International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Studies on the Effect of Plant Growth Regulators on Yield Attributes of Coriander (Coriandrum sativum L.)

G. Vadehi[1], S. Malarvannan[2], S. Anandhi Lavanya[3], K. Mohanraj[4], V. Prakash[5]

[1,2,3,5]Associate Professor, School of Agriculture, Bharath Institute of Higher Education and Research, Chennai - 600073
4 Assistant Professor, VIT School of Agriculture Innovations and Advanced Learning

ABSTRACT
Experiment was conducted to study the effect of NAA (1 Naphthalene Acetic Acid), Chlormequat (2 Chloroethyl trimethyl Ammonium Chloride), Ethrel (2-Chloroethyl Phosphonic Acid) and 2,4 D (2,4 Dichloro Phenoxy Acetic Acid) on the growth of Coriander at Horticultural College and Research Institute, Coimbatore at three concentrations each as foliar spray at 25th, 40th and 55th days after sowing. Water spray served as control. The results revealed that the treatment of Experiment was conducted to study the effect of NAA @ 20 ppm improved the yield and related growth attributes of coriander.

Keywords: Coriander, Yield, Plant growth regulators.

INTRODUCTION

Coriander (*Coriandrum sativum*L.) is an important annual herb belonging to the Family Apiaceae which is a native of Mediterranean region. The major producers are Morocco, Canada, India, Pakistan Romania and Russia. Others include Iran, Turkey, Egypt, Israel, China, Thailand, Myanmar, Poland, and Mexico. Coriander is mainly cultivated in Rajasthan and Gujarat with a minimum acreage in Madhya Pradesh, Haryana, Punjab, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Bihar. Cultivated area of 5, 91,090 ha with the production of 3, 38,260 tonnes. Seed will contain 18-21 per cent fatty oil and used in cosmetic industries. The leaves are used in preparation of chutney and used as seasoning in curries, soups and sauces. It is thin-stemmed, small bushy herb, branched and grows about 25 to 50 cm tall, with alternate and compound leaves and highly segmented and linear. Inflorescence is compound umbel and usually contains about five smaller umbellets. Fruits are globular, yellow brown when ripened they are 3 to 4 mm in diameter. Fruits are single seeded mericarps. The fruits have fragrant odour and pleasant aromatic taste. The odour and taste is due to compound d-linalool or coriandrol. The seed contains fatty oil 6.15, 14.1% protein, 21.6% carbohydrate 21.6%, 32.6% fibers, 11.2% moistures and 4.4% mineral matters and coriander leaves are very rich in Vitamin A and Vitamin C. (Singh, 2014) Used as a spice, in culinary, medicine and in perfumery, beverage and pharmaceuticals industries. Plant growth regulators are the substances which

promote or inhibit any physiological response in plants. Plant growth regulators leads to better yield with increase in the cost of production. Therefore standardizations with different levels of growth regulators influence the yield (Haokip *et al*., 2016).

MATERIAL AND METHODS

Experiment was carried out at Orchard in Horticultural College and Research Institute Coimbatore. The experiment was laid in a Randomized Block Design of three replications and thirteen treatments. The soil type of the experimental plot was clay loam with a PH of 6.8. Seeds of coriander variety CO3 was done in a spacing of 22.5 x 15 cm. GrowthregulatorsEthrelat50,100,150ppm,CCC100,200,300ppm,2,4-D 1,2,5 ppm and NAA10,15,20 ppm were sprayed, and water spray served as the control. Observations for yield characters grain number /umbel, umbels/plant, umbellets/ umbel, seed weight and thousand seed weight was recorded.

DETAILS OF TREATMENTS

T_1-Ethrel 50 ppm; T_2-Ethrel 100 ppm; T_3-Ethrel 150 ppm; T_4-CCC 100 ppm; T_5-CCC 200 ppm; T_6-CCC 300 ppm; T_7- 2,4,-D 1ppm; T_8-2,4,-D 2 ppm; T_9-2,4,-D 5 ppm; T_{10}-NAA 10 ppm; T_{11}- NAA 15 ppm; T_{12}- NAA 20 ppm; T_{13}-Control (Water Spray).

RESULTS AND DISCUSSION

GRAIN NUMBER PER UMBEL

Foliar application of NAA 20 ppm recorded higher grains per umbel (24.67) compared to other treatments. The grain number per umbel was less in water spray (13.39).This was followed by foliar application of CCC 200ppm (22.91).

UMBELS PER PLANT

Foliar application of NAA 20 ppm (19.21) showed higher number of umbels. The number of umbels per plant was lower (11.72) in water spray followed by 2,4-D 5 ppm(12.27).The increase in number of umbels per plant attributed is due to the increase in the number of both primary and secondary branches per plant.

UMBELLETS PER UMBEL

Foliar application of NAA 20 ppm outperformed other treatments, showing higher number of umbellets per umbel (7.17). The number was lower in water spray (4.01). Increase in the number umbels and umbellets by foliar application of 20 ppm NAA might be due to the control of excessive vegetative growth and its allocation of the metabolites towards sinks suggested by Joshi and Singh (1982).

The increase in number of umbellets per umbel Cycocel might be due to accumulation of metabolites which get translocated towards the reproductive sinks and these in turn resulted in stimulation of umbellets. The increment in seed yield and biological yield was significantly higher in Cycocel which might be due to enhanced in growth and yield attributes. The above results were in conformity with the finding Meena *et al.,* (2006), Kumar and Sundareswaran (2011), Haokip *et al.,* (2016), Yugandhar *et al.,* (2016) in coriander.

Increase in the number umbels and umbellets by foliar application of 20 ppm NAA might be due to the

control of excessive vegetative growth and allocation of metabolites towards sink as suggested by Joshi and Singh (1982).

SEED YIELD

Foliar application of (NAA 20 ppm seed yield varied from 752.62 (water spray) to 1383.79 kg ha^{-1} (NAA 20 ppm) Favourable contributions of bioregulators towards yield increase have been attributed to their influence on metabolic and cell division activities in the shoot apical meristem which could induce bud initiation leading to increased vegetative and reproductive branching. This in turn resulted in the higher production of sink tissues by Raffiueuddin (1986). Seed yield are increased by improved vegetative growth due to plant growth regulators application coupled with increased photosynthesis on one hand and greater mobilization of photosynthesis towards reproductive sites on the other might have been found to increase in the growth and yield attributes. Thus, the effect of all these growth regulators improved yield attributes, resulted in increase in seed yield.

Table1 Effect of plant growth regulators on yield and yield components of coriander harvest stage

Treatments	*Grains Per umbel*	*Umbells per plant*	*Umbellets per plant*	*Seed yield kgha-1*	*Thousand Seed Weight (g)*
Ethrel50ppm	18.53	15.35	5.07	980.62	19.83
Ethrel100ppm	18.15	14.73	4.92	951.09	23.38
Ethrel150ppm	17.30	13.93	4.79	891.07	20.05
CCC100ppm	19.91	16.55	5.57	1108.11	18.88
CCC200ppm	22.91	18.70	6.27	1299.37	17.72
CCC300ppm	19.28	15.80	5.39	1063.93	16.77
2,4D-1ppm	16.53	13.39	4.39	832.23	1627
2,4,D-2ppm	15.50	12.77	4.58	812.99	16.00
2,4,D-5ppm	14.13	12.27	4.23	797.04	14.31
NAA-10ppm	21.78	17.72	5.91	1270.81	20.50
NAA–15ppm	21.06	16.82	5.75	1192.39	22.33
NAA–20ppm	24.67	19.21	7.17	1383.79	24.83
Control	13.39	11.72	4.01	752.62	15.16
SEd	0.841	0.269	0.144	13.084	0.560
CD(p-0.05)	1.833	0.587	0.313	27.054	1.221

THOUSAND SEED WEIGHT

NAA 20 ppm showed superior performance (24.83g) followed by Ethrel 100 ppm (23.38g). Seed weight was lowest in 2,4-D 5ppm (14.3 1) as foliar spray. This findings is in agreement with the findings of Reddy and Shah (1994) in groundnut, these results are in conformity with the findings of Pandamavathy *et al.*, (1987)

REFERENCES

1. Haokip, C. M., Sharangi, A. B., Debbarma, K., Devi, A. K. R. and Karthik, C. S. (2016). Role of plant growth regulators on the growth and yield of coriander (*Coriandrum sativum* L.).*Journal of Crop and Weed,* 12(3): 33-35.
2. Joshi ,T.J. and J.K. Singh. (1982). Effect of NAA, CCC and GA on seed production of carrot. *Indian. J. PlantPhysiol.*, 1:58-70.
3. Kumar, V.A. and Sundareswaran, S. (2011). Effect of foliar application of chemicals and growth regulator on growth in coriander (*Coriandrum sativum*L.). *Progressive Horticulture*, 43 (2):193-195.
4. Meena, S.S., Sen, N.L. and Malhotra, S.K. (2006). Influence of sowing date, nitrogen and plant growth regulators on growth and yield of coriander (*Coriandrum sativum*L.).
5. Padmavathi, C. (1987). Yield response and its physiological basis to exogenous application of growth regulants in black gram. M.Sc (Ag.). Thesis submitted to and approved by Tamil Nadu Agriculture University, Coimbatore.
6. Raffique-uddin, M. (1986). Effect of NAA and CCC on yield contributing characters of PhaseolusLegumeRes., 7(1):43-47.
7. Reddy, C.S. and C.B.Shah. (1984). Effect of growth regulators on Spanish bunch and Virgina runner groundnut. (2014) Effect of foliage cutting and growth regulators on seed yield and quality in coriander (*Coriandrum sativum* L.). Unpublished M.Sc. (Agri.) thesis submitted to Department of Seed Science and Technology, College of Agriculture, Chaudhary Charan Singh Haryana Agricultural University, Haryana,
8. Yugandhar, V., Reddy, P. S. S., Sivaram, G. T.and Reddy, D. S. (2016). Influence of plant growth regulators on growth, seed yield, quality and economics of coriander (*Coriandrum sativum*L.)Cv.Sudha. *Journal of Spices and Aromatic Crops,* 25(1):13-17.