

## Trellis Method of Cultivation with Mulching in Tomato

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### Introduction

A major vegetable crop in India is tomato and is also called commonly as “love apple” which is an herbaceous plant from the Nightshade genus. India is the world’s second-largest tomato grower with about 5.92% of the nation’s total tomato production attributed by Telangana state. The fruits are frequently consumed fresh in salads, cooked as vegetables and used as an ingredient in many recipes including chutneys and pickles. Additionally, a significant portion of the global tomato production is processed into products like tomato juice, ketchups, purees, paste, sun-dried tomatoes and dehydrated pulp. It is renowned as a food that is both protective and productive.

Tomatoes are the major dietary source of the antioxidant lycopene which has been linked to many health benefits including reduced risk of heart disease and cancers. They are also good source of vitamin C, potassium, folate and vitamin K in the diet. Tomatoes have substances called lutein and zeaxanthin that may help protect your eyes from the blue light made by digital devices like smartphones and computers. They also may help keep your eyes from feeling tired and ease headaches from eyestrain.

This highly preferred vegetable when grown using trellis has good yield with reduced incidence of diseases, hasten ripening as there will be adequate air circulation and sunlight and mulch protects the lowest-growing fruits from resting on the ground and developing rot resulting in reduced crop yield.

### Trellis

A trellis is a support structure used to elevate tomato plants off the ground and improve airflow. Trellising is crucial as it maintains sturdy stems, guards the plants against disease and makes it simpler to pick the fruit. During early summer, the tomato plants are to be pruned as necessary regardless of the method used for cultivating them. The pathogens in



the soil are kept from splashing up onto the leaves by removing the bottom leaves. This helps the plants to develop robust leaves and stems that can sustain more fruit by pruning suckers which are the tiny leafy shoots that grow above each stem.

#### **Benefits of trellis cultivation of tomato:**

- The method increases the amount of sunshine that plants receive which helps the plants to develop and produce well.
- There will be an increase in the fruit or leaf quality
- The plants don't rot before harvest
- It encourages strong crops with good fruit quality
- The application of fertilisers and pruning become simpler thereby reducing the drudgery levels involved
- The following of trellis alternatives give tomato plants the practical and affordable support they require throughout the growing season.

#### **Support for stake fences**

This sturdy trellis system is easy to assemble and reasonably priced. For both bush and vining tomatoes, it can be used effectively by just modifying the size and width in accordance with the suggested height for plants.

A segment of welded wire fencing is fundamentally linked using u-nails to a sharpened wooden stake. As plants grow, pieces of fabric or string are tied to them to keep the leaves and stems off the ground. It can be constructed by using easily available components in farmer's fields.

#### **Pruning with strings**

The simplest technique to support a vine vertically may be to attach it to a frame or other support with some string or twine. A cheap and easily accessible solution is vertical string trellising which can be fastened to greenhouse studs or rafters when tomatoes are grown in greenhouses.

**Wire tomato cages:** These commercially available cylindrical galvanised wire tomato cages are freestanding to a height of about 4 inches and spike into the ground directly. These cages can be placed over young seedlings directly thereby helping the plant's branches to eventually grow through the cage and have enough support. Tomatoes of the smaller stem size thrive in these cages, but taller types require extra assistance as they can outgrow the

cage. The necessity to tie the tomato plants to stakes, wire, string or a frame is removed by using these cages. The commercial tomato cages are typically cone-shaped, tapered wire cylinders with the narrow end closer to the ground with configuration that supports the younger plants' shorter branches.

### Concrete mesh

It is made from 9-gauge wire and cut into 6-inch squares for use in building projects to reinforce concrete. Although the product is soft enough to cut without special tools and easily rusts, it is firm enough to support itself. Additionally, don't fret about the rust because this type of fence material will endure for many years rust or no rust.

Concrete mesh, when fastened to studs with spacers, serves as a handy vertical support in greenhouses. (We maintain it at least a foot away from all walls to allow for sufficient airflow.) Concrete mesh can be used outside and pairs well with a freestanding frame for the majority of pruning techniques.



Stake fence

Pruning with strings

Wire tomato cage

Concrete mesh

### Mulching

Mulching is a technique used to delay the emergence of weeds in the soil. Mulch also blocks some of the light that reaches the soil's surface. Gardeners must overcome a few obstacles that prevent harvest successes when planting vegetable seeds or transplants in the ground. Mulch helps to minimize soil erosion and weed growth.

### Types of mulches

There are two types of mulching methods based on their origin and they are organic and inorganic mulches.

### Organic mulches

Grass, straw, dry leaves, bark, sawdust and compost are some examples of organic mulch materials. These have the ability to degrade quickly and add some organic matter and

nutrients to the soil. They also have the ability to easily degrade because they attract insects, slugs and cutworms that eat them.

- **Grass clippings:** Grass clippings are one of the most common and accessible mulch components in the country. Freshly integrated into the soil, it contributes to soil nitrogen and organic matter. However, adding green grass material with the ability to regenerate its root system may hinder the growth and development of desired crops. Hence, usually dry grass is used as a mulching material.
- **Straw:** The most popular mulching material utilized as mulches on soil surface for moisture conservation are paddy and wheat straw as well as other agricultural leftovers including stubbles, groundnut shells and cotton shells. Despite being low in nutrients, straw can improve soil fertility when it decomposes. Straw mulches lessen evaporation by reducing absorbed heat energy by the soil as well as its mobility above the soil.
- **Newspaper:** Mulching with newspaper improves soil's organic content as well as assist in weed control. Usually, newspapers that are one and two centimetres in thickness are used and the edges are secured with pebbles, gravel or heavy materials that prevent paper from flying off. The application of newspaper mulch on a windy day should be avoided and colour ink newspapers should also be avoided because colours can seep into the soil and can be dangerous to the plants.
- **Dry leaves:** Leaves are an excellent mulching material since they are readily and abundantly accessible. Though dried leaves are helpful for initiating germination during the cold season and safeguarding dormant plants during the winter by keeping them warm, due to their thin weight they may be blown away even by light wind. Stone, bark or other such heavy materials that assist lessen these issues can be used.

**Inorganic mulches:** These include:

- **Photo-degradable plastic mulch:** This kind of plastic mulch material degrades quickly when exposed to sunlight continuously.
- **Biodegradable plastic mulch:** Over time, this kind of plastic mulch film degrades quickly in the soil and can avoid environmental hazards.
- **Color of film:** Film colour options include black, translucent, white, silver, and a number of other hues. However, choosing a particular colour for the plastic mulch

film depends on the type of horticultural crop as this is typically employed in their cultivation.

- **Black plastic film:** It aids in moisture retention, weed control and radiation abatement. It is one of the most commonly used mulches.
- **Reflective silver film:** It usually keeps the temperature in the root zone cooler.
- **Transparent film:** It warms the ground and is most often used for solarization in colder regions.



**Trellis with straw mulching**



**Trellis with plastic sheets**



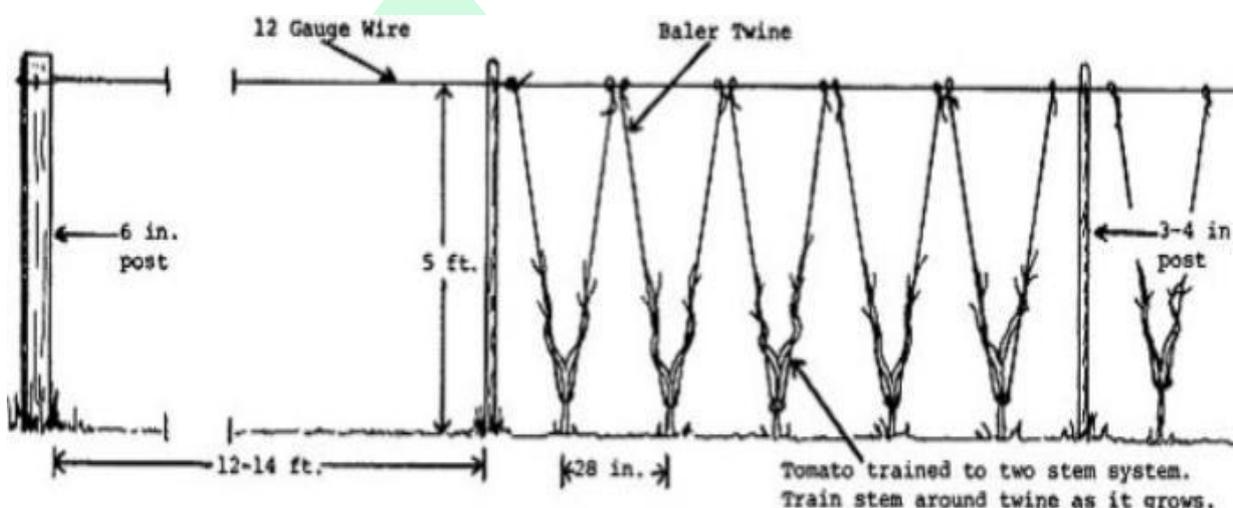
**Benefits of mulching tomato of plants:** The following are the benefits of using mulching sheets to grow tomatoes:

- **Retains soil moisture:** Mulching helps to preserve soil moisture for longer duration and in dry weathers, it keeps water from rapidly evaporating.
- **Controls soil temperature:** The substantial layer of mulch sheet on the soil's surface helps to regulate the soil temperature. The cool soil beneath the mulching helps tomatoes to grow well during the hot summer. On the other hand, it helps keep the soil warm in cold weather.
- **Save water:** Helps in water conservation in tomato cultivation as overall water requirement is greatly reduced.
- **Disease prevention:** Mulching protects the soil's top layer and keeps tomato plants healthy and clean. Additionally, it shields them against diseases brought by fungi in the soil.
- **Stops growing weeds:** Mulching creates a 2 – 3 inches layer on the earth surrounding the tomato plants that inhibits the growth of new weeds there by reducing the number of weddings and fertiliser application also.

- **Enhances soil health:** When organic mulching is used, during the course of season, it breaks down into the soil and enhances soil fertility providing tomato plants with additional micronutrients and minerals from the soil.

#### Method of tomato cultivation with trellis and mulching:

Tomatoes grown using trellis consists of strong (3 – 6 inch) support posts that are spread widely with heavy gauge wire strung horizontally across their tops. From the top wire, lengths of twine are dropped and fastened to the base of each tomato plant. The plants



develop two main stems and as they develop, each stem is coiled around a length of twine. Throughout the row, support posts should be positioned 12–20 feet apart and rise 5–6 feet above the ground. Due to the reduced canopy and increased sun exposure, the fruit of trellised plants are more prone to sunburn. Despite having fewer fruits than plants taught in other ways, these fruits are bigger and ripen sooner.

The use of mulches whether made of plastic or organic materials reduces incidence of diseases as there is little soil contact for the leaves and fruit. Mulches also aid in moisture conservation by acting as a barrier to slow down soil drying. By obstructing sunlight, this physical barrier also prevents weed development. Mulches made of black plastic warm the soil and promote early season plant development. Drip irrigation is frequently utilized in conjunction with plastic mulches. Those growers who opt not to install drip may drill holes in the plastic mulches to allow rain infiltration in areas where crops depend on summer rainfall. However, this makes the plastic more brittle, makes tearing and weed growth issues worse. Straw is an organic mulch that cools the soil and may inhibit early season growth.



However, later in the growing season, when temperatures are high, the plants might benefit from the cooling mulch. The potential of organic mulches to break down over time, adding organic matter to the soil and enhancing soil fertility is an added benefit.

### **Conclusion**

Tomato is a highly cherished crop used as an ingredient in many recipes. For optimal effects, tomato mulching should be done as soon as possible after planting. Many farmers still use the ancient gardening practice of trellising their plants. Commonly crops are not only kept off the ground and the usage of trellises in the garden is beneficial for crops like tomatoes. It will stop fruit from rotting, which happens when fruit is buried deep within a crop or left on the ground.

As there are many types of crops, there are numerous trellis alternatives. The farmers are free to select or use any cost-effective trellis design as long as it promotes healthy crop growth and more production of tomatoes.