Biopesticides for Managing Diseases of Eggplant 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 eggplant that are specified on these labels and occur in the northeastern U.S. are included below. This information provides some indication about the breadth of activity of the product. Some products are labeled broadly (general label) with separate lists for crops and target diseases and pathogens. Products listed with OMRI (Organic Materials Review Institute) are NOP compliant. Check state registration: each product may have separate lists for crops and target diseases and pathogens.

Actinovate AG. 0.0371% Streptomyces lydicus strain WYEC 108. Labeled for Fusarium crown and root rot, Phytophthora blight, Pythium damping-off, and Verticillium wilt. For best results with applications to foliage, label indicates to use a non-ionic spreader-sticker. OMRI-listed. EPA Reg. No. 73314-20. Novozymes.

Aviv. 0.08% Bacillus subtilis strain IAB/BS03. Labeled for soil treatment for root pathogens (Fusarium, Phytophthora, Rhizoctonia, and Verticillium). Replaces Prevent. OMRI-listed. EPA Reg. No. 91473-1-86182. Seipasa S.A.

BioST Nematicide 100. 95% heat-killed Burkholderia spp. strain A396 cells and spent fermentation media. Labeled for several nematodes including root-knot. OMRI-listed. EPA Reg. No. 84059-14-42750. Albaugh, LLC.

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. Labeled for application to soil for pathogens that attack roots and crown tissue: Fusarium, Phytophthora, Rhizoctonia, Pythium, Sclerotinia, and Verticillium. General label. OMRI-listed. EPA Reg. No. 80289-9-67690. Manufactured by Isagro USA; distributed by SePRO Corporation.

Brandt Organics Aleo. 78% garlic oil. Labeled generally for bacterial and fungal diseases including Pythium damping off and gray mold. OMRI-listed. Exempt from EPA registration. Brandt Consolidated, Inc.

Carb-O-Nator. 85% potassium bicarbonate. Labeled for anthracnose and gray mold. OMRI-listed. EPA Reg. No. 70051-117. Certis USA, LLC.


Cinnerate. 60% cinnamon oil. Labeled for pathogens such as Botrytis cinerea which causes gray mold (label has separate lists of crops and diseases). OMRI-listed. Exempt from EPA registration. Seipasa S.A.

Companion. 0.03% Bacillus subtilis strain GB03. Labeled for blight caused by Sclerotinia (white mold) and root rots caused by Pythium and Rhizoctonia. EPA Reg. No. 71065-3. Growth Products, Ltd.
**Contans WG.** 5.3% *Paraconiothyrium minitans* strain CON/M/91-08. Soil-applied product for *Sclerotinia sclerotiorum* (white mold pathogen). OMRI-listed. EPA Reg. No. 72444-1. SipcamAdvan.

**DiTera DF Biological Nematicide.** 90% *Myrothecium verrucaria* strain AARC-0255 fermentation solids and solubles. Labeled for several nematodes including root-knot. OMRI-listed. EPA Reg. No. 73049-67. Valent BioSciences LLC.

**Double Nickel 55 LC and WDG.** *Bacillus amyloliquefaciens* strain D747, 98.8% and 25%, respectively. Labeled for gray mold and damping off and root rot caused by *Fusarium, Pythium, Phytophthora, Rhizoctonia,* and *Verticillium.* OMRI-listed. EPA Reg No. 70051-107 and 108, respectively. Certis USA, LLC.

**EcoSwing Botanical Fungicide.** 82% extract of *Swinglea glutinosa.* Labeled for use on eggplant; no diseases or pathogens of eggplant included in the general list of targeted pests. OMRI-listed. EPA Reg. No. 10163-357. Gowans Co.

**ECOWORKS EC.** 70% cold pressed neem oil. Labeled generally for fungal diseases including anthracnose, and also several insects and mites. OMRI-listed. EPA Reg. No. 89152-4. ECOSTADT Technologies LLC.

**GreenFurrow EF 400.** 5.6% clove, 7.1% rosemary, 11.3% peppermint oil, 10.5% cottonseed oil. Labeled diseases of vegetable crops that occur in eggplant include anthracnose and white mold. Exempt from EPA registration. Mar Vista Resources.

**Howler.** 50% *Pseudomonas chlororaphis* strain AFS009. Labeled for foliar spray for diseases caused by *Botrytis* (gray mold) and *Colletotrichum* (anthracnose) and soil treatment for *Fusarium, Phytophthora, Pythium, Rhizoctonia,* and *Sclerotinia.* OMRI-listed. EPA Reg. No. 91197-3-92488. AgBiome Innovations Inc.

**Kaligreen.** 82% potassium bicarbonate. Labeled only for powdery mildew which does not affect eggplant in the northeast. OMRI-listed. EPA Reg. No. 11581-2. Arysta LifeScience North America LLC.

**KeyPlex 350 OR.** 0.063% yeast extract hydrolysate from *Saccharomyces cerevisiae.* Contains 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. EPA approval for organic production. EPA Reg. No. 73512-4. KeyPlex.

**LALSTOP G46 WG.** 93% *Gliocladium catenulatum* Strain J446. Labeled generally for seedborne and soil-borne diseases caused by several pathogens including *Fusarium, Phytophthora, Pythium, Rhizoctonia, Sclerotinia,* and *Verticillium,* and foliar diseases caused by several pathogens including *Botrytis* (gray mold*), and also anthracnose. *This disease not specified on label. OMRI-listed. EPA Reg. No. 64137-13. Lallemand Specialties Inc./Lallemand Plant Care.

**LifeGard WG.** 40% *Bacillus mycoides* isolate J. Biological Plant Activator. Labeled for gray mold. OMRI-listed. EPA Reg. No. 70051-119. Certis USA, LLC.


**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.

Minuet. 9.89% Bacillus subtilis strain QST 713. Labeled for application to soil for Fusarium, Phytophthora, Pythium, Rhizoctonia, and Verticillium. OMRI listed. EPA Reg No. 264-1202. Bayer CropScience.

Mycostop. 35% Streptomyces griseoviridis strain K61. Labeled for foliar spray to suppress Botrytis. Labeled for seed and root rots caused by Pythium, Phytophthora and Rhizoctonia. 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. OMRI listed. EPA Reg No. 64137-5. Lallemand Plant Care.

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

OSO. 5% polyoxin D zinc salt. Labeled diseases include anthracnose and gray mold. OMRI-listed. EPA Reg No. 68173-4-70051. Certis USA, LLC.

OxiDate 2. 27% hydrogen dioxide and 2% peroxyacetic acid. Labeled for anthracnose and gray mold, and root rots caused by Fusarium, Pythium, and Rhizoctonia. OMRI-listed. EPA Reg No. 70299-12. BioSafe Systems, LLC.

PerCarb. 85% sodium carbonate peroxyhydrate. Labeled for anthracnose. OMRI-listed. EPA Reg No. 70299-15. BioSafe Systems, LLC.

Prestop. 93% Gliocladium catenulatum strain J1446. Broadly labeled for seed-borne and soil-borne diseases (such as those caused by Phytophthora, Pythium, Rhizoctonia, Sclerotinia, and Verticillium) and foliar diseases (including those caused by Colletotrichum and Botrytis). Can be incorporated in potting mix, applied to soil and to foliage. OMRI-listed. EPA Reg No. 64137-13. Lallemand Plant Care.

Prevent. Renamed AVIV.

Problad Verde. 20% Banda de Lupinus albus doce (BLAD). Labeled for gray mold. OMRI-listed. EPA Reg No. 84876-2. CEV, S.A.

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.

Rango. 70% cold pressed neem oil. Generally labeled for anthracnose and foliar diseases caused by fungal pathogens such as Botrytis, and for soil applications for nematodes and soil-borne fungal pathogens including Fusarium, Pythium, and Rhizoctonia solani (label has separate lists of crops and diseases). OMRI-listed. EPA Reg No. 88760-10. Terramera, Inc.


Romeo. 94.1% cerevisane (cell walls of Saccharomyces cerevisiae strain LAS117). Labeled for Botrytis gray mold. OMRI-listed. EPA Reg No. 91810-2. Lesaffre Yeast Corporation

RootShield Granules, AG, and WP. 1.15% Trichoderma harzianum Rifai strain KRL-AG2. Apply to transplant roots, soil (greenhouse or field), or seed (RootShield AG). The biocontrol fungus grows on roots protecting them against fungal pathogens such as Rhizoctonia, Pythium, and Fusarium. OMRI-listed. EPA Reg No. 68539-3, -4 and -7 for Granules, AG, 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. Replaced Serenade Soil. This bacterium colonizes roots and produces compounds that affect pathogens directly and triggers metabolic pathways to activate the plant’s natural defenses and modulate growth. Labeled for foliar application targeting anthracnose and gray mold, and applied to soil for _Fusarium, Phytophthora, Pythium, Rhizoctonia, and Verticillium_. OMRI-listed. EPA Reg. No. 264-1152. Bayer CropScience.


Serifel NG. 11% _Bacillus amyloliquefaciens_ strain MBI 600. Labeled for use on greenhouse crops applied to soil or growing media for root rot pathogens (_Fusarium, Pythium, Rhizoctonia_) and as foliar spray for gray mold. Replaces Subtilex NG. OMRI-listed. EPA Reg No. 71840-8. BASF Corporation.

Serifel. 9.9% _Bacillus amyloliquefaciens_ strain MBI 600. Labeled for anthracnose and Botrytis gray mold. OMRI-listed. EPA Reg No. 71840-18. BASF Corporation.


Sonata. 1.38% _Bacillus pumilus_ strain QST 2808. Labeled for use on eggplant but none of the labeled diseases occur on eggplant in the northeast. OMRI-listed. EPA Reg. No. 264-1153. Bayer CropScience.

Sporan EC². 16% rosemary oil, 10% clove oil, 10% thyme oil, 2% peppermint oil. Labeled for gray mold. OMRI-listed. Exempt from EPA registration. KeyPlex.


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% peroxycetic acid. Generally labeled for control of soil-borne plant diseases such as those caused by _Fusarium_ (root rot), _Phytophthora_ (blights, rots), _Pythium_, and _Rhizoctonia_; crops not specified on label. 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.

TerraNeem EC. 84.9% cold pressed neem oil. Labeled generally for anthracnose and foliar diseases caused by fungal pathogens such as _Botrytis_, and for soil applications for nematodes and soil-borne fungal pathogens including _Fusarium, Pythium, and Rhizoctonia solani_ (label has separate lists of crops and diseases). OMRI-listed. EPA Reg. No. 88760-5. Terramera, Inc.

Thymox Control. 27% thyme oil. Proprietary nano emulsion technology. Broadly labeled for fungal diseases such as grey mold, and bacterial diseases; crops not specified. OMRI-listed. Exempt from EPA registration. Kemin Industries, Inc. Manufactured by Laboratoire M2.

Thyme Guard. 23% thyme oil extract. Broadly labeled for diseases caused by fungi, bacteria, viruses, and nematodes; crops not specified. Exempt from EPA registration. Determined to be NOP compliant by Washington State Dept of Ag. Agro Research International.
**Timorex Act.** 12.5% tea tree oil. Labeled for anthracnose, gray mold, and applied to soil for damping-off, crown and root rot caused by *Fusarium, Pythium, Rhizoctonia, Sclerotinia, Phytophthora*, or *Verticillium*. OMRI-listed. EPA Reg. No. 86182-3-88783. Summit Agro USA, LLC.

**Triathlon BA.** 98.85% *Bacillus amyloliquefaciens* strain D747. Labeled for controlling gray mold and applied to soil for suppressing damping off, seedling blights, and root or crown diseases caused by *Pythium, Rhizoctonia, Fusarium, Phytophthora*, or *Verticillium* spp. OMRI-listed. EPA Reg. No. 70051-107-59807. OHP, Inc.

**Triology.** 70% clarified hydrophobic extract of neem oil. Labeled generally for several insects and diseases, including anthracnose and *Botrytis* (label has separate lists of crops and diseases). OMRI-listed. EPA Reg. No. 70051-2. Certis USA, LLC.

**Zonix.** 8.5% rhamnolipid biosurfactant. Kills zoospores, which is one spore type produced by Oomycete pathogens which cause diseases such as Phytophthora blight. OMRI-listed. EPA Reg. No. 72431-1. PropTera, LLC.

Below is an organic fungicide with active ingredient that is considered to be biocompatible, but the ingredient is not a naturally occurring substance and thus is not in the US EPA biopesticide active ingredient list at https://www.epa.gov/ingredients-used-pesticide-products/biopesticide-active-ingredients:

**Organic JMS Stylet-oil.** 97.1% paraffinic oil. Labeled for several insect pests and viruses vectored by aphids. OMRI-listed. EPA Reg. No. 65564-1. JMS Flower Farms, 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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