The Guide to
Seed Treatment Stewardship

Seed Treatment
Application

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CropLife AMERICA

DISCLAIMER

The Seed Treatment Stewardship Guide is intended solely as an educational tool and as general guidance to assist growers in voluntarily developing and implementing stewardship practices related to the use of treated seed. This Guide is intended to serve as a reference document only. Entities may choose to refer to the entire Guide or specific sections of the Guide as appropriate. The guidance is intended to be flexible, and its application will differ according to the products involved and size, nature and complexity of the entity using the guidance. The Guide is representative and not exhaustive.

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Overview of Seed Treatment

Seed Treatments as a Part of U.S. Agriculture

The use of seed treatment technologies by farmers is an effective tool to provide the necessary protection of seeds for a strong, healthy start. Using seed treatments delivers a very precise application that shields seeds from the insects and diseases that exist in the soil during those early developmental stages. This protection ensures that the plant has a greater opportunity to grow a strong root system which is the foundation of a healthy, productive plant.

In addition, seed treatments reduce the environmental impact of the production process by decreasing the number of spray applications of agrichemical products and lessening exposures to non-target species, including humans and pollinators. Seed treatments can guard against insect or disease damage during a plant's most vulnerable developmental stages and help maximize the performance potential of each seed. The industry is constantly evolving to improve seed treatment processes. Seed treatments have been used for decades and thanks to advances in the technology, only milligrams of active ingredient are now used per individual seed.

Definition of Seed Treatment

Seed treatment is the application of biological organisms/products and chemical ingredients to seed to suppress, control, or repel plant pathogens, insects, or other pests that attack seeds, seedlings or plants. Other products such as inoculants, herbicide safeners, micronutrients, plant growth regulators, seed coating materials, colorants, etc. may also be applied to the seed. Treated seed is intended for planting and may not be used for food, feed, or oil purposes.

This Guide is geared specifically to those who apply seed treatments. If you are planning to plant treated seed, refer to the **ASTA-CLA Guide to Handling, Planting and Disposal of Treated Seed**.

Highlights

It is essential to educate those who treat, handle, transport and plant the seed to help ensure that seed treatment solutions result in success for everyone involved. Some of the critical factors that seed treatment applicators need to consider are:

1. Comply with all regulations for registered pesticide products and ensure proper employee training.
2. Establish written application protocols using best practices to ensure high quality seed treatment application to minimize dust off.
3. Adopt stewardship documentation for the full life-cycle of seed treatment products.
4. Properly discard of treatment, treated seed and rinse water to minimize environmental impact.
5. Ensure that all required and pertinent seed treatment information is conveyed to customers through product labels and education."

SECTION 1:

Selection of Treatment Products

Application of seed applied technologies (SAT) can include fungicides, insecticides, nematicides, plant health products, inoculants, micronutrients, herbicide safeners, plant growth regulators and other biologically active materials to seed. SAT may also include other materials such as colorants, polymers, coating materials, drying agents, water, etc. to provide suitable appearance, physical properties, process performance and other factors. [For purposes of this document the complete list of active & non-active ingredients applied to a batch of seed will be referred to as a "seed treatment recipe."] Selection of individual products and recipes should be based on an evaluation of data demonstrating efficacy, seed safety, application characteristics and plantability of the treated seed.

I. Manufacturer / Consultant Recommendations

- Contact manufacturers of seed treatment products regarding information for users on product efficacy, compatibility with other products, seed safety data, seed flowability, coverage and visual appearance, plantability of treated seed, product dust-off, application limitations (air and seed temperature), humidity considerations, drying requirements, registration, etc.
- Depending on in-house expertise, reputable consultants with specialized understanding of seed treatment products and application technology may be needed to help develop seed treatment recipes.

II. Seed Treatment Recipes may include individual products, custom blends, and/or Ready-to-Use Seed Treatment Products

- A seed treatment recipe is the combination of all the registered and unregistered treatment products identified by a manufacturer, seed company, or other entity for a specific purpose on a crop. The components may be sourced from one or multiple manufacturers. The products may be combined in a slurry on site prior to application or pumped individually into the treating equipment. Each recipe should be evaluated and verified to be suitable for each crop.
- Custom blends are mixtures of independently registered products blended together by manufacturers or distributors for applicators to reduce the number of products that need to be combined on site.
- Ready-to-Use products are commercially marketed pre-mixtures of registered seed treatment products designed to properly treat seed, typically without the use of additional components other than water.
  - Manufacturers should provide the data to demonstrate the performance of these "Ready-to-Use" formulations.
  - If other active components are added to a "Ready-to-Use" product, then it becomes a custom seed treatment recipe and will need to be fully verified.

III. Determining Efficacy

- Consult product labels for crop registration, pests controlled, application rates, active ingredient, and any use restrictions.
- Use only recommended rates to control target pests listed on the label.
- Contact the manufacturers and/or conduct field trials to verify efficacy of seed treatment components intended for use in the final recipe using representative seed genetics.

IV. Seed Safety and Human & Environmental Safety

- Seed germination and vigor may be affected by any one component or the combination of the components in a seed treatment recipe.
- Contact the manufacturers for verification of seed safety for the specific recipe and/or conduct trials prior to commercial planting of treated seed. Either verify or conduct a seed storage study equivalent to typical commercial storage times for treated seed.
- Understand the human and environmental issues/restrictions regarding the application of all products and planting of treated seed.

V. Application Requirements and Process Verification

- Determine if the treatment equipment to be used for the application of the product/recipe is appropriate or will require modifications and/or upgrading.
- Test runs of the specific recipe should be conducted in small-scale application equipment and/or commercial equipment. Specifically note:
  - Product compatibility issues
  - Application rates and treating throughput
  - Product drying characteristics and build up on equipment
  - Treated seed flowability, caking or clumping
  - Seed coverage and appearance
  - Plantability in appropriate equipment types
  - Dustiness of treated seed
  - Document all observations to facilitate commercial seed treatment start up
- Note: Manufacturers and/or consultants may be aware of existing processes for the application of the specific treatment recipe in other similarly equipped commercial operations that can potentially serve as a road map when testing and commercializing a new recipe.

VI. Export Considerations

- Each country has its own regulations regarding the importation and planting of treated seed. Always verify that the seed treatment products to be applied meet the regulations of the importing country before application.
- Be sure to document all products applied to the seed for export.

VII. Intellectual Property

- Clarify any freedom to operate issues concerning the sale and use of all seed treatment products and combinations of products with the manufacturer.

SECTION 2:

Application of Seed Applied Technologies

The quality of the treatment application process is dependent on the quality of the seed prior to treatment (seed integrity, dustiness), composition/quality of the seed treatment materials, the application rate on the seed, the process conditions (seed throughput, seed temperature, product temperature, air temperature/humidity, etc.), treatment protocols, the application equipment, and the skill of the operators. The following recommendations will help manage these factors for high-quality treated seed.

I. Use the full "life cycle" documentation approach for pesticide treatment products

- Establish that information accompanying receipt of the treatment components (e.g., shipping documentation, lot numbers, Material Safety Data Sheets (MSDS) for treatment components) is accessible, secure and retained, internally and/or externally, as provided by third party.
- Establish an understanding and/or agreement with third-party providers of non-active ingredients on standards for their materials being used in the treating process, including the need for data.
- Verify/inspect treatment products when received for quality and/or damage, and log any expiration dates (may require first in, first out usage).
- Develop work orders for treating seed batches: lot/batch numbers, units treated, quantity of treatments applied (reconcile with quantity of treated seed), treatment lot numbers used, application date, etc.
- Develop a documented slurry preparation procedure. Include items such as a list of components, lot numbers, the sequence for combining ingredients, the name of the mixer/loader, and preparation date.
- Record all results of quality testing completed on the treated batches of seed: coverage/appearance, flowability, plantability, dust off (Heubach or other appropriate testing protocol), seed germination and vigor, etc.
- Document treated seed sales, treated seed discard, treatment/slurry discard, rinse water discard and packaging material discard
- Maintain records of all treatment equipment calibration and maintenance.
  - Establish a documentation retention policy.

II. Personnel Training

- Establish documented training procedures for employees involved in seed treatment activities such as mixer/loaders, seed treatment equipment operators, packagers, and forklift operators. Include hazardous material handling as specified on the treatment labels, MSDSs or seed tag language as appropriate.
- Keep records of training certifications.
- Instruct personnel on selection and use of proper PPE. Individuals must always read and follow the treatment labels, the treated seed container/tag and shipping document safety instructions. PPE typically includes long pants, long sleeved shirt/coveralls, chemical resistant gloves, shoes and socks, etc.
- Also reference and use required or suggested PPE as indicated by equipment manufacturers for operation of equipment used to treat, handle or transport treated seed. Additional PPE may include eye, ear, foot, respiratory and/or head protection.
- Emergency Plan Training
  1. Have an emergency preparedness plan for unintended exposures, spills or accidents.
  2. Have any relevant emergency contact information easily accessible.
  3. In the event of emergency, call the manufacturer's Product Emergency Number.

III. Establish an Application Process

- Verify the lot/batch number of the seed to be treated and that it meets quality criteria for treating.
- Select/locate the documented recipe for the treatment products and crop.
- Determine if sufficient usable quantities of all recipe components are in stock. Verify shelf life of components where applicable.
- Verify treating equipment is capable of accurately and uniformly applying the chosen recipe to the target crop seed.
- Applicators, mixers/loaders, etc. should read and understand all product label directions and precautions, MSDSs and any supplemental manufacturer's recommendations for all components of the treating recipe. Note that following the pesticide product label application instructions is a regulatory requirement for use.
- When applying multiple registered products, comply with the most restrictive label requirements of the individual components.
- Prepare slurries, if needed.
- Ensure application equipment is free of treatment contamination from the previous batch by following a documented change over procedure when changing treatment recipes.
- Properly calibrate/adjust the treating equipment for the new seed treatment recipe.
- Periodically monitor physical properties (e.g. tackiness, seed flow, visible dust off) and appearance (e.g. uniformity, color) of treated seed during the treatment process. Also frequently inspect equipment for any buildup of treatment materials.

- Verify application rate (options include calibration verification, mass balance of applied material and seed throughput, and analysis of treated seed).
- Ensure the proper information is transferred for the container/tag language (See Section 3).
- Establish and use documented procedures for the handling, control, and proper disposal of unused slurry components, empty packaging materials, waste, and treated seed.
- Establish and follow treater cleanup procedures.

IV. Overtreatment

- Overtreatment is the application of a second seed treatment recipe to previously treated seed.
- All the procedures listed previously in this section are applicable.
- Compatibility with the original treatment actives needs to be verified.
- If the overtreatment contains any of the same active ingredients in the original application, the total amount cannot exceed maximum label rates.
- Note: Overtreatment can also impact the seed integrity and/or the seed to seed distribution of the original treatment. Therefore a one time application of all seed treatment products is the preferred process.

V. Handling Treated Seed

- Avoid personal exposure to dust when filling or opening/emptying packaged treated seed or transferring bulk treated seed.
- Properly dispose of any spillage to minimize exposure to people, livestock, wildlife, and the environment.
- Ensure handlers are aware of all seed treatment safety and stewardship label and bag/tag language.

VI. Transporting Treated Seed

- Ensure that seed treatment tag language is printed on or attached to the treated seed containers/packages or is contained in shipping documents for bulk treated seed.
- Protect treated seed from direct sunlight, extreme heat and moisture.
- Avoid undue mechanical abrasion and damage to the treated seed and packaging to minimize seed treatment dust-off, maintain seed quality, and to reduce spillage.
  - In case of spills, collect the treated seed immediately.
  - Properly dispose of spillage to minimize exposure to humans, livestock, wildlife, and the environment.

SECTION 3:

Treated Seed Labeling

The Federal Seed Act (FSA) mandates that treated seed containers have labels that provide information to allow seed customers and handlers to make informed choices and to adhere to "best management practices" for use. The U.S. Environmental Protection Agency (EPA) may specify additional information on the seed tag, via instructions on the labels of seed treatment products registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

I. Treated Seed container/tag language:

- Every container of treated seed must be labeled per regulations promulgated under the FSA "Not to be used for food, feed or oil purposes," along with the identity of the active ingredients used to treat the seed.
- Additional bag/tag language may be required as specified in the EPA-approved seed treatment product label.
- Note that all seeds treated with chemical pesticides, except for hopper planter box application, must be colored with an "EPA approved dye or colorant that imparts an unnatural color to the seed" [40 CFR §153.155(c)]. Additional local, state and federal requirements may apply.
- Instructions and requirements for the safe use of seed treatment products and safe handling and transport of treated seeds are detailed on the treatment product label. Label language requirements for storage and transportation of treated seed must be added to the treated seed container/tag or shipping documents for bulk seed.

SECTION 4:

Storage of Seed Treatment Products and Treated Seeds

I. Seed Treatment Product Storage:

- Follow local and state regulations for facility construction requirements including a well-ventilated space that is and equipped for adequate containment of seed treatment products in the event of spillage/leakage of containers.
- Follow product label instructions for storage and container disposal requirements.
- Documentation involving emergency response procedures and contacts including the MSDS or SDS for all seed treatment products and/or other chemicals held in storage should be available.
- Pesticides must be kept secure from children, livestock, wildlife, and unauthorized persons.

II. Treated Seed Storage:

- Treated seed needs to be protected from extreme temperatures and moisture therefore the facility should have good ventilation, block direct sunlight, and be dry.
- Treated seed should be secure from children, livestock, wildlife, and unauthorized persons.

SECTION 5:

Discard of Seed Treatment Products and Treated Seeds

I. Disposal of Rinse Water from Seed Treatment Equipment

- Do not dump rinse water to soil, ground water, surface water, or septic systems.
- Minimize rinse water - wash out equipment only when necessary.
- Re-use rinse water if possible to dilute the next batch of formulation but only if using the same seed treatment recipe. Factor in the potential for increased concentration of active ingredient, if significant amounts of rinse water are used.
- Excess rinse water may be applied as a pesticide application to a field site for which the active ingredient is registered only if the applied concentration does not exceed the label recommendation.

II. Disposal of Pesticide-Treated Seed

- Consult with your state and local authorities to ensure that your disposal plan is in compliance with all appropriate regulations.
- Disposal facilities will be required to have an EPA permit to dispose of pesticides, pesticide contaminated rinse water, or pesticide treated seed. Whether a facility has the proper permits to dispose of a "particular pesticide" can only be determined by directly contacting the specific facility.
- High Temperature Incineration by a Waste Management Facility
  - These facilities are in the disposal business but confirmation of the proper permits is still needed.
- Alternative Fuel Source for Power Plants or Cement Kilns
  - There are a variety of power plants that utilize alternative fuels, such as biomass, municipal solid waste, or non-fossil waste.
- Alternative Fuel Source for Ethanol Plants
  - Properly permitted ethanol plants can use treated seed as an alternate power source.
  - A very limited number of ethanol plants have permits to ferment treated seed but the distiller's grain cannot enter the food or feed channels.
- Disposal in an Approved Municipal Landfill
  - Disposal in approved municipal landfills is permitted in some states depending the specific products used to treat the seed.
  - Determine if the treated seed, and the resultant seed dust, are federally classified as hazardous wastes under Federal Regulation Title 40--Protection of Environment, Chapter I- Environmental Protection Agency, Subchapter I-Solid Wastes, Part 261 Identification and listing of Hazardous Waste (40 CFR.261). Note that some states may have more stringent regulations than others. In addition, treated seed, and resultant seed dust, are subject to solid waste regulations at the state and local levels. Always check state and local regulations prior to disposing of treated seed or dust.
- The contacts for both solid and hazardous waste disposal in each state can be found **here**.

RESOURCES:

Disclaimer:
The external links provided in this guide are intended for use as additional, external supplementary resources for the reader. Neither the American Seed Trade Association nor CropLife America can be held liable for the information found outside the scope of this document.

Click on icon to visit link

EPA links

- Environmental Protection Agency General
- Environmental Protection Agency – Label Review Manual – Chapter 18: Unique Product
- Pesticide Labeling Questions
- Apply Pesticides Correctly, a Guide for Commercial Applicators
- Wastes-Hazardous Wastes
- Federal Insecticide, Rodenticide and Fungicide Act (FIFRA)
- Federal Regulation Title 40 – Protection of Environment, Chapter I – Environmental Protection Agency, Subchapter I-Solid Wastes, Part 261 Identification and listing of Hazardous Waste
- State Sites for Solid and Hazardous Waste

USDA links

- USDA Home page
- Agricultural Marketing Service-Seed Regulatory and Testing Services

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Seed Law/Regulations

- Federal Seed Act (FSA)
- State Seed Laws
- Association of American Pesticide Control Officials
- Association of American Seed Control Officials
- Recommended Uniform State Seed Law (RUSSL)

Stewardship Resources

- The Pesticide Environmental Stewardship Website

Training Resources

- PERC (Pesticide Education Resources Collaborative)
- National Partnership for Safe & Effective Pesticide Management
- The American Association of Pesticide Safety Educators

Disposal Resources

- The Pesticide Stewardship Alliance (TPSA) state pesticide disposal resources
- The Pesticide Environmental Stewardship Website

Labeling links

- CDMS
- Agrian

Association Resources

- Ag Retailers Association
- American Seed Trade Association
- Association of American Pesticide Control Officials
- Association of American Seed Control Officials
- Association of Equipment Manufacturers
- CropLife America
- National Association of State Departments of Agriculture
- Pollinator Partnership

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