Growth and yield of herbage coriander as influenced by foliar spray of urea

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ABSTRACT

An experiment was conducted to study the growth and yield of herbage coriander as influenced by four urea spraying treatments (0.50, 0.75, 1.0 and 1.5%) along with control. The treatments were applied at 20 days of sowing. Spraying of urea had a significant impact on growth and yield of herbage coriander. Among the treatments, the treatment 0.50 per cent urea recorded its superiority for number of leaves per plant (38.33), shoot-root ratio (7.60), use index (88.37) and increase in yield over control (35.99%). This treatment was at par with other treatments for the characters like plant height, number of branches per plant, leaf chlorophyll content, shoot weight and yield which were better than control. However, number of leaves per plant, shoot-root ratio, use index, yield per ha and increase in yield over control decreased with the increase in urea concentration.

Keywords: Urea; spray; growth; yield; herbage coriander

INTRODUCTION

Coriander (*Coriandrum sativum* L) is an important leafy vegetable crop commonly used as a flavouring agent in curries and other cooked materials. It has been cultivated since human antiquity (Tiwari and Agrawal 2004). It is native to southern Europe and the Asia minor. Precisely Italy is presumed as the native place of coriander which is extensively grown through the other parts of the world (Thumburaj and Singh 2004). The fresh stem, leaves and fruits of coriander have a pleasant aromatic odour. The entire shoot portion when young (before flowering) is used in preparing chutneys and sauces.

This green herb is rich in vitamin A and C. It is a rich source of minerals and has high medicinal properties. For its successful production, all necessary nutrients must be supplied to the plant judiciously in sufficient quantity. Among the different major plant nutrients, nitrogen is required in large amount (Brady 1990) and this macronutrient makes the plant leaves succulent and soft. The efficiency of nitrogenous fertilizer depends to a great extent on the time and method of application because nitrogenous fertilizers are highly water soluble and easily lost from soil in various ways. The present investigations were, therefore, undertaken to study the effect of foliar application of urea on growth and yield of herbage coriander during winter season.

MATERIAL and METHODS

The field experiment was conducted on herbage coriander at Oilseeds Research Station, Jalgaon, Maharashtra during rabi season of 2022-23. The treatments used for foliar spray of urea were T_1 (0.5%), T_2 (0.75%), T_3 (1.0%), T_4 (1.5%) and T_5 (control – water). All treatments were replicated thrice in RBD. The row to row spacing was 30 cm and all other cultural practices were uniformly undertaken for the whole experimental plot. The foliar sprays were applied twenty days after sowing and entire crop was harvested thirty five to forty days after sowing (just at initiation of flowering). Twenty five plants were selected in each replication for recording the observations viz plant height, number of branches per plant, chlorophyll content, shoot-root ratio and yield per ha. The use index was calculated from the data recorded on shoot weight and per plant weight.

RESULTS and DISCUSSION

The data on various growth and yield parameters of herbage coriander as influenced by foliar spray of urea are presented in Table 1.

Plant height: The urea spraying treatments recorded significant differences in plant height over control. The plant height in various urea treatments was 26.63, 26.50, 26.00 and 25.00 cm in T_1 (0.5%), T_2 (0.75%), T_3 (1.0%) and T_4 (1.5% urea) respectively, which were at par, but statistically higher than 21.33 cm in T_5 (Control – water). The increase in plant height in all urea treatments might be due to enhancement in plant growth due to supply of nitrogen, increase in chlorophyll content and higher photosynthesis rate. These results are in conformity with the findings of Mengel and Kirkby (1987) and Badgujar et al (1987).

Number of branches per plant: As in case of plant height, significant differences in number of branches per plant were noticed in urea treatments over control. Higher number of branches per plant of 9.13, 8.90, 8.63 and 8.50 was recorded in T_1, T_2, T_3 and T_4 respectively, which were at par, as compared to 7.10 in T_5. Similar findings have been reported by Dixit (2007) and Meena and Malhotra (2006) in coriander crop.

Number of leaves per plant: Maximum number of leaves per plant (38.33) was noticed in T_1 followed by 36.33 in T_2 and 34.00 and 33.00 in T_3 and T_4 respectively, the latter two being at par, all treatments being superior over 29.00 in T_5. The highest beneficial effect in terms of maximum number of leaves per plant recorded with lowest concentration of urea spray might be due to supply of sufficient nitrogen for production of leaves and as concentration of urea increased, the number of leaves per plant also got decreased. However, the number of leaves was least in control.

Chlorophyll content: Maximum chlorophyll content helps in better and faster development of plants by influencing the photosynthetic efficiency and thus accumulating dry matter. Significant differences in respect of chlorophyll content were recorded due to urea treatments as compared to control. Chlorophyll content was 35.97, 35.90, 35.71 and 35.59 mgper g in T_1, T_2, T_3 and T_4 respectively, which were statistically at par as compared to 32.67 mg/g in T_5. Higher chlorophyll content noticed in urea treatments might be due to presence of nitrogen in urea. Similar observation was made by Sharangi et al (2011) in coriander crop.

Shoot weight: Shoot weight of 3.19, 3.11, 2.99 and 2.88 g per plant was recorded in T_1, T_2, T_3 and T_4 respectively, all being statistically at par, as compared to 2.10 g per plant in T_5. The higher shoot weight of coriander in urea treatments might be due to higher plant vigour (plant height, number of branches/plant and leaves/plant). The results recorded are in partial agreement with the work of Moniruzzaman et al (2009).

Shoot-root ratio: The highest (7.60) shoot-root ratio was recorded in T_1 followed by 7.23 in T_2, 6.80 in T_3 and 6.13 in T_4, whereas, minimum shoot-root ratio was recorded in T_5 (3.62). Increase in shoot-ratio with increase in urea concentration might be due to scorching of leaves by higher concentration of urea.

Use index: Highest use index of 88.37 per cent was recorded in T_1 followed by T_2 (87.85%), T_3 (87.68%) and T_4 (85.97%) and lowest in T_5 (78.35%), meaning, thereby, the use index decreased with the increase in urea concentration.

Foliage yield: The foliage yield of coriander was significantly influenced by different urea foliar sprays. Higher foliage yield of 71.85, 69.14 and 67.16 q per hectare was recorded in treatments T_1, T_2 and T_3 respectively, which were at par, followed by T_4 (66.17 q/ha) and least in T_5 (52.84 q/ha). Thus all urea treatments recorded higher foliage yield as compared to control. The increase in yield over control was35.99, 30.86, 27.11 and 25.23 per cent in T_1, T_2, T_3 and T_4 respectively over control. The results recorded are similar to the findings of Badgujar et al (1987), Brady (1990), Rakib et al (2015) and Moniruzzaman et al (2009).

Though all the treatments containing urea proved superior over control for all growth and yield parameters viz plant height, number of branches and leaves per plant, shoot weight, shoot-root ratio, use index and foliage yield, however, treatment containing 0.5 per cent urea proved superior over all other treatments in respect of number of leaves per plant, shoot-root ratio, use index and increase in yield over control.

Table 1. Plant growth and yield attributes of herbage coriander as influenced by urea foliar spray

Treatment	Plant height (cm)	Number of branches/ plant	Number of leaves /plant	Leaf chlorophyll content (mg/g)	Shoot weight (g)	Shoot-root ratio	Use index (%)	Yield (q/ha)	Increase in yield over control (%)
T_1 (0.5% urea)	26.63	9.13	38.33	35.97	3.19	7.60	88.37	71.85	35.99
T_2 (0.75% urea)	26.50	8.90	36.33	35.90	3.11	7.23	87.85	69.14	30.86
T_3 (1.0% urea)	26.00	8.63	34.00	35.71	2.99	6.80	87.68	67.16	27.11
T_4 (1.5% urea)	25.00	8.50	33.00	35.59	2.88	6.13	85.97	66.17	25.23
T_5 (Control – water)	21.33	7.10	29.00	32.67	2.10	3.62	78.35	52.84	-
Mean	-	-	-	-	-	6.28	85.64	65.43	-
SEm(±)	0.75	0.29	0.51	0.52	0.16	-	-	1.03	-
$CD_{0.05}$	2.46	0.97	1.68	1.70	0.53	-	-	3.36	-

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