

# Organic Fungicides for Managing Powdery Mildew in Cucurbits

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Following is a list of some biopesticides and other organic fungicides labeled for cucurbit powdery mildew. There are several formulations of copper and sulfur not included. Each product name is followed by active ingredient. Most products are labeled for managing other diseases which are included. 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.

**AVIV.** 0.08% *Bacillus subtilis* strain IAB/BS03. Labeled for Alternaria leaf spot, anthracnose, downy mildew, gummy stem blight, powdery mildew, Phytophthora blight and also as soil treatment for root pathogens (*Fusarium*, *Phytophthora*, *Pythium*, and *Rhizoctonia*) in cucurbits. Replaces Prevont. OMRI-listed. EPA Reg. No. 91473-1-86182. Seipasa S.A.

**Cease.** 1.34% *Bacillus subtilis* strain QST 713. Broadly labeled for use on greenhouse vegetables. Labeled for angular leaf spot, anthracnose, bacterial fruit blotch, downy mildew, gummy stem blight, and powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 69592-19-68539. BioWorks, Inc.

**Cinnerate.** 60% cinnamon oil. Labeled for diseases such as powdery mildew and gray mold. OMRI-listed. Exempt from EPA registration. Seipasa S.A.

**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.

**Double Nickel 55 LC and WDG.** *Bacillus amyloliquefacinens* 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.

**EcoSwing Botanical Fungicide.** 82% extract of *Swinglea glutinosa*. Labeled for powdery mildew. OMRI-listed. EPA Reg. No. 10163-357. Gowan Co.

**ECOWORKS EC.** 70% cold pressed neem oil. Labeled generally for powdery mildew, downy mildew, leaf spot, botrytis, anthracnose, blight, etc. and also several insects and mites. OMRI-listed. EPA Reg. No. 89152-4. ECOSTADT Technologies LLC.

**GreenFurrow 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. Mar Vista Resources.

**GreenFurrow 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. Mar Vista Resources.

**Kaligreen.** 82% potassium bicarbonate. Labeled for powdery mildew. OMRI-listed. EPA Reg. No. 11581-2. Arysta LifeScience North America LLC.

**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. 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.

**Mildew Cure** (also marketed as 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.

**MilStop.** 85% potassium bicarbonate. Broadly labeled including Alternaria leaf spot, anthracnose, downy mildew, powdery mildew, scab, and Septoria leaf spot in cucurbits. OMRI-listed. EPA Reg. No. 70870-1-68539. BioWorks, Inc.

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

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

**Organic 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.

**OSO.** 5% polyoxin D zinc salt. Alternaria, anthracnose, downy mildew, gray mold, gummy stem blight, powdery mildew, and scab in cucurbits. OMRI-listed. EPA Reg No. 68173-4-70051. Certis USA, LLC.

**OxiDate 2.** 27% hydrogen dioxide and 2% peroxyacetic acid. Labeled for Alternaria, anthracnose, belly rot, downy mildew, Fusarium wilt, gummy stem blight, leaf spot, Phytophthora, powdery mildew, and root rots in cucurbits. OMRI-listed. EPA Reg. No. 70299-12. BioSafe Systems, LLC.

**PerCarb.** 85% sodium carbonate peroxyhydrate. Alternaria leaf spot, anthracnose, downy mildew, gummy stem blight, leaf spot, powdery mildew in cucurbits. 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 (*Alternaria*, *Colletotrichum*, *Botrytis*, *Didymella*, and *Fusarium* plus powdery mildew). Can be incorporated in potting mix, applied to soil and to foliage. OMRI-listed. EPA Reg. No. 64137-13. Lallemand Plant Care.

**Prevont.** Renamed AVIV.

**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.

**Regalia.** 5% extract of *Reynoutria sachalinensis*. Boosts the plant's natural defense mechanisms against certain fungal and bacterial diseases. Broadly labeled including Alternaria blight, anthracnose, Cercospora leaf spot, downy mildew, gummy stem blight, Phytophthora blight, and powdery mildew in cucurbits. OMRI-listed. EPA Reg. No. 84059-2. Marrone Bio Innovations, 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. OMRI-listed. EPA Reg. No. 264-1152. Bayer CropScience.

**Serenade Opti.** 26.2% *Bacillus subtilis* strain QST 713. New formulation. Broadly labeled including downy mildew, gummy stem blight, and powdery mildew in cucurbits. OMRI-listed.

EPA Reg. No. 264-1160. Previous product names and formulations: Serenade, Serenade Max, Serenade Optimum. Bayer CropScience.

**Serifel.** 9.9% *Bacillus amyloliquifaciens* strain MBI 600. Broadly labeled for foliar diseases, including anthracnose, Alternaria leaf spot, downy mildew, gummy stem blight, and powdery mildew in cucurbits. OMRI-listed. EPA Reg No. 71840-18. BASF Corporation.

**Serifel NG.** 11% *Bacillus amyloliquifaciens* strain MBI 600. Labeled for use on greenhouse crops applied to soil for root rot pathogens and as foliar spray for powdery mildew. OMRI-listed. EPA Reg No. 71840-8. BASF Corporation.

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

**Sonata.** 1.38% *Bacillus pumilus* strain QST 2808. Labeled for downy mildew and powdery mildew. OMRI-listed. EPA Reg. No. 264-1153. Bayer CropScience (formerly AgraQuest).

**Sporan EC.** 16% rosemary oil, 10% clove oil, 10% thyme oil, 2% peppermint oil. Labeled for Alternaria leaf spot, downy mildew, and powdery mildew. OMRI-listed. Exempt from EPA registration. KeyPlex.

**Taegro 2.** 13% *Bacillus subtilis* var. *amyloliquifaciens* strain FZB24. Labeled for suppression of powdery mildew and seedling diseases caused by *Fusarium*, *Phytophthora*, *Pythium*, and *Rhizoctonia*. OMRI-listed. EPA Reg. No. 70127-12. Novozymes Biologicals, Ind.

**Thyme Guard.** 23% thyme oil extract. Labeled generally for diseases caused by all pathogen groups and also insect pests. Determined to be NOP compliant by Washington State Dept of Ag. Exempt from EPA registration. Agro Research International.

**Timorex Act.** 12.5% tea tree oil. Labeled for several diseases, including downy mildew, gummy stem blight, powdery mildew, and soil-borne diseases (damping-off, crown and root rot). OMRI-listed. EPA Reg. No. 86182-3-88783. Summit Agro USA, LLC.

**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.

**Trilogy.** 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.

**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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