



AGRONOMIC SPOTLIGHT



VEGETABLE SEED TREATMENTS

- » Seed treatments help protect vegetable seed and seedlings from soilborne and seedborne pathogens and insect pests.
- » Seed treatments can improve stand establishment, survival, and product quality.
- » A combination of chemicals are often used to manage a variety of pests and pathogens.

Seed treatments include chemicals and procedures that are used to protect seeds and seedlings from seed- and soil-borne pathogens and pests. Seed treatments can be especially helpful on seeds planted into cold, wet soil, as slow germination and growth can increase the susceptibility of seeds and seedlings to insects and pathogens. Seed treatment products are usually applied to the seed at very low rates, and they may be more cost-effective and result in lower amounts of active ingredients released into the environment as compared to post-emergent treatment methods.^{1,2}

Seed treatments include the application of chemicals including bactericides, fungicides, and insecticides. Some seed treatment products include combinations of chemicals to target a range of pathogens and insects (Table 1). A qualified commercial seed company or seed dealer can apply seed treatments that are intended to support improved seed germination, vigor and protection against pathogens.^{1,2}

Several fungicides are used for treating vegetable seed (Table 1). Some of the fungicides, such as captan and thiram, are broad spectrum and are used to protect against a wide range of fungal pathogens. Other fungicides have narrower spectra of activity and are used to protect against particular groups of pathogens. Many vegetable seed treatment products, such as the FarMore® Seed Treatment Technology products, contain a combination of a broad-spectrum fungicide and a narrow spectrum fungicide to manage a specific pathogen group. For example, most of the broad-spectrum seed treatment fungicides are not effective against the oomycete (water mold) group of fungal-like organisms, including species of *Phytophthora* and *Pythium*, and the downy mildew pathogens. To protect against these pathogens, a fungicide specific for that group, such as mefenoxam or metalaxyl, is included. Products may also combine two broad-spectrum fungicides with somewhat different ranges of pathogens against which they are effective.

Most of the insecticides used for seed treatment are able to manage a wide range of insect pests. Currently, the neonicotinoid class of insecticides (or neonics) are commonly

used to protect seeds and seedlings against a wide range of insect pests. The neonics are often less toxic to mammals and birds than are the organophosphate and carbamate classes of insecticides.³ However, the dust from treated seed may be a source of honey bee exposure to neonics, so care should be taken to minimize the release of this dust into the environment. The insecticide spinosad is a natural chemical derived from a soil bacterium, and it can be used as a seed treatment for onion maggot and seedcorn maggot on onion.

Seed sanitation procedures can be used to clean the seed, and may also eliminate some pathogens from the seed. These procedures include hot water treatments and soaking seed in dilute solutions of bleach or hydrochloric acid (HCL). These sanitation procedures are often used to eliminate seedborne bacterial pathogens.^{1,2}

The decision on whether or not to use a seed treatment, or which seed treatments to use will depend on the condition of the seed, the environmental conditions at the time of planting, and the pests and pathogens commonly present in the area or region. A seed treatment option that is very effective in California may not be appropriate for the conditions in the northeastern region of the U.S. Consult with an extension specialist, crop-consultant, or seed-dealer to determine the best seed treatment options for your region and conditions.

Sources:

¹ Babadoost, M. 1992. Vegetable seed treatment. University of Illinois Extension, RPD No. 915.

² Ivey, L. 2013. Seed treatments - vegetables. LSU AgCenter.

³ Neonics Vegetable Seed Treatment Information. Seminis. <https://seminis-us.com/resources/vegetable-seed-treatment-options/neonics-vegetable-seed-treatment-information/>

For additional agronomic information, please contact your local seed representative. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about vegetable production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with vegetable crops.

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Table 1. Some common vegetable seed treatment products registered for use in the United States as of April 2020.

Active Ingredient (Products)	Helps protect against*	beans	broccoli	cabbage	carrot	cauliflower	cucumber	eggplant	lettuce	melon	onion	pea	pepper (bell)	spinach	squash	sweet corn	tomato	watermelon
Bactericides																		
streptomycin sulfate (AS-50® Agricultural Streptomycin)	halo blight	✓																
Fungicides																		
azoxystrobin (Dynasty® Fungicide)	seedborne and soilborne fungi that cause decay, damping-off and seedling blight, including species of <i>Rhizoctonia</i> and <i>Penicillium</i> , and some protection from seedborne head smut on sweet corn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
captan (Captan 4L ST Flowable Seed Treatment Fungicide)	seedborne and soilborne fungi which cause seed decay and seedling blight	✓	✓	✓		✓	✓			✓	✓	✓	**	✓	✓	✓		✓
carboxin (Vitavax® Flowable Fungicide)	seed decay, and damping-off fungi, including <i>Rhizoctonia solani</i> , seedborne head smut in sweet corn	✓														✓		
carboxin + thiram (Pro-Gro® Dust Seed Protectant)	onion smut										✓							
fludioxonil (Maxim® 4FS Fungicide)	seedborne and soilborne fungi that cause seed decay, damping-off, and seedling blights	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
iprodione (Nevado® 4F)	<i>Alternaria</i> species		✓	✓	✓						✓							
mefenoxam (Apron XL LS®)	damping-off and seed rots caused by <i>Pythium</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
mefenoxam + difenoconazole (Dividend Extreme® Fungicide)	systemic downy mildew in garden bean and sweet corn suppression of post-emergent die-back complex and damping-off															✓		
metalaxyl (Allegiance® FL Seed Treatment Fungicide)	Pythium damping-off, early season <i>Phytophthora</i> and systemic downy mildew in beans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
thiabendazole (Mertect® 340-F Fungicide)	seedling disease caused by <i>Fusarium</i> spp., Verticillium wilt of spinach, Phomopsis seed decay, seedling wilt, and damping-off of bean, Asochyta blight of pea	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓			✓
thiram (42-S Thiram Fungicide)	seed decay, damping-off and seedling blights caused by many seedborne and soilborne organisms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Insecticides																		
clothianidin (Poncho®600)	chinch bug, corn flea beetle, corn leaf aphid, cutworm, grape colaspis, seedcorn maggot, southern corn leaf beetle, southern corn rootworm, southern green stinkbug, sugarcane beetle, white grub, thrips, and wireworms															✓		
imidacloprid (Goucho® 600 Flowable)	aphids, corn flea beetle, seed corn maggot, wireworm, fire-ant, bean leaf beetle	✓			✓											✓		
Spinosad (Regard® SC Insecticide)	onion maggot and seedcorn maggot										✓							
thiamethoxam (Cruiser® 70WS)	aphids, beetles, cabbage maggots, certain seed and root maggots, flea beetles, leaf miners, whiteflies, and wireworms		✓	✓		✓					✓			✓				
(Cruiser®5FS)	wireworm, seedcorn maggot, southern corn leaf beetle, chinch bug, flea beetle, grape colaspis, white grub, black cutworm, thrips, southern green stinkbug, seedcorn beetle, sugarcane beetle, aphids, bean leaf beetle, cucumber beetle, leafhopper, leaf miner, pea leaf weevil, thrips, whitefly, and wireworm	✓					✓				✓	✓			✓	✓		✓

* Listed pathogens/pests may not be applicable to all crops on which a product is registered. Consult individual product labels for more information. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. ** California Wonder