

## Growing Disease-Free Organic Tomato

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Many of the conventional pesticides and fertilizers persist in the soil are harmful to the beneficial soil microorganism including earthworms, thereby resulting in degradation of Soil fertility, increasing environmental awareness, pollution potential and health hazards. In such a situation, agriculture is shifting from chemical to organic farming, as well as demand for organic vegetable production is also increasing day by day.



Among vegetables cultivation of resistant tomato (free from diseases and pests) by organic farming has a challenge for tomato growers. Organic farming is a system that seeks to avoid the use of chemical, fertilizers and pesticides. Tomato cultivated by organic farming produces healthy, nutritious and residual free fruits. Organic tomatoes are always in high demand in both local and whole-sale markets and have been need of farmers for their easy cost production and consumers for their good health.

As already known, tomato is one of the most popular vegetable grown all over the world and used both as raw (salad) and cooked vegetables as well as using for various value added products such as puree sauce, paste etc. These tomato products may be health hazards to human being due to using chemicals fertilizers and pesticides in tomato crop. Mostly countries are using chemical fertilizers and pesticides in more amounts increasing to tomato production resulted farmers are facing poor soil health, soil, air and water pollutions. Today, it is difficult to cultivation of resistant tomato by organic methods this may be due to major attack of diseases and pests. Spray of traditional produce like neem oil, castor oil, cow urine, solution of cow dung and seed treatment by trichoderma etc are the avoid the disease and pests. Organic compost or manures are prepared by plants, animals, humans vegetables wastes after their decomposition and using as plant nutrients. Farmyard manure, poultry manure, sheep and goat manure are the main manures using for proper availability of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O in the soil. Oil cakes like groundnut cake, coconut cake, castor cake, neem cake, mahua cake are also using for organic agriculture due to nitrogen availability.

Table 1: Nutrient content (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O) of manures collected from animal residues

Manure	Nutrient content (%)		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Blood meal	10-12	1-2	1.0
Fish meal	4-10	3-9	0.3-1.5
Meat meal	10.5	2.5	0.5
Bone meal	3-4	20-25	
Dairy	13	25	40
Beef	9	9	13
Swine	17	40	24
layer	20	51	33
Boiler	60	27	33

Many vegetables (potato, tomato sweet potato, carrot, raddish, onion etc.) having good result by using farmyard manure, compost, vermi-compost and other green manures. Tomatoes cultivated by organic methods are always in high demand in both local and whole-sale markets. Today, India is a leading country where about 70% of organic agriculture items are produced while in the global market for organically. The present article elaborated how to cultivate resistant tomato using organic farming.

## Growing Organic Tomato

**Preparation of field:** The land may be ploughed and harrowed 3 or 4 times to obtain a fine tilth. About 10 tonnes of Farm Yard Manure (FYM or vermicompost/compost @ 1-1.5 tonnes/acre is applied at the last ploughing. Green manuring is recommended or areas with assured rainfall and also for irrigated crop. Avoid weed growth through mechanical, manual means or using organic weedicides as weeds are the harbour for the pests. Beds are prepared against the slope and after leveling the bed, field channels of 50cm breadth are prepared at intervals of 1 m.



**Jatropa cake**

**Seed and Treatments:** Tomato is propagated by seeds. The planting of pathogen-free organically produced tomato seed is an important first step in managing diseases. Seed selection is an important aspect in tomato production by organic farming. For raising nurseries, seeds of high yielding varieties with tolerance to diseases many are used. They should be carefully selected from certified organic farms or from own seed plot which is raised organically. To start with, chemically untreated seeds from local high yielding varieties could also be used, in the absence of organically produced seeds. Fungicidal seed treatments are not option organic growers; however there are some seed treatments such as hot water treatment at 50°C for 30 minutes that can be used by organic farmers to eradicate some other pathogens also from seed. Prior to sowing, the seeds should be treated with Trichoderma at the rate of 7-10g/kg of seed depending upon the spore load in Trichoderma preparation.

**Variety:** Variety selection is most important for cultivation of tomato. The varieties which are responsive to organic manure are to be taken for high yield and superior quality produce. Besides high yielder capacities several commercial cultivars and wild species are resistance to different diseases and can be utilized for cultivation from organic farming.

**Nursery Management:** In order to grow seedlings in the nursery, beds are prepared with a height of 20 cm to avoid excess water. Soils are well exposed to high temperatures and soil solarization to prevent other possible pests and diseases which may be attack on tomato seedling. After the beds are prepared, 20 to 25 kg of farmyard manure along with 1.2 kg Kanranj/Neem cake is applied per bed . After necessary application of water, the beds are covered with thin white plastic sheels for raising the temperature without loss of moisture. Such practice will further eradicate harmful bacteria and fungus. Mulch (plastic sheet, straw and newspaper) helps to protect the plant from inoculums splashing from the soil onto lower leaves. Similarly the seed bed would be drench with Trichoderma viride solution @ 50g/l of water to destroy the root rot fungus.

**Crop Rotation:** Using a three or four year crop rotation with non solanaceous crops will allow infested plant debris to decompose in the soil. Rotations with small grains, mustard, maize and legumes are preferable, whereas the maize for crop rotation to avoid/eradicate root knot nematode. Marigold as crop rotation is a good option. Marigold produce several compounds including essential oil that are biologically active and thus potentially allelopathic to disease.

**Cropping Calendar:** Traditionally, farmers usually have 3 tomato production seasons such as (1) early season – seeds are sown in July/August, and crops planted in August/September, harvested at the end of October or December; (2) main season - seeds are sown from the middle of September to end of October, crops are planted in November, and harvested in February or March; and (3) late season-seeds are sown in November, crops are planted in December, and harvested in March or April.