18	10.52
Arka Isha	11.07	9.84	10.46	14.55	13.72	14.13
Mean	9.21	8.41		12.78	11.34	
CD(0.05)						
Growing conditions	0.48			0.53		
Varieties	0.77			0.83		
Interaction	NS			NS		

Generally, coriander leaves possess comparatively less oil than the seeds. No significant effect was observed for different varieties with respect to volatile oil (%). This might be because the essential oil content may be the cumulative resultant of a number of internal cellular factors and it is a varietal character. The essential oil content (percentage) among the varieties ranged from 0.05 to 0.06. The variation among the varieties might be due to the difference in the synthesis of volatile oil due to some promotive or inhibiting mechanism through some biochemical reactions within the genotype. Total chlorophyll content was recorded more in open field (1.98mg) than rain shelter (1.92mg) (**Fig 1**) however; chlorophyll *b* was more in rain shelter than in open field. This may be due to the low light intensity available in the rain shelter, so plants tend to produce more chlorophyll *b* to capture a wider range spectrum of light. In general, the vitamin C content in leaves was observed significantly high in the open field compared to the rain shelter (**Fig 2**). This might be due to high light intensity in open leading to more production of vitamins compared to rain

Table 2. Effect of growing conditions on quality parameters in coriander

	Volatile oil (%)			Vitamin C(mg)		
Varieties	Rain shelter	Open field	Mean	Rain shelter	Open field	Mean
CO-1	0.06	0.06	0.06	124.55	209.35	166.95
CO-2	0.06	0.05	0.05	116.60	177.55	147.08
CO-3	0.06	0.06	0.06	148.40	233.20	190.80
CO(Cr-4)	0.05	0.05	0.05	127.20	103.25	115.23
Arka Isha	0.06	0.06	0.06	106.00	225.25	165.63
Mean	0.06	0.05		124.55	189.72	
CD(0.05)						
Growing conditions	NS			12.45		
Varieties	NS			19.69		
Interaction	NS			27.84		

Table 2. contd...

	Chlorophyll a (mg/100g)			Chlorophyll b (mg/100g)			Total chlorophyll (mg/100g)		
Varieties	Rain shelter	Open field	Mean	Rain shelter	Open field	Mean	Rain shelter	Open field	Mean
CO-1	1.33	1.03	1.18	0.59	0.40	0.50	1.92	1.44	1.68
CO-2	1.08	1.19	1.14	0.45	0.37	0.41	1.53	1.57	1.55
CO-3	1.37	1.53	1.45	0.54	0.52	0.53	1.91	2.05	1.98
CO(Cr-4)	1.51	1.24	1.38	0.58	0.46	0.52	2.10	2.56	2.33
Arka Isha	1.56	1.67	1.62	0.86	0.60	0.73	2.16	2.28	2.22
Mean	1.37	1.33		0.60	0.47		1.92	1.98	
CD(0.05)									
Growing conditions		NS			0.02			NS	
Varieties		0.08			0.04			0.10	
Interaction		0.11			0.05			0.15	

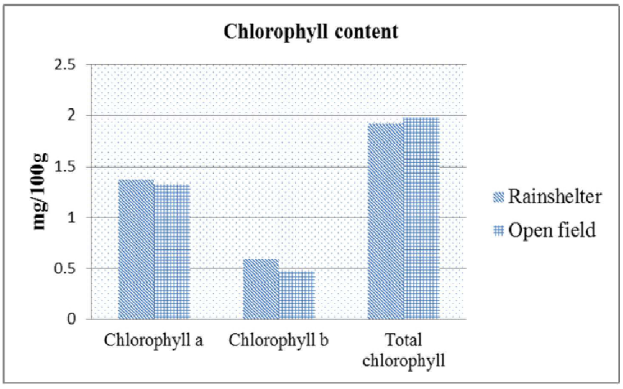

Fig 1. Effect of growing conditions on chlorophyll content

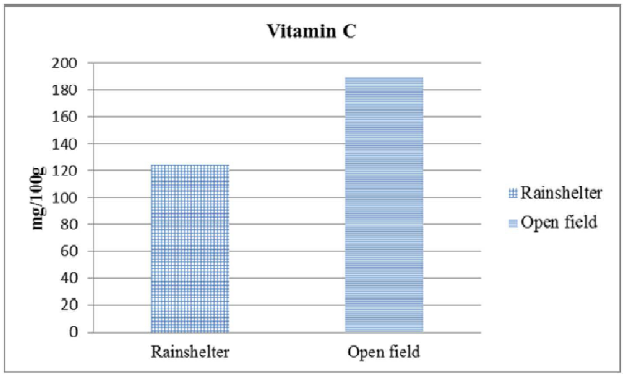

Fig 2. Effect of growing conditions on Vitamin C

ACKNOWLEDGEMENT

The authors wish to acknowledge the Kerala Agricultural University for the fund and the College of Horticulture, Vellanikkara for the facilities provided during the course of study.

REFERENCES

Clevengers, J. F. 1982. Apparatus for determination of volatile oil. *J. Am. Pharmacol. Assoc.*17: 346-348.

Girenko, M. M. 1982. Initial material and basic trends in breeding of some uncommon species of vegetables (in Russ. Eng. Detr.). Bull. VIR Vavilova, 120: 33-37.

Giridhar, K., Suryakumari, S., and Naid, N. L. 2015. In search of ideal multi-cut coriander. *Spice India* 28(10): 10-16.

Palanikumar, M. Rajamani, K. 2012. Physiological and biochemical analysis of coriander (Coriandrum sativum L.) genotypes under different seasons. *Crop Res.* 44. 208-216

Sadasivam, S. and Manickam, A. 1992. (2nd Ed.). *Biochemical methods*. New Age International (P) Limited Publishers and Tamil Nadu Agricultural University, Coimbatore.

Varalakshmi, B., Rao. V. K., Rao, S. D.V., Tiwari, R. B., and M. Prabhakar. 2012. High-yielding multicut coriander variety, Arka Isha. *J. Hort. Sci.*7 (1):91-93.

(*MS Received 03 August 2017, Revised 30 October 2018, Accepted 21 November 2018*)