



# Defensor

## Bacterial Soil Inoculant for Balancing

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**To balance fungus-infested plant and soil ecology,  
now more concentrated, lower cost.**

### Description:

*Biostart*<sup>™</sup> Defensor, is a microbial soil inoculant that enhances biodiversity and discourages growth of undesirable microorganisms in the soil ecosystem. This is a natural process that is promoted by *Biostart*<sup>™</sup> Defensor.

The two *Bacillus* strains used in *Biostart*<sup>™</sup> Defensor are naturally occurring (non GMO) and have been selected for their high degree of microbial competitiveness. They are produced in state of the art stainless steel bioreactors under precisely controlled conditions that assure potency, stability and batch to batch uniformity to yield a spore count of 1 trillion cfu/gallon.

Field trials around the world over the last 10 years demonstrate the beneficial effects of *Biostart*<sup>™</sup> Defensor. Crops cultured in fungus-infested soils treated with Defensor consistently produce higher yields than those obtained in untreated control plots.

### Microbial Composition:

*Bacillus subtilis* (CM-5 strain)

*Bacillus cereus* (BCE-2 strain)

### Product Characteristics:

**Appearance:** opaque tan-colored liquid  
**Odor:** citrus  
**pH:** 3.9 - 4.1  
**Bacillus spore count:** 1 trillion (1 X 10<sup>12</sup>) CFU/ gallon

### Benefits:

- Increases diversity of microbial food web
- Restores soil life and structure—ease of working, water holding capacity
- Helps bring healthy balance among beneficial and pathogenic organisms
- Competes with fungus diseases—taking up space and not letting disease organisms in
- Systemic acquired resistance ( stimulates plant immune system against disease
- Produces bacillibactin, a siderophore enzyme that destroys certain soil pests
- Bacterial digestion by-products increase available plant nutrients
- Easy to use – hard to abuse
- Bacteria in spore form – small, inactive, easy to disperse, suspend, won't clog spray or drip lines, long shelf life
- Nontoxic to people, animals, plants, no re-entry interval, natural (no GMO), OMRI listed
- Increases plant health, vigor, yield, resistance to stress, pests, disease
- Concentrated, 1 trillion (10<sup>12</sup> CFU) bacteria /gallon

## Packaging and Handling:

*Biostart*<sup>™</sup> Defensor is packaged in bulk, 1, 5, 15, 30 and 55-gallon plastic containers. Ideal storage temperature: 50° -70° F (10° - 21° C). Do not store over 90° F, for more than 2 weeks. Shelf life 18 months when stored at 35° - 86° F. Store tightly closed in a cool place out of direct sun.

## Application:

*Biostart*<sup>™</sup> Defensor, diluted in tap water, is applied through any existing irrigation system, (sprinkler, drip, hydroponic) or through spray equipment. Maximize effect by applying Defensor with bacterial food. Molasses, dextrose (glucose), brewers yeast, kelp, fish and other organic fertilizers work well. Rincon-Vitova's Microbe Nutrients is a mixture of dry molasses, yeast and humic acid. Use equal volume or weight of food (up to 20 X volume of inoculant). For 1 quart of Defensor, use 2 pounds Microbe Nutrients or substitute 1 quart liquid molasses.

For foliar application, use humic acid or NuFilm 17 as a sticker. NuFilm 17 is used at rate of 125 ml (4 oz) per acre (premix in warm water); humic acid at one quart per acre. NuFilm 17 holds the bacteria on the leaf surfaces, resisting rain and overhead irrigation for a week.

Combining with other inoculants or with fungicides is not advised. Organic fertilizers improve performance. Wait two weeks after applying *Biostart*<sup>™</sup> Rhizoboost. Check with us about other tank mixes or co-application.

The main objective is to get the beneficial bacteria into the root zone of the plant; however, foliar applications have the additional objective of increasing the ratio of beneficial bacteria on the plant itself. The amount of water used depends on the crop, soil type and application method. Every farmer's situation is different.

### Vegetables - Strawberries – Flowers (with a growing period less than six months)

When to apply and how much per acre		Defensor	Microbe Nutrients
<b>Planting</b>	Or just prior to planting depending on food web conditions	2-4 quart / acre	4–8 lb / acre
<b>Post Emergence-</b>	Within 1 week after crop emergence	1-2 quart / acre	2–4 lb / acre
<b>Growing Season</b>	Apply every 21 days for maximum effect until total of 8 quarts per acre have been applied during season	1 quart / acre	2 lb / acre

### Trees, Vines, Permanent Crops (with a growing period more than six months)

When to apply and how much per acre		Defensor	Microbe Nutrients
<b>Transplanting</b>	Per tree in planting hole or on soil over root ball area	2 ounce / application (diluted in a minimum of 1 gallon of water)	2 ounce
<b>Growing Season</b>	<b>1st application</b> through drip or sprinkler system in 1st irrigation	2-4 quart / acre	4-8 lb / acre
	<b>2nd &amp; subsequent applications.</b> Apply every 21-30 days for maximum effect until total of 12 quarts per acre have been applied	1-2 quart / acre	2-4 lb / acre