Biopesticides for Managing Cucurbit Crop Diseases Organically
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Following is a list of some biopesticides labeled for disease control in vegetable crops. The active ingredient follows product name. Most products are labeled for managing multiple diseases on many crops. The diseases of cucurbit crops that are specified on these labels are included. This information provides some indication about the breadth of activity. Products listed with OMRI (Organic Materials Review Institute) are NOP compliant. Check state registration: each product may not be registered in all states. Also, always check with your certifier before purchasing any product. ‘No Ag Label’ indicates an agricultural label was not found for the product.

**Actinovate AG.**  0.0371% *Streptomyces lydicus* strain WYEC 108. Labeled for suppressing several soil-borne and foliar diseases which are listed separately from the crops. Pathogens of cucurbits in the list for soil treatment and seed treatment are *Fusarium, Pythium, Phytophthora,* and *Monosporascus.* Labeled for foliar treatment of powdery and downy mildew, *Anthracnose, Sclerotinia, Alternaria,* and *Erwinia.* Label indicates to use a non-ionic spreader-sticker. OMRI-listed. EPA Reg. No. 73314-1. Monsanto BioAg (formerly Natural Industries, Inc.).

**BacStop.**  2.0% thyme, 2.0% clove & clove oil, 1.5% cinnamon, 1.0% peppermint & peppermint oil, and 1.0% garlic oil. Broadly labeled primarily for bacterial diseases including bacterial leaf spot, bacterial wilt, bacterial fruit blotch, downy mildew, and powdery mildew in cucurbits. Recommended used with EF400 for these and some other diseases. Exempt from EPA registration. USAgritech, Inc.

**Bio-Tam.**  2% *Trichoderma asperellum* strain ICC 012 and 2% *Trichoderma gamsii* strain ICC 080. These beneficial fungi have different modes of action and are active over different temperature ranges (starting at 45°F) and environmental conditions. They are effective for diseases caused by *Phytophthora capsici, Rhizoctonia, Pythium* and *Verticillium.* General label. OMRI-listed. EPA Reg. No. 80289-9-69592. Isagro USA; distributed by Bayer CropScience (formerly AgraQuest).


**Companion.**  0.03% *Bacillus subtilis* strain GB03. Broadly labeled for foliar and soil-borne diseases, including bacterial wilt, gummy stem blight, powdery mildew, damping-off, crown and root rot, *Phytophthora* blight, and *Fusarium* wilt in cucurbits. EPA Reg. No. 71065-3. Growth Products, Ltd.

**Contans WG.**  5.3% *Coniothyrium mimitans* strain CON/M/91-08. Soil-applied product for *Sclerotinia sclerotiorum* (white mold pathogen). OMRI-listed. EPA Reg. No. 72444-1. SipcamAdvan.

**Double Nickel 55 LC and WDG.**  *Bacillus amyloliquefaciens* strain D747, 98.8% and 25%, respectively. Broadly labeled for foliar and soil-borne diseases, including downy mildew, gummy stem blight, powdery mildew, damping-off, crown and root rot, *Monosporascus* vine decline, and charcoal rot in cucurbits. OMRI-listed. EPA Reg No. 70051-107 and 108, respectively. Certis USA, LLC.

**EF400.**  8.2% clove, 8.1% rosemary, and 6.7% peppermint. Broadly labeled including downy mildew and powdery mildew in cucurbits. Exempt from EPA registration. USAgritech, Inc.

**KeyPlex 350 OR.** 0.063% yeast extract hydrolysate from *Saccharomyces cerevisiae*. Combination of defensive proteins (alpha-keto acids) and secondary and micronutrients. Elicits systemic acquired resistance in plants against fungal and bacterial pathogens. Labeled for general disease control in vegetables with specific mention of bacterial leaf spot in tomato. EPA approval for organic production. EPA Reg. No. 73512-4. KeyPlex.

**LifeGard WG.** 40% *Bacillus mycoides* isolate J. Biological Plant Activator. Labeled for anthracnose, downy mildew, gummy stem blight, and powdery mildew. OMRI-listed. EPA Reg No. 70051-119. Certis USA, LLC. Federally registered Jan 2017; not registered in NYS yet.

**MeloCon WG.** 6% *Paecilomyces lilacinus* strain PL251. This soil fungus parasitizes many types of plant parasitic nematodes, including root knot and root lesion, without adverse impact on beneficial nematodes. OMRI-listed. EPA Reg No. 72444-2. Certis USA, LLC.

**Mildew Cure** (formerly GC-3 Organic fungicide). 30% cottonseed oil, 30% corn oil, 23% garlic extract. Labeled for powdery mildew. OMRI-listed. Exempt from EPA registration. JH Biotech, Inc.


**M-Pede.** 49% Potassium salts of fatty acids. Labeled for powdery mildew in greenhouse cucumber plus several insects and mites. EPA Reg. No. 10163-324. Gowan Co.

**Mycostop.** 30% *Streptomycyes griseoviridis* strain K61. Mycostop can be incorporated in potting mix, applied as a seed treatment, used as a transplant dip, and applied to soil as a spray, drench, or through drip irrigation. It is labeled for control of seed rot, root and stem rot, and wilt caused by Fusarium, Alternaria, and Phomopsis of container-grown vegetables and damping-off and early root rot of vegetables in the field. OMRI listed. EPA Reg No. 64137-5. Verdera Oy.

**Organocide.** 5% sesame oil. Labeled broadly for several fungal diseases and insects. OMRI-listed. Exempt from EPA registration. No Ag Label. Organic Laboratories, Inc.


**Prestop.** 32% *Gliocladium catenulatum* strain J1446. Broadly labeled primarily for application to soil for several seed and soil pathogens, and also to foliage for select crops and before fruiting. New formulation expected in 2016 will permit use on edible plant parts thus also enabling label expansion. OMRI-listed. EPA Reg. No. 64137-11. Verdera Oy. U.S. Distributor: AgBio Inc.

**Procidic.** 3.5% Citric acid. Labeled for damping-off, foliar diseases caused by fungal and bacterial pathogens, and post-harvest diseases. Previously marketed as Citrex. Procidic was reviewed and determined to be NOP compliant by Washington State Dept of Ag. Exempt from EPA registration. Greenspire Global, Inc.

**Promax.** 3.5% Thyme oil. Protective and curative soil fungicide and nematicide for control of soil-borne diseases and plant parasitic nematodes on a broad range of crops. OMRI-listed. Exempt from EPA registration. Bio Huma Netics, Inc.


**RootShield WP and Granules (formerly T-22 HC and PlantShield HC).** 1.15% *Trichoderma harzianum* Rifai strain KRL-AG2. Protects plant roots against the fungal pathogens Rhizoctonia, *Pythium*, and *Fusarium*. The biocontrol fungus accomplishes this by growing on roots and releasing enzymes that dissolve the cell wall of many fungal pathogens, which it consumes. OMRI-listed. EPA Reg. No. 68539-3 and -7 for Granules and WP formulations, respectively. BioWorks, Inc.
RootShield Plus WP. 1.15% Trichoderma harzianum Rifai strain T-22 and 0.61% Trichoderma virens strain G-41. See previous product. OMRI-listed. EPA Reg. No. 68539-9. BioWorks, Inc.

Serenade ASO. 1.34% Bacillus subtilis strain QST 713. This bacterium colonizes roots when applied to soil and produces compounds that affect pathogens directly and triggers metabolic pathways to activate the plant’s natural defenses and modulate growth. Labeled for angular leaf spot, anthracnose, downy mildew, gummy stem blight, and powdery mildew and for soil diseases caused by Rhizoctonia, Pythium, Fusarium, Verticillium and Phytophthora. Serenade ASO has replaced Serenade Soil and Serenade Opti. Previous product names and formulations: Serenade, Serenade Max, Serenade Optimum. OMRI-listed. EPA Reg. No. 264-1152. Bayer CropScience.

Sil-Matrix. 29% potassium silicate. Labeled for powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 82100-1. PQ Corporation.


Taegro ECO. 13% Bacillus subtilis var. amyloliquefaciens strain FZB24. Labeled for diseases caused by the soil-borne pathogens Rhizoctonia and Fusarium in many crops. OMRI-listed. EPA Reg. No. 70127-8. Syngenta Crop Protection (formerly Novozymes Biologicals, Ind.)

Tenet WP. Same as Bio-Tam. OMRI-listed. EPA Reg. No. 80289-9. Isagro USA; distributed by SipcamAdvan.

TerraClean 5. 27% hydrogen dioxide and 5% peroxyacetic acid. Generally labeled for control of soil-borne plant diseases such as those caused by Fusarium (root rot), Pythium, and Rhizoctonia on any crop. It penetrates soil to kill and suppress pathogens, and it releases vast amounts of oxygen that stimulates root development, nutrient uptake, and thus plant growth. OMRI-listed. EPA Reg. No. 70299-13. BioSafe Systems, Inc.

Timorex Gold. 23.8% tea tree oil. Labeled generally for several diseases, including anthracnose, bacterial diseases, downy mildew, and powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 70051-2. Stockton USA, LLC.

Triology. 70% clarified hydrophobic extract of neem oil. Labeled generally for several insects and diseases, including Alternaria, anthracnose, downy mildew, leaf spot, and powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 70051-2. Certis USA, LLC.

Zonix biofungicide. 8.5% Rhamnolipid Biosurfactant. Kills zoospores, which is one spore type produced by Oomycete pathogens which cause diseases such as Phytophthora blight and downy mildews. OMRI-listed. EPA Reg. No. 72431-1. PropTera, LLC.

Below are some organic fungicides in addition to copper and sulfur that are not biopesticides:

JMS Stylet-oil. 97.1% paraffinic oil. Labeled for several insect pests, viruses transmitted by aphids, and some fungal diseases in several crops including Alternaria leaf spot, gummy stem blight, and powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 65564-1. JMS Flower Farms, Inc.

TriTek. 80% mineral oil. Labeled for several insect pests and powdery mildew in several crops including cucumber, melon, and squash. OMRI-listed. EPA Reg. No. 48813-1. Previously named Saf-T-Side. Brandt Consolidated, Inc.

Please Note: The specific directions on fungicide labels must be adhered to -- they supersede these recommendations, if there is a conflict. If you are farming organically, before purchase make sure product is registered in your state and approved by your certifier. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.

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