

# EFFECT OF BIOSTIMULANTS ON YIELD PARAMETERS OF CARROT (*Daucus carota L.*) var. Early Nantes

**P. MADHANAKUMARI\* & S.PARTHIBAN\*\***

\*Assistant Professor, Department of Horticulture, Faculty of Agriculture, Annamalai University,

\*\*MSc (Hort) in vegetable science, Department of Horticulture, Faculty of Agriculture,  
Annamalai University, Annamalai Nagar – 608 002, Tamil Nadu, India.

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**ABSTRACT:** This present investigation was conducted during 2017 to 2018 on carrot variety 'Early nantes' in red laterite soil at kethorai village, Coonoor, The Nilgiris district of Tamilnadu, during 2017 to 2018 to study the effect of biostimulants on yield of carrot. The experiment was laid out in randomized block design (RBD) with ten treatments and replicated thrice. The treatments includes various sources of biostimulants viz. Humic acid, Chitosan, Sea weed extract, Effective microorganisms and Panchagavya were given as foliar application on three stages viz., first spray on 2 leaves stage, second spray on 5-7 leaves stage and third spray on when root attains 5-6 diameters in size. The various yield characters were recorded. The results of the experiment revealed that the yield parameters viz., length of root, root diameter, root girth, root weight, root dry weight, root yield plot<sup>-1</sup> and total root yield ha<sup>-1</sup> were favorably influenced by foliar application of sea weed extract at a concentration of 3 ml per litre.

**Key Words:** : Carrot, Biostimulants, SWE, Foliar spray.

## Introduction

Carrot (*Daucus carota L.*) is one of the most important root vegetables and it belongs to the family Umbelliferae. It is an important vegetable crop grown all over the world during summer and winter in temperate regions and during winter in tropical and sub-tropical regions. The major carrot growing states in India are Haryana, Punjab, Uttar Pradesh, Karnataka, Tamil Nadu and Andhra Pradesh. Haryana is the leading producer of carrot 372.13 tonnes with 27.80% share and in Tamilnadu production is 140.95 tonnes with 10.53 % share. The total cultivable area under carrot in India is 24,000 ha with an annual production of 3.40 lakh tonnes (NHB, 2017). Carrot is used as a vegetable for soups, stews, curries, pies and grated roots are used as salad. Tender roots are used for making pickles and halwa. Carrot juice is also very popular and is the main source of carotene and is also used as colouring buffer in food preparation. Biostimulants stimulated endogenous plant defense response to both biotic and abiotic stress factors (Cambri *et al.*, 2008). The multiple functions of biostimulants have induced many researchers to investigate such effects on crops (Paradikovic *et al.*, 2011). Sea weed extract or marine macroalgae are rich in diverse compounds like lipids, proteins, carbohydrates, phytohormones, amino acids, osmoprotectants, antimicrobial compounds minerals (Nati *et al.*, 2016).

## Materials and Methods

The experiment on "Effect of biostimulants on yield of carrot" (*Daucus carota L.*) var. Early Nantes was carried out in the Kethorai village, Coonoor, The Nilgiri district of Tamilnadu. The experiment was carried out during 2017 - 2018. The treatments includes various sources of biostimulants viz. Humic acid, Chitosan, Sea weed extract, Effective microorganisms and Panchagavya were given as foliar application on three stages viz., first spray on 2 leaves stage, second spray on 5-7 leaves stage and third spray on when root attains 5-6 diameters in size. The various yield characters were recorded. Carrot variety used in this experiment was 'Early Nantes'. It is a coreless, excellent variety for early and successional crops, producing uniform long smooth skinned blunt- ended roots.

Observations on yield parameters viz., length of root, root diameter, root girth, root weight, root dry weight, root yield plot<sup>-1</sup> and total root yield ha<sup>-1</sup> were recorded. The observations collected during the experiment in respect of crop were statistically analyses using the procedure given by Panse and Sukhatme (1978). The IRRISTAT software was used for the statistical analysis of the data.

## Treatment details are given below

Treatments	
T <sub>1</sub>	Humic acid (3%)

T <sub>2</sub>	Humic acid (2%)
T <sub>3</sub>	Chitosan (100ppm)
T <sub>4</sub>	Chitosan (150ppm)
T <sub>5</sub>	Sea weed extract (3ml / litre)
T <sub>6</sub>	Sea weed extract (2ml / litre)
T <sub>7</sub>	Effective microorganisms (1:1000)
T <sub>8</sub>	Panchagavya (3%)
T <sub>9</sub>	Panchagavya (5%)
T <sub>10</sub>	Control

### Results and discussion :

Application of various biostimulants significantly influenced the yield parameters of carrot var. Early nantes. The yield characters viz., length of root, root diameter, root girth, root weight, root dry weight, root yield plot<sup>-1</sup> and total root yield ha<sup>-1</sup> were significantly influenced by various treatments. The highest root length (22.16 cm), root diameter (3.41 cm), root girth (11.90 cm), root weight (109.17 g plant<sup>-1</sup>), root dry weight (11.55 g plant<sup>-1</sup>), root yield plot<sup>-1</sup> (14.55 kg) and total root yield ha<sup>-1</sup> (27.29 t) were recorded the highest in the treatment T<sub>5</sub> which received sea weed extract @ 3 ml. The lowest root length (7.35 cm), root diameter (1.55 cm), root girth (7.02 cm), root weight (60.32 g plant<sup>-1</sup>), root dry weight (6.49 g plant<sup>-1</sup>), root yield plot<sup>-1</sup> (8.04 kg) and total root yield ha<sup>-1</sup> (15.08 t) were recorded in the treatment T<sub>10</sub> – control.

Sea weed extract was found to be superior because of high level of organic matter aids in retaining moisture and minerals in upper soil level available to roots. Sivasankari *et al.* (2006). Similar findings reported by Kumari *et al.* (2011) and Hernandez-Herrera *et al.* (2013) application of sea weed extract as foliar spray increased root length. This could be due to the mineral nutrients present in sea weed extract.

Yield and yield attributes increased by sea weed extract may be due to the presence of plant growth regulators (indole 3 acetic acid, gibberellins, kinetin and zeatin). Similar findings reported by Saravanan *et al.* (2003) and Haider *et al.* (2012) in potato plants treated with lower concentration of sea weed extract showed higher growth and yield. Improvement in growth may be due to the presence of certain growth promoting constitution and osmoprotectant betains in the extract.

The possible reasons may include the bioactive components of sea weed extracts which at higher concentrations can inhibit plant growth. Similar findings was reported by Somasundaram *et al.*, (2008) sea weed extract improved root system in tomato could be influenced by endogenous auxins as well as other compounds and sea weed is the opulent source of secondary nutrients like magnesium. Uma maheshwari (2017) also opined root diameter increased by application of sea weed extract might be due to accumulation of protein and carbohydrates.

**Table 1.Effect of biostimulants on yield of carrot**

S. no.	Root Length (cm)	Root Diameter (cm)	Root girth (cm)	Root weight (g plant <sup>-1</sup> )	Root dry weight (g)	Root yield (kg plot <sup>-1</sup> )	Total root yield (t ha <sup>-1</sup> )
T <sub>1</sub>	8.98	2.05	7.83	67.97	7.82	9.06	16.99
T <sub>2</sub>	8.71	1.80	7.61	63.98	7.16	8.53	15.99
T <sub>3</sub>	18.41	3.14	10.91	99.80	10.91	13.30	24.95
T <sub>4</sub>	10.25	2.61	9.05	79.05	9.37	10.53	19.76
T <sub>5</sub>	22.16	3.41	11.90	109.17	11.55	14.55	27.29
T <sub>6</sub>	10.93	2.64	9.26	81.07	9.60	10.80	20.26
T <sub>7</sub>	10.01	2.31	8.06	71.63	8.45	9.55	17.90
T <sub>8</sub>	14.64	2.89	9.92	90.44	10.26	12.05	22.61
T <sub>9</sub>	10.09	2.35	8.17	72.96	8.73	9.72	18.24
T <sub>10</sub>	7.35	1.55	7.02	60.32	6.49	8.04	15.08
S.Ed	1.85	0.12	0.49	4.67	0.30	0.62	-
CD (p=0.05)	3.70	0.24	0.98	9.35	0.61	1.24	-

## CONCLUSION

Based on the present investigation, it can be concluded that foliar application of sea weed extract @ (3ml) can improve the yield attributing parameters which will ultimately results in increasing the productivity of carrot and it could be recommended to the farmers for obtaining higher yield and monetary return.

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