



Starter Solutions for Vegetable Crops

Starter solutions are mixtures of soluble fertilizer and water used to get young plants off to a good start. The fertilizer material easily dissolves in water and the nutrients are readily available for plant uptake. Starter solutions are used primarily for transplanted vegetables such as tomato, eggplant, pepper, muskmelon, watermelon, cabbage, cauliflower and broccoli.

Advantages of Starter Solutions

Starter solutions are easy to prepare. When dry, concentrated starter fertilizer is mixed with water, it dissolves in only a minute or two. With warm water, mixing is very rapid. There will be no residue at the bottom of the mixing container. (Regular field grade fertilizers will not completely dissolve.)

There is little risk of plant injury (burning) when using starter solutions. Dry fertilizer in close contact with plant roots can result in serious injury, while starters can be added directly to plant roots. Starter fertilizers contain no potentially harmful salts which accumulate and cause problems.

The nutrients in starter solutions are immediately absorbed and utilized by plants. Plants respond rapidly.

Starter solutions minimize transplant shock. When plants are moved from a protected environment to the open garden or field, there is an interruption in the normal processes of growth. Most often the root system is disturbed. Also, the plants are subjected to cool nights and low soil temperatures. Rapid intake of nutrients assists the plant in quick recovery as new root and top growth takes place.

Phosphorus is essential for root growth. Even though this element is distributed throughout the soil, it is not readily available to plants when the soil temperature is 60°F. and lower. Since soil temperatures are low in the early spring, the addition of a starter solution at transplanting gives plants a boost by making phosphorus readily available. Additional phosphorus can compensate for low soil temperatures; however, there is a limit. For example, tomato growth will not be improved with additional phosphorus if the soil temperature is below about 56°F. But if the phosphorus is already near the plant, it will be available when the soil temperature rises to 58 to 60°F.

Formulations of Starters

There are many formulations of starter fertilizers. For vegetable production, we generally recommend starters that contain 2 to 3 times as much phosphorus as nitrogen or potassium. Application of high nitrogen starters could result in excessive vegetative growth.

Rate

Use about ½ pint per plant at transplanting. It is important to use enough solution to saturate the entire root ball so that all of the roots will have access to the starter.

The solution is made by mixing the dry starter fertilizer with water at a rate of approximately 1 ounce, or 2 tablespoons, per gallon. The recommended rate is provided on the label of each brand of starter. Because starter fertilizers are safe, the actual mixing rate can vary considerably; companies selling starters of different analyses often recommend the same mixing and application rate.

The mixing rate of starters varies with groups of crops as shown in the following table for transplanted crops.

2 Tablespoons/Gallon	1⅓ Tablespoons/Gallon
Broccoli	Squash
Tomato	Muskmelon
Pepper	Watermelon
Eggplant	Cucumber
Cabbage	
Cauliflower	

Even though the mixing rate varies, the application rate should be the same: 1/2 pint per plant.

Using Starter Solutions

Seedlings If seedlings need fertilization, starter solutions are ideal. Mix 1 tablespoon per gallon and apply over the top of the seedlings or as a soil drench. A light rinse with water after application will ensure that no burning of tender leaves occurs.

Transplants Starter solutions can be used in two ways with transplants. Before transplants are set in the field, soak the root system with starter solution either by dipping or applying overhead. If the overhead method is used, rinse the leaves with water.

Another method of application is at the time of transplanting. After the plant is inserted into the planting hole, pour ½ pint of solution into the hole so that the solution saturates the root ball. The primary concern is that the roots have immediate access to a readily-available source of phosphorus.

Starter solutions can also be added anytime after transplanting if unusual weather conditions prevail, such as heavy rains which leach nutrients out of the root zone in the soil.

Seeds Research at the University of New Hampshire has shown that cucumber yields are greatly improved when a starter solution is applied at seeding. Form a depression in the soil as the seeds are covered (in the hill system of planting). Pour about ½ pint of solution into the depression, being careful not to wash the soil away from the seeds. A sprayer which can rapidly deliver the required amount of solution might provide an efficient application system.

Whether adding starter solutions at seeding will be beneficial and economical for all seeded crops is not yet known. Gardeners might try small experiments to determine the value of treatment of

seeded crops. Some starter fertilizers are designed for application in a dry form to sweet corn and beans at the time of planting. *These dry forms of starter should not be used to make starter solutions.*

Soil Moisture

Do not apply starter solutions when soils are excessively dry since such conditions could result in root damage. If plants are set into dry soil, water should be added first, followed by starter solution.

Cost

Starter fertilizers are highly-concentrated forms of fertilizer and are therefore quite expensive per unit of plant food as compared to general field-type fertilizers. Consequently, starter solutions are not recommended for broadcast application.

General Guidelines

Use starter solutions when transplanting (or at seeding on a trial basis).

Mix at the proper rate. Check label.

Apply about ½ pint per plant.

Soak the entire root system uniformly with starter solution.

Use starter solutions only when soil moisture is adequate for normal plant growth.

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