

Original Research Article

<https://doi.org/10.20546/ijcmas.2018.712.425>

## Influence of Integrated Weed Management on Quality Parameters and Yield of Carrot

K. Chaitanya<sup>1\*</sup>, M. Madhavi<sup>2</sup> and R.V.S.K. Reddy<sup>3</sup>

<sup>1</sup>Water Technology Center, PJSTAU, Rajendranagar, Hyderabad, India

<sup>2</sup>AICRP on weed, Rajendranagar, Hyderabad, India

<sup>3</sup>Dr. Y.S.R. Horticultural University, Venkataramannagudem, India

\*Corresponding author

### ABSTRACT

#### Keywords

Integrated weed management,  $\beta$ -carotene content, Carrot, Vit-C content, Yield

#### Article Info

##### Accepted:

30 November 2018

##### Available Online:

10 December 2018

An experiment was conducted during rabi 2010-11 to study the influence of integrated weed management on  $\beta$ -carotene content and Vit-C content of carrot. The results indicated that the influence of integrated weed management on these quality parameters was found to be non-significant. However, maximum  $\beta$ -carotene content (8291.205  $\mu\text{g}$ ) and Vit-C content (6.30mg per 100 gms) were recorded with treatment Metribuzin 0.3 kg a.i ha<sup>-1</sup> (PE) + Hand Weeding 30 DAS and the minimum were recorded in unweeded control. Application of different pre-emergence herbicides and their combinations with post emergence herbicides and hand weeding had exerted a significant influence on yield of carrot. Pre-emergence application of Metribuzin 0.3 kg a.i ha<sup>-1</sup> (PE) followed by hand Weeding at 30 Days after sowing was effective and significantly superior over the rest of treatments by recording the highest yield of carrot (21.72 t/ha)

### Introduction

It is a major remunerative root vegetable crop growing in states of Punjab, Uttar Pradesh, Karnataka, Tamil Nadu and Andhra Pradesh cultivated in a area of 5529 ha with the annual production of 101291M tones and the productivity of about 18.32 t/ha. Carrot (*Daucus carota* L.) crop is grown in spring, summer and autumn in temperate regions and during winter in tropical and sub-tropical regions. It belongs to family Umbelliferae and is an excellent source of carotene, a precursor of vitamin-A and fibre in the diet. Purple and black carrots are used for the preparations of

beverages called 'kanji', which is a very good appetizer. The area under vegetable crops is increasing rapidly, while the production per unit area is low. The main cause of this might be due to complete dependence on the vagaries of the nature, supplementary irrigation facilities and weed losses. This has further resulted towards lowering of the yield of the state.

The effects of weeds are great on agriculture as they form an important factor in the management of land and water resources in crop production. The losses caused by weeds exceed the losses from any other category of

agriculture like insects, nematodes, diseases, rodents etc. of the total annual loss of agricultural produce from various pests in India, weeds account for 35 per cent, insects 10-20 percent, diseases 10 percent (Van Der Zweep, 1995). The yield reduction in vegetable crops ranges from 10 to 90 percent. There is of course, a considerable variation among different places and crops. In general, critical period of crop weed competition in vegetables has been observed between 2 to 8 weeks after sowing / transplanting. Due to non-availability of labour on time and at economic rate, the weed control through mechanical method has become a problem in cultivation of vegetable crops. Initially labour cost for weed management was comparatively low than the chemical weed control. But due to increase in industrial and urban area labour problem had becoming more and more critical for vegetable production. Also, it increases the cost of cultivation of vegetable produce.

At this stage, integrated weed management approach was found to be a satisfactory solution for this problem. This method could give the good results and avoid the pollution effect on the environment due to minimum use of chemicals. Hence, the present investigation therefore is proposed to Study the influence of integrated weed management on quality parameters of carrot.

### **Materials and Methods**

An experiment was conducted during rabi 2010-11 at Vegetable Research Station, ARI, Rajendranagar, Hyderabad. The experiment was laid out in Randomized block design with 3 replications and 14 treatments viz. Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha<sup>-1</sup>, Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha<sup>-1</sup> followed by Quizalofop ethyl 50 g a.i ha<sup>-1</sup> as post emergence at 30 DAS, Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha<sup>-1</sup> followed by Propaquizafop 75

g a.i ha<sup>-1</sup> as post emergence at 30 DAS., Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha<sup>-1</sup> followed by hand weeding (30 DAS), Metribuzin 0.3 kg a.i ha<sup>-1</sup> as pre emergence, Metribuzin 0.3 kg a.i ha<sup>-1</sup> as pre emergence followed by Quizalofop ethyl 50g a.i ha<sup>-1</sup> as post emergence at 30 DAS., Metribuzin 0.3kg a.i ha<sup>-1</sup> as pre emergence followed by Propaquizafop 75g a.i ha<sup>-1</sup> as post emergence at 30 DAS., Metribuzin 0.3kg a.i ha<sup>-1</sup> as pre emergence + one hand weeding at 30DAS., Pendimethalin as pre emergence @ 0.75 kg a.i ha<sup>-1</sup>, Pendimethalin as pre emergence @ 0.75 kg a.i ha<sup>-1</sup> followed by Quizalofopethyl 50 g a.i ha<sup>-1</sup> as post emergence at 30 DAS, Pendimethalin as pre emergence @ 0.75 kg a.i ha<sup>-1</sup> followed by Propaquizafop 75g a.i ha<sup>-1</sup> as post emergence at 30 DAS, Pendimethalin as pre emergence @0.75 kg a.i ha<sup>-1</sup> followed by hand weeding(30 DAS), Hand weeding at 30 and 60 DAS and Unweeded control. The Pre-emergence herbicide viz. Pendimethalin, Pendimethalin c.s and Metribuzin sprayed uniformly one day after sowing and Post emergence application of herbicide Propaquizafop and Quizalofop ethyl was applied uniformly at 30 DAS. The content of  $\beta$ -carotene was determined by using the method outlined by Peach and Tracey (1955) and Ascorbic acid content was estimated by the method of Ranganna (1986) titrated against standard dye solution (2, 6 dichlorophenol indophenol dye) expressed as mg ascorbic acid / 100 g.

### **Results and Discussions**

The entire weed Management treatments significantly increased the yield of carrot over unweeded control. The pre-emergence application of Metribuzin 0.3 kg a.i ha<sup>-1</sup> (PE) followed by hand Weeding at 30 Days after sowing was effective and significantly superior over the rest of rest of treatments by recording the highest yield of carrot (21.72 t/ha) and minimum was recorded in unweeded

control (6.13t/ha). These results are in conformity with the findings of Channappagoudar and Biradar (2007). This might be due to the better weed control efficiency and lowest crop weed competition provided the better availability of soil

moisture, light, space and nutrients for plant growth and root development, which in turn resulted in overall improvement in other yield contributing characters viz., length, girth, and fresh weight of root resulted in highest marketable root yield.

**Table.1** Effect of different weed control treatments on yield and quality parameters ( $\beta$ -carotene Content and Vit-C content) of carrot

TREATMENT	Root Yield /plot(kg)	Root yield/ha (tonnes)	$\beta$ -carotene ( $\mu$ g)	Vit-C(mg per 100 gms)
Pendimethalin c.s 0.75 kg a.i ha <sup>-1</sup> (PE)	22.50	11.03	8281.795	5.81
Pendimethalin c.s 0.75 kg a.i ha <sup>-1</sup> (PE)+ Quizalofop ethyl 50g a.i ha <sup>-1</sup> at 30 DAS (POE)	35.10	17.21	8284.664	6.20
Pendimethalin c.s 0.75 kg a.i ha <sup>-1</sup> (PE) + Propaquizafop 75 g a.i ha <sup>-1</sup> at 30 DAS (POE)	35.40	17.35	8285.787	6.18
Pendimethalin c.s 0.75 kg a.i ha <sup>-1</sup> (PE) + Hand Weeding 30DAS	40.60	19.90	8288.385	6.26
Metribuzin 0.3kg a.i ha <sup>-1</sup> (PE)	24.90	12.21	8282.246	5.84
Metribuzin 0.3kg a.i ha <sup>-1</sup> (PE) + Quizalofop ethyl 50 g a.i ha <sup>-1</sup> at 30 DAS (POE)	35.30	17.31	8286.205	6.24
Metribuzin 0.3 kg a.i ha <sup>-1</sup> (PE) + Propaquizafop 75g a.i ha <sup>-1</sup> at 30 DAS (POE)	35.40	17.37	8287.016	6.20
Metribuzin 0.3 kg a.i ha <sup>-1</sup> (PE) + Hand Weeding 30DAS	<b>44.30</b>	<b>21.72</b>	<b>8291.205</b>	<b>6.30</b>
Pendimethalin 0.75 kg a.i ha <sup>-1</sup> (PE)	21.90	10.74	8280.443	5.74
Pendimethalin 0.75 kg a.i ha <sup>-1</sup> (PE) + Quizalofop ethyl 50g a.i ha <sup>-1</sup> at 30 DAS (POE)	34.20	16.76	8283.139	6.18
Pendimethalin 0.75 kg a.i ha <sup>-1</sup> (PE) + Propaquizafop 75 g a.i ha <sup>-1</sup> at 30 DAS (POE)	34.00	16.67	8284.008	6.16
Pendimethalin 0.75 kg a.i ha <sup>-1</sup> (PE) + Hand Weeding 30DAS	38.40	18.82	8286.648	6.24
Hand Weeding at 30 and 60 DAS	40.63	19.92	8290.533	6.25
Unweeded control	<b>12.50</b>	<b>6.13</b>	<b>8270.754</b>	<b>5.29</b>
SE (m)±	0.18	0.21	-	-
CD at 5%	0.52	0.61	N.S	N.S

The quality parameters,  $\beta$ -carotene content and Vit-C content of carrot was non-significantly influenced due to the different herbicidal treatments. These results are in conformity with the earlier findings of Bhullar *et al.* (2010), Soares *et al.*, (2010) in carrot. However, the maximum  $\beta$ -carotene content (8291.205  $\mu\text{g}$ ) and Vit-C content (6.30mg per 100 gms) were recorded with treatment Metribuzin 0.3 kg a.i ha<sup>-1</sup> (PE) + Hand Weeding 30 DAS and the minimum were recorded in unweeded control. The data regarding yield and quality attributes as influenced due to differential herbicide treatments are presented in Table.

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### How to cite this article:

Chaitanya, K., M. Madhavi and Reddy, R.V.S.K. 2018. Influence of Integrated Weed Management on Quality Parameters and Yield of Carrot. *Int.J.Curr.Microbiol.App.Sci*. 7(12): 3728-3731. doi: <https://doi.org/10.20546/ijcmas.2018.712.425>