



Post-Harvest Pest Control for Organic Grain Storage

Guidance

Post-harvest pest control is the prevention of pests from coming into contact or impacting the quality of a raw organic agricultural commodity after it has been harvested and before processing. Control of these pests is important not only for food safety and sanitary reasons but also to eliminate waste and lost profits due to loss of product.

NOP REGULATIONS AND PCO POLICY

The Crop Pest, Weed, and Disease Management Practice Standard at §205.206 requires that producers must first use management practices to prevent crop pests, weeds, and diseases. These problems may then be controlled through mechanical or physical methods. When preventative management practices are insufficient to prevent or control crop pests, weeds, and diseases, a biological or botanical substance or a substance included on the National List of synthetic substances allowed for use in organic crop production may be applied to prevent, suppress, or control pests, weeds, or diseases. The conditions for using the substance must be documented in the organic system plan.

ADDITIONAL INFORMATION

PHYSICAL/MECHANICAL PREVENTION

Physical/Mechanical prevention practices should be the first option in regards to post-harvest pest management. Factors such as temperature, moisture, humidity, storage time, cleanliness, etc. all have an impact on the ability to prevent pests from coming into contact with stored crops.

Preventative management practices include the following:

- Ensure storage bins are clean and sealed. Proper housekeeping and removal of weeds, trash, or moldy grain in and around the bin, aeration ducts, and auger trenches will help to eliminate an environment where insects can thrive. Ensure that all openings of the bin are sealed in order to provide a barrier against insect entry at all locations below the roof eaves.
- When loading grain, ensure that it is clean and dry. High levels of moisture in the grain will create the potential for insects and mold growth. Foreign materials should be removed from the grain to the best of your ability. Also, keeping the stored grain surface relatively level will be easier to manage and help to prevent temperature changes during storage.
- Maintain grain temperature and moisture levels. Grain temperature should be below 60°F to control insects and mold. Grain temperatures should be reduced to the optimum storage level as early as possible following harvest, and grain temperature should be managed by aeration of grain in the fall, winter, and early spring. Aeration will also help to reduce grain moisture content and prevent moisture migration equalizing grain temperature and moisture throughout the bin.
- Monitor stored grain conditions. Use a grain thermometer to keep track of grain temperature and implement a regular grain sampling and monitoring plan. Aerate and turn detected hotspots.

APPLICATION OF APPROVED POST-HARVEST MATERIALS

If physical and mechanical prevention is not sufficient to prevent or control crop pests, weeds, and diseases, a biological or botanical substance or a substance included on the National List of synthetic substances allowed for use in organic crop production may be applied to prevent, suppress, or control pests, weeds, or diseases. Approved post-harvest materials may be applied differently depending on the material used, type of pest, or type of crop being stored.

- A coarse spray of an approved material may be applied to empty bins in order to eradicate existing pests and prevent pest entry.
- A grain “protectant” is an insecticide that can be applied to the bulk grain as it goes into a storage bin. This treatment offers protection for about one season and can be considered if the grain is to be held for more than six months.
- When a “protectant” is not used, a surface dressing may be applied to prevent insects from entering the top of the grain mass and to control surface infestations of Indian meal moth.

Label instructions for each specific post-harvest material will provide direction for proper application of that product.

RESTRICTIONS

It is important to note that following restriction applies to the use of most post-harvest pest control materials:

Pesticide. May be used if preventative, mechanical, and physical management practices provided for at §205.206(a)-(d) are insufficient to prevent or control crop pests, weeds, and diseases. The operator must document conditions for using the substance in organic system plan.

APPROVED INPUTS

When preventative physical/mechanical methods are not enough to prevent pests from infiltrating storage bins, approved post-harvest materials may be used. In order for a post-harvest material to be allowed under the National Organic Program regulations, the active ingredients must either be a synthetic specifically listed at §205.601 for post-harvest use or listed at §205.605 and meet applicable annotations, or be a non-synthetic not listed at §205.602. Currently, no synthetic ingredients are listed at §205.601 for post-harvest pest control. Inert ingredients in post-harvest pest control materials must either be allowed at §205.601(m) or a non-synthetic substance not restricted or prohibited at §205.602. Please note: even though a pesticide may be allowed for use in the field on organic crops does not always mean it will be allowed for post-harvest use, as the pesticide must meet additional specific criteria to be allowed for post-harvest use.

All inputs must be reviewed and approved by PCO prior to use, so be sure to check with us or consult a current PCO Approved Materials List, OMRI, or WSDA list prior to purchasing or using a product. PCO does not endorse any of the products listed in this guidance document. This is not an all-inclusive list and other inputs may be allowed. Please contact PCO if you have any questions on materials or restrictions.

Approved materials labeled for post-harvest pest control include the following non-synthetic active ingredients:

- **Pyrethrin/Pyrethrum.** Derived from the chrysanthemum flower, pyrethrin disrupts the sodium and potassium ion-exchange process in insects resulting in an immediate “knockdown” effect and insect death. This material degrades rapidly under sunlight, air and moisture and has a relatively low mammalian toxicity. Pyrethrin controls a wide range of insects and mites including flies, fleas, beetles, and spider

mites. Examples of approved products include: PyGanic Crop Protection EC 1.4/5.0 II and EverGreen Pyrethrum Concentrate by MGK.

- **Azadirachtin.** Derived from the tree *Azadirachta Indica*, it works as a feeding deterrent, insect-growth regulator, repellent, and sterilant. Azadirachtin has an extremely low mammalian toxicity and is the least toxic of the commercial botanical insecticides. It is active on a broad range of insects, including stored grain pests, aphids, caterpillars and mealybugs. Examples of approved products include: General Hydroponics Amax Botanical Insecticide / Matricide / Nematode by General Hydroponics.
- **Sabadilla.** Derived from the seeds of plant *Schoenocaulon Officinale*, sabadilla works by affecting nerve cell membranes, causing loss of nerve function, paralysis, and death. It is one of the least toxic botanical insecticides and degrades rapidly in sunlight and moisture. Sabadilla is effective against caterpillars, leaf hoppers, thrips, stink, and squash bugs. Examples of approved products include: Veratran D by MGK.
- **Spinosads.** Derived from the soil actinomycete, *Saccharopolyspora Sinosa*, spinosad targets binding sites on nicotinic acetylcholine receptors leading to disruption of neurotransmission. Spinosad is recommended for the control of a wide range of caterpillars, leaf miners and foliage-feeding beetles. Examples of approved products include: Entrust Naturalyte Insect Control by Dow Agrosciences, Monterey Garden Insect Spray by Lawn and Garden Products, and Seduce Insect Bait by Certis USA.
- **Bacillus Thuringiensis.** A soil dwelling bacterium that forms insecticidal endotoxins that affect the insect gut causing starvation and death. This material has a low toxicity in humans and is most effective on moths, butterflies, flies, mosquitoes, beetles, wasps, ants, sawflies, and nematodes. Examples of approved products include: Dipel DF and Gnatrol WDG Biological Larvicide by Valent BioSciences Corp., Agree WG Biological Insecticide by Certis USA, Monterey B.t. RTU Biological Insecticide by Lawn and Garden Products.
- **Diatomaceous Earth.** A naturally occurring sedimentary rock that is crumbled into a fine white powder. The surface of each particle of diatomaceous earth is very sharp on a microscopic level, and these sharp edges cut into pest as they feed or move over the grain, causing them to desiccate. Examples of approved products includes: DiaSource Diatomaceous Earth by DiaSource Inc., Perma Guard D 10 Grain or Seed Storage Insecticide by Perma-Guard Inc., LastCrawl Diatomaceous Earth by Keystone Mills, etc.