

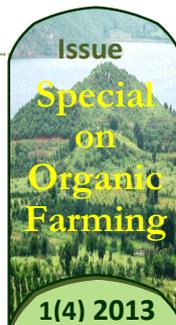


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## Cultivation of Carrot (*Daucus Carota*) under Organic Farming in India

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Carrots are the major single source of Vitamin A in the diets of many cultures. Organic carrots are not only large in size and orange deep in colour but also they have wonderful nutritional benefits, like helping to prevent heart disease and cancer, as well as protecting our vision.

### Introduction

The vegetable crops have been well advocated in solving the problem of food security. They are rich source of minerals, vitamins, fibre and contain a fair amount of protein as well as carbohydrates. In addition to local market demand vegetables have the potential for both domestic and export market. Although India is the second largest producer of vegetables next only to China in World, the productivity of different vegetables in our country is comparatively lower than the World's average productivity. Again the per capita availability of vegetable (210g/head/day) is still behind the recommended quantity (285g /head /day). Our demand by 2020 will be around 250 million tonnes. Thus due to the rapid growth of the population with reduction in land, in order to feed the population, the only solution is the vertical expansion or by increasing the productivity per unit area per unit time as the potential available land and water resources and of technology still remain unexploited. Our strategy should be produced more vegetables from less land, less water with less pesticides and with less detrimental to soil and environment as well. Organic vegetable cultivation offers one of the most sustainable farming systems with recurring benefits to only long-term soil health but provides a lasting stability in production by importing better resistance against various biotic and abiotic stresses.

Carrots are the major single source of Vitamin A in the diets of many cultures. This is one of the reasons of widespread cultivation of this crop. They are also a good source of other vitamins, minerals and fiber. Carrots are produced for a variety of uses. Fresh market production

for retail sales is still an important market. Fresh packed articles include peeled baby carrots, carrot sticks, shredded carrots and salad mixes. Processing markets include baby food production, frozen and canned products. Carrots are popular as snack foods, for deli trays, in salads, cooked in casseroles, as main vegetable dishes as well as numerous other culinary creations.

Organic carrots are large in size and in deep orange colour which is more attractive to consumers in market. The best thing about organic carrots is that they have wonderful nutritional benefits, like helping to prevent heart disease and cancer, as well as protecting your vision. Here are some great nutritional benefits of organic carrots.

- **Full of nutrients-** Organic carrot have for time more of our daily vitamin A along with a serving of carrots will provide vitamins B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, B<sub>6</sub>, C, E and K, and also the plenty of fiber, manganese and potassium. Organic carrots have a little bit of everything.
- **Powerful antioxidants-** Antioxidants help to fight cell damage done to the body by toxins that find their way from our environment into our bloodstream. Along with traditional antioxidants like vitamin C, carrots contain phytonutrient antioxidants like beta-carotene. Beta-carotene has some incredible benefits, and may protect the body from cancers of the lungs, stomach, colon, cervix, uterus, and the oral cavity.
- **Protect your vision-** The retina of the eye needs vitamin A to function. Vitamin A deficiency can cause night blindness. Extra vitamin A can prevent night blindness as well as combat macular degeneration and the formation of cataracts to keep your eyes healthy.
- **Help prevent cardiovascular disease-** There is a direct correlation between eating more carrots and lowering your risk of cardiovascular disease. Making carrots part of your everyday diet is an excellent way to prevent heart disease, and lower your cholesterol (a major factor for heart disease). Eating root vegetables like organic carrots also reduces the chances of having a heart attack.
- **Reduce the risk of stroke-** Eating more carrots can reduce the risk of suffering a stroke. Some suggests that eating more than five carrots a week can greatly reduce this risk.
- **Good for your teeth-** Carrots act as natural abrasives, stimulating your gums and eliminating sticky plaque from your teeth. They help keep your teeth clean after meals by triggering saliva to help scrub stains on your teeth. The minerals found in carrots will also help kill germs in your mouth and prevent tooth damage.

#### Package and Practices of Organic Carrot Cultivation

**Soil:** The carrot crop needs deep loose loamy soil. It requires a pH ranging from 6.0 to 7.0 for higher production.

### Varieties

**Hills:** Ooty-1, Early Nantes and New Koroda

**Plains:** India Gold, Pusa Kesar and Half Long Danvers

### Seed treatment

- Seed treatment with cow pat pit @ 3 g in one litre water for 24 hours
- Seed treatment with 5 % *Trichoderma viride*.

### Sowing

**Hills:** Carrot is a cool season crop and when grown at 15 C to 20 C will develop a good colour. At elevation above 1500 metres, carrot can be grown throughout the year under assured irrigation. At elevations between 1000 - 1500 metres, carrot can be grown in July -February.

**Plains:** Carrot can be grown in the month of August.

**Seed rate:** Recommended seed rate of carrot is 4 kg/ha.

**Spacing:** The rows are spaced 25 - 30 cm apart. The seeds mixed with sand (one part of seed with 4 parts of sand) are sown.

### Thinning

**Hills:** 10 cm between plants 5 cm between plants to facilitate proper development of roots.

**Plains:** 5 cm between plants

### Land preparation

**Hills:** The land is prepared to a fine tilth and raised beds of 15 cm height, one meter breadth and convenient length are formed.

**Plains:** Two ploughings are given and ridges and furrows are formed at 30 cm spacing. Before sowing of organic carrot the land should be deep ploughed in summer and cultivation of garlic in first year may be included to avoid fungal diseases and infection because, garlic contains antifungal properties and it would avoid chemical application for soil sterilization.

### Irrigation

Irrigation should be given once in five days. During drought period, after giving irrigation in the evening, beds should be covered with wet gunny bags. This prevents excessive water loss during sunny days. Germination of the seeds is also improved.

A mixture of neem leaves, roots of beri well fermented in whey (Mattha) and extract obtained from this mixture may be supplied with irrigation water to avoid diseases and better health of the plants.

### Nutrient Management

- Green manuring with lupin 60 days before planting

- Sprinkling horn manure to the soil at the time of land preparation @ 2.5 kg/ha by dissolving it in 100 liters of water
- Application of well decomposed farm yard manure @ 50 t/ha at the time of land preparation
- Application of biodynamic compost @ 5 t/ha at the time of land preparation
- Application of vermicompost @ 5 t/ha at the time of land preparation
- Application of neem cake @ 1250 kg/ha at the time of land preparation
- Application of biofertilizers, *Azospirillum* and Phosphobacteria @ 25 kg each/ha at the time of land preparation
- Spraying cow pat pit @ 5 kg/ha in 100 liters of water on 45<sup>th</sup>, 60<sup>th</sup> and 75<sup>th</sup> day after sowing.

#### After cultivation

First weeding is to be done on 15<sup>th</sup> day. Thinning and earthing up should be given on 30<sup>th</sup> day.

#### Growth regulators

- Foliar spraying of panchagavya @ 3 per cent at 10 days interval from 1<sup>st</sup> month after sowing
- Spraying 10% vermiwash 5 times at 15 days interval from one month after sowing
- Foliar spray of horn silica @ 2.5 g/ha in 35 litres of water on 65<sup>th</sup> day after sowing to increase (he yield and quality of the carrot roots

#### Plant protection

##### Root knot nematode

- Application of neem cake @ 1 t/ha at the time of sowing to control root knot nematode, *Meloidogyne spp*
- Growing carrot once in 3 years by following crop rotation
- Growing marigold once in 2 years
- Application of *Paecilomyces lilacinus* @ 10 kg/ha before sowing seeds

##### Leaf spot

Foliar spray of 3% Dasagavya at 10 days interval from 1<sup>st</sup> month after planting.

##### Soil borne diseases

Application of *Trichoderma viride* and *Pseudomonas fluorescense* @ 2.5 kg/ha at the time of land preparation.

**Yield:** Organic carrots may be produce 25-30 t/ha in the duration of 100 to 120 days.

#### Conclusion

Carrots are produced for a variety of uses. There is a need of promoting its cultivation under organic cultivation so that its quality for rich source of vitamin A is sustained.