Protecting Consumers and Workers: The ABCs of Pesticide Registration and Regulation

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Overview

• Federal law.
• An overview of the registration process.
• Determining safe levels of human exposure.
• Protecting workers and consumers.
• The pesticide label.
• Summary.
Sources


• EPA’s Office of Pesticide Program’s website: www.epa.gov/pesticides
Federal Law

• Two applicable laws:
  1. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); and
FIFRA

• Federal Insecticide Act was enacted in 1910.
• FIFRA was first enacted in 1972 where pesticide regulation was transferred from USDA to EPA.
• Amended in 1988.
• Amended again in 1996 with the passage of the Food Quality Protection Act (FQPA), where it passed the House on a 417-0 vote and in the Senate by unanimous consent.
FIFRA Provisions

- Requires all pesticides sold or distributed in the U.S. (including imported pesticides) to be registered by EPA. Registration is based on evaluation of scientific data and assessment of risks and benefits of a product's use.
- Label directions control how products are used and are a reflection of a product’s risk assessment. THE LABEL IS THE LAW!
- EPA has broad authority to suspend or cancel a product's registration.
- Training is required for workers in pesticide-treated areas and certification and training for applicators of restricted use pesticides.
FFDCA Provisions

• Requires EPA to set pesticide tolerances (Maximum Residue Levels or MRLs) for all pesticides used in or on food or in a manner that will result in a residue in or on food or animal feed.

• The MRL or tolerance is the maximum permissible level for pesticide residues allowed in or on human food and animal feed.

• Requires EPA to establish strong provisions for protecting infants and children, as well as other sensitive subpopulations.
FQPA of 1996

• Amended both FIFRA and FFDCA.
• Requires EPA to find that a pesticide poses a "reasonable certainty of no harm" before it can be registered for use on food or feed.
• Requires EPA to review each pesticide registration at least once every 15 years.
FQPA of 1996

- Requires EPA to address several factors before a tolerance can be established, including:
  - The aggregate exposure through diet and drinking water and from using pesticides in and around the home;
  - The cumulative effects from exposure to pesticides that have a common mode of action. That is, two or more pesticide products that cause a common toxic effect(s);
  - Whether there is increased susceptibility to infants and children, or other sensitive subpopulations, from exposure to the pesticide; and
  - Whether the pesticide produces an effect in humans similar to an effect produced by a naturally-occurring estrogen or produces other endocrine-disruption effects.
Pesticide Registration

• The process of registering a pesticide is a scientific, legal, and administrative procedure where EPA examines:
  ➢ The ingredients of the pesticide;
  ➢ The particular site(s) or crop(s) where it is to be used;
  ➢ The amount, frequency, and timing of its use; and
  ➢ Storage and disposal practices.
Pesticide Registration

• 150+ required studies.
• Data and development costs typically exceed $250 million.
• EPA needs 2+ years to review all of the data.
• At the end of the process, EPA either approves or denies the registration.
• Issuance of an approved label and the establishment of corresponding MRLs is the final stage of the process.
Risk Assessment at EPA

- Risk = Toxicity x Exposure
- EPA assesses both acute (short-term) and chronic exposure.
- Aggregate risk = Residues in food + Residues in water + Nonoccupational exposures
EPA starts with Mice
Mouse Feeding Studies – An Example

- Mice are fed different doses of a pesticide:
  1. 25 milligrams/kg of bodyweight – normal mice.
  2. 50 milligrams/kg of bodyweight – normal mice.
  3. 75 milligrams/kg of bodyweight – normal mice.
  4. **100 milligrams/kg of bodyweight** – something changes, but no adverse effects.
  5. 125 milligrams/kg of bodyweight – adverse changes are observed.
Mouse Feeding Studies

- The 75 milligram is called the No Observed Effects Level or NOEL.
- The 100 milligram dose is called the No Observed Adverse Effects Level or NOAEL.
- The 125 milligram dose is called the Lowest Observed Adverse Effects Level or LOAEL.

EPA uses the NOAEL as the starting point for determining safe levels of exposure for consumers. The NOAEL is defined as the highest dose in a toxicity study at which no adverse health effect is seen.
Uncertainty or Safety Factors

- EPA regulations require the use of two 10X safety or uncertainty factors to determine safe levels of exposure for consumers.
  1. One 10X safety factor is used to account for differences within species (intraspecies).
  2. One 10X safety factor is used to account for differences between species (interspecies).
- In some cases, the law requires EPA to apply an additional 3-10X safety factor to account for data gaps in a product’s toxicity database or to protect infants and children.
Uncertainty or Safety Factors

Here’s how it works:

- EPA divides the NOAEL by the first 10X safety factor to account for differences within species.
- EPA then divides this number by the second 10X safety factor to account for differences between species.
Uncertainty or Safety Factors

In our example:
- The NOAEL of 100 is divided by 10 to equal 10.
- This dose is divided by 10 again to equal 1.
- EPA calls the 1 milligram dose the Reference Dose or Average Daily Intake.
Reference Dose

- The RD is the amount of this pesticide that people can safely eat daily over a 70-year lifetime.
- The RD is 100 times below the dose that causes no effects in a lab animal.
- EPA also calls the RD the “risk cup.”
The Risk Cup

All labeled crops go into the risk cup

When the risk cup is full, no more crops can be added to the label.

When the risk cup overflows, crops must be taken off the label or label mitigation must occur.
The Risk Cup
The Risk Cup

EPA calculates the space in the risk cup occupied by each crop by using residue studies and consumption data provided by USDA, FDA and the National Health and Nutrition Survey. For example, if apples and artichokes are on the label:

- Apples are heavily consumed and take up a lot of space in the risk cup.
- Artichokes are not heavily consumed and take up almost no space.
But there’s more......

- EPA determines safe levels of exposure by regulating at the 99.9\textsuperscript{th} percentile of consumption.
- What does this mean?
99.9\textsuperscript{th} Percentile of Consumption
99.9\textsuperscript{th} Percentile of Consumption

Extreme Eaters:

- Toddler who consumes a half gallon of apple juice everyday or 4 pounds of table grapes.
- EPA assumes that everything they consume has residues at the maximum allowed level.
Tiered Risk Assessments

- **Tier 1**: Worst case assessment assumes:
  - 100% of the crop is treated.
  - Residues remain on the entire crop at maximum levels.

- **Tier 4**: Highly refined assessment utilizes:
  - Actual % crop treated data.
  - Actual residue levels from USDA’s Pesticide Data Program and FDA’s monitoring data.
  - Residue decline studies.
PDP – Imidan (Phosmet)/Apples

• 2016 data:
  ➢ 17 detections out of 531 samples.
  ➢ Tolerance or MRL for Imidan is 10 ppm.
  ➢ Highest detection was 0.49 ppm, 20+ times below the tolerance and at least 2,000 times below the NOAEL.
  ➢ Lowest is 0.022 ppm.
Tolerances or MRLs

• The tolerance or MRL is the amount of pesticide residue allowed to remain in or on each treated food commodity.
• When products are applied according to label directions, actual residues are unlikely to exceed this level.
• Residues found above the tolerance triggers enforcement actions that includes seizure and destroying of the commodity.
• In setting the tolerance, EPA must make a safety finding that the pesticide can be used with "reasonable certainty of no harm."
U.S. Standards

- Largely copied throughout the world.
- High level of protection and safety for consumers.
- Actual exposure levels are tens of thousands (or millions) of times below the NOAEL.
Protecting Workers

• Workers in a number of occupations may be exposed to pesticides when they:
  ➢ Prepare pesticides for use, such as by mixing a product with water or when loading the pesticide into application equipment. (Mixers/loaders)
  ➢ Apply pesticides. (Applicators)
  ➢ Enter an area where pesticides have been applied to perform tasks, such as picking crops. (Reentry workers)
  ➢ Bystanders.
WPS Protected Employees

- Agricultural workers are those who perform tasks related to growing and harvesting plants on farms or in greenhouses, nurseries or forests and includes workers who:
  - Mix, load or apply agricultural pesticides;
  - Clean or repair pesticide application equipment;
  - Assist with the application of pesticides;
  - Reentry workers to include hand thinners; or
  - Flaggers and others who assist with the application of products
- Agricultural workers also includes those who are employed for any type of compensation (including self-employed) doing tasks such as:
  - Carrying nursery stock, repotting plants and watering; or
  - Other tasks directly related to the production of agricultural plants on an agricultural establishment.
Protecting Workers

• EPA conducts risk assessments to determine regulations needed to protect workers.

• EPA evaluates various agricultural tasks where pesticides are used. There must be a 100-fold “margin of exposure” between a known endpoint and each task.
Protecting Workers

• MOEs less than 100 must be mitigated through various label requirements until MOEs exceed 100. These requirements include:
  ➢ Enhanced personal protective equipment;
  ➢ Closed systems;
  ➢ Water soluble packaging;
  ➢ Prohibiting certain cultural practices that require contact with treated surfaces:
    ✓ Hand thinning apples; or
    ✓ Summer pruning.
Worker Data

• Agricultural Handlers Exposure Task Force
  ➢ Formed in 2001 by 28 companies to satisfy FIFRA requirements. The TF designed and developed a database on exposure of agricultural workers during the mixing, loading, application of pesticides and reentry workers. The data covers all types of mixing/loading systems, types of application equipment and types of formulations.
Worker Data

• Outdoor Residential Exposure Task Force

Formed in 1994 by 30 agricultural chemical companies to satisfy FIFRA data requirements on exposure of homeowners and professional lawn care operators during the application of pesticides; and exposure to individuals who enter a residential turf area following a pesticide application. The exposure data was used to assess exposure potential and conduct risk assessments for outdoor residential turf, garden and ornamental pesticide products.
Pesticide Data

• All data and studies are publicly available at:
  ➢ http://npirspublic.ceris.purdue.edu/ppis/
Measures to Protect Workers

• Label language that:
  ➢ Reduces application rates;
  ➢ Changes use directions;
  ➢ Lengthens the restricted-entry interval;
  ➢ Requires engineering controls, such as use of closed systems for mixing and loading; and
  ➢ Requires specific personal protective equipment, such as gloves, masks, and respirators.
Ag Worker Protection Standard

• On November 2, 2015, EPA revised the WPS to implement more protections for agricultural workers, handlers and their families.

• Most of the revised WPS requirements became effective on January 2, 2017.
WPS Requirements

• **Employers must provide:**
  - Pesticide safety training for workers and handlers.
  - Access to specific information for workers and handlers, including:
    - pesticide applications on the establishment;
    - safety data sheets for pesticides applied on the establishment; and
    - pesticide safety information (poster) that includes emergency information.
  - Access to labeling information for pesticide handlers and early-entry workers.
  - Notify workers about pesticide-treated areas so they can avoid inadvertent exposures.
WPS Requirements

• Requires employers to:
  ➢ Keep workers and other people out of areas being treated with pesticides.
  ➢ Keep workers and other people away from pesticide application equipment during applications.
  ➢ Suspend applications if workers or people are near pesticide application equipment during applications.
• Keep workers out of areas that are under a restricted-entry interval (REI).
• Protect early-entry workers who are doing permitted tasks in pesticide-treated areas during an REI, including special instructions and duties related to correct use of personal protective equipment.
• Monitor handlers using highly toxic pesticides.
WPS Requirements

- Requires employers to:
  - Provide and maintain required personal protective equipment to handlers.
  - If a respirator is required by a pesticide label, provide the handler with a medical evaluation, fit test and respirator training.
  - Provide decontamination supplies including a sufficient supply of water, soap and towels for routine washing and emergency decontamination and eyewash systems for certain handlers.
  - Emergency assistance by making transportation available to a medical care facility in case of a pesticide injury or poisoning, and providing information about the pesticide(s) to which the person may have been exposed.
The Label is the Law!
The Label is the Law

• All labels are publicly available at:
  ➢ http://www.cdms.net/LabelsSDS/home/
  ➢ https://home.agrian.com/
ALTACOR® is a water dispersible granule.

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>By Weight</th>
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<tbody>
<tr>
<td>Chlorantraniliprole</td>
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<tr>
<td>3-Bromo-N-[4-chloro-2-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide</td>
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<table>
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<tr>
<th>Other Ingredients</th>
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<tbody>
<tr>
<td>TOTAL</td>
<td>100.0%</td>
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</table>

EPA Reg. No. 352-730

Nonrefillable Container
Net: ____________

OR

Refillable Container
Net: ____________

E. I. du Pont de Nemours and Company
Chestnut Run Plaza, 974 Centre Road
Wilmington, DE 19805
Phone: 1-800-441-7515 (Toll Free)

Not for sale, sale into, distribution and/or use in Nassau, Suffolk, Kings, and Queens counties of New York State.

PRECAUTIONARY STATEMENTS
KEEP OUT OF REACH OF CHILDREN
DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
DuPont™ ALTACOR® insect control, also referred to below as DuPont™ ALTACOR®, ALTACOR® Insect Control or ALTACOR®, must be used only in accordance with the directions on this label, in separate EPA-approved labeling or exemptions under FIFRA (Supplemental Labels, Special Local Need Registrations, FIFRA Section 18 exemptions, FIFRA 2(2c) Bulletins), or as otherwise permitted by FIFRA. Always read the entire label, including the Limitation of Warranty and Liability.

RESTRICTIONS

• This product is only for commercial use.
• Not for residential use.
• Not for use on ornamental plants or plants being grown for ornamental purposes.
• May be used on crops on this label grown for seed production.
• Do not use in greenhouses.
• Do not apply ALTACOR® through any irrigation system unless specified in the crop section of this label or in EPA approved supplemental labeling.

New York State Only:
The following restrictions are required to permit use of ALTACOR® Insect Control in the State of New York:
• This product may not be applied within 100 feet of a water body (lake, pond, river, stream, wetland, or drainage ditch).
• Aerial application of this product is prohibited.
• Not for sale, sale into, distribution and/or use in Nassau, Suffolk, Kings, and Queens counties of New York State.

AGRICULTURAL USE REQUIREMENTS

ALTACOR® insect control must be used only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on the label about personal protective equipment, restricted-entry interval, and notification to workers (as applicable).

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

For early entry into treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, wear:
• Long-sleeved shirt and long pants
• Shoes plus socks
PRECAUTIONARY STATEMENTS

KEEP OUT OF REACH OF CHILDREN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID

For questions regarding emergency medical treatment, you may contact 1-800-441-3637 for information.

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

When used as directed this product does not present a hazard to humans or domestic animals.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear:

  Long-sleeved shirt and long pants.
  Shoes plus socks.

After the product has been diluted in accordance with label directions for use, shirt, pants, socks, and shoes are sufficient Personal Protective Equipment. Follow manufacturer’s instructions for cleaning/maintaining personal protective equipment (PPE). If no such instructions for washables are available, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

 USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
<table>
<thead>
<tr>
<th>Pome Fruits, (EPA Crop Group 11-10), Including: Apple; Crabapple; Loquat; Mayhaw; Pear; Pear, oriental; Quince</th>
<th>Green fruitworm</th>
<th>0.055 - 0.088</th>
<th>2.5 - 4.0</th>
<th>5</th>
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<tbody>
<tr>
<td></td>
<td>Spotted tentiform leafminer</td>
<td>Western tentiform leafminer</td>
<td>0.055 - 0.099</td>
<td>2.5 - 4.5</td>
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<td>Apple maggot*</td>
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<td>Western</td>
<td>U.S. States†:</td>
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<td></td>
<td>Codling moth**</td>
<td></td>
<td>U.S. States†:</td>
<td>3.0 - 4.5</td>
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<td></td>
<td>European apple sawfly</td>
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<td></td>
<td>European corn borer</td>
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<td></td>
<td>Light brown apple moth</td>
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<td></td>
<td>Obliquebanded leafroller***</td>
<td>Western</td>
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<td></td>
<td>Oriental fruit moth</td>
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<td></td>
<td>Pandemis leafroller</td>
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<td></td>
<td>Plum curculio*</td>
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<td></td>
<td>Redbanded leafroller</td>
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<td></td>
<td>Tufted apple bud moth</td>
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<td></td>
<td>Variegated leafroller</td>
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<td></td>
<td>White apple leafhopper*</td>
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Do not apply more than 9 oz ALTACOR® or 0.2 lb a.i. of chlorantraniliprole containing products per acre per calendar year. The minimum interval between treatments is 10 days.

** Spray Volume:** Thorough coverage is essential. Select a spray volume appropriate for the size of trees and density of foliage.

Do not apply dilute applications of more than 200 gal water per acre. For best results apply 100 - 150 gal water per acre.

Do not apply less than 30 gal water per acre by ground.

Effect on beneficial insects - Beneficial insects such as predators or parasitoids are an important component in pome fruit IPM. ALTACOR® has demonstrated low to no impact on the predator *Deraeocoris brevis* and key parasitoids, *Aphelinus mali*, *Aphytis spp.*, and *Encarsia spp.* This low impact is very important in preservation of biological control of pear psylla, San Jose scale and wooly apple aphid when ALTACOR® is applied early season for control of first generation codling moth.

* Suppression only.

** Codling Moth:** Make first application prior to egg hatch. Each application provides 10 to 17 days of protection depending on intensity of codling moth pressure and rate of fruit growth. Applications with an
<table>
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<tr>
<th>Crops</th>
<th>Insects</th>
<th>DuPont™ ALTACOR® Rate Per Acre</th>
<th>Last Application Days to Harvest</th>
<th>REI (Hours)</th>
</tr>
</thead>
</table>
| Pome Fruits cont'd   | development of each generation. Higher rates in the labeled rate range may be needed for high infestation levels and/or large, dense foliage trees. **Codling Moth Resistance Management:** Do not apply ALTACOR® (or other Group 28 insecticides) more than three times to a generation of codling moth (codling moth typically has a single generation “treatment window” of 30 to 45 days). Application(s) to the next generation of codling moth must be with an effective product(s) with a different mode of action (different IRAC group number) for at least a 30 day “treatment window” before making any additional applications of ALTACOR® (or other Group 28 insecticides). **Apples - Western U.S. States:** Use the 3.0 oz/acre rate for low pressure infestations and make repeat applications on a 14 day schedule. For high pressure infestations or for orchards with a history of significant codling moth damage, apply ALTACOR® at 4.0 to 4.5 ounces per acre. Make repeat applications on a 10 to 17 day schedule. For best results in high pressure orchards, use a comprehensive management program involving ovicide treatments followed by properly timed larvicide applications at high labeled rates and shortened retreatment intervals. When using ALTACOR® in an integrated program with other codling moth insecticides, make sure the retreatment schedule is consistent with the period of effectiveness for each product used. **Pears - Western U.S. States:** Apply ALTACOR® on a 14 to 17 day schedule. For low pressure infestations use the 3.0 oz rate. For high pressure infestations or for orchards with a history of significant codling moth damage, apply ALTACOR® at 4.0 to 4.5 oz/acre. ***Obliquebanded Leafroller:** For overwintering larvae, apply in the spring (pink to petal fall stage) at first sign of active feeding. For summer generation apply just prior to or at the beginning of egg hatch. Leafroller feeding stops after ingestion of treated foliage, however, during periods of cold weather when leafrollers are inactive, it may take several days to achieve complete control. Applications with an EPA registered horticultural oil may improve performance; for specific recommendations on use of oil, consult manufacturers specific oil labels for precautions and restrictions regarding the use of oils in pome fruit. Higher rates in the labeled rate range may be needed for high infestations levels and/or large, dense foliage trees. **Obliquebanded Leafroller Resistance Management:** Only apply ALTACOR® (or other Group 28 insecticides) to one generation of obliquebanded leafroller per year. Application(s) to other generations of
Imidan® 70-W
(Water Soluble Bags)

ACTIVE INGREDIENT: Phosmet
N-(Mercaptrimethyl) phthalimide, S-(O,O-dimethyl phosphorodithioate) ............................................................. 70.0%
OTHER INGREDIENTS

TOTAL 100.0%

KEEP OUT OF REACH OF CHILDREN
WARNING-AVISO
Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID
ORGANOPHOSPHATE

IF INHALED:
• Move person to fresh air.
• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
• Call a poison control center or doctor for further treatment advice.

IF SWALLOWED:
• Call a poison control center or doctor immediately for treatment advice.
• Have person sip a glass of water if able to swallow.
• Do not induce vomiting unless told to do so by the poison control center or doctor.
• Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING:
• Take off contaminated clothing.
• Rinse skin immediately with plenty of water for 15-20 minutes.
• Call a poison control center or doctor for treatment advice.

IF IN EYES:
• Hold eye open and rinse slowly and gently with water for 15-20 minutes.
• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
• Call a poison control center or doctor for treatment advice.

HOT LINE NUMBER
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-888-478-0798 for emergency medical treatment information.

NOTE TO PHYSICIAN
This product is an organophosphate insecticide. If symptoms of cholinesterase inhibition are present, atropine sulfate by injection is antidotal. 2-PAM is also antidotal and may be administered, but only in conjunction with atropine.

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
WARNING-AVISO
May be fatal if swallowed, inhaled or absorbed through the skin. Avoid contact with eyes, skin, or clothing. Avoid breathing spray mist. Causes moderate eye irritation.
DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation. Not for use in residential areas. Use in park or recreational areas is prohibited.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow entry into treated areas during the restricted entry interval (REI). The REI for each crop is listed in the directions for use associated with each crop.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material
- Chemical-resistant headgear for overhead exposure
WARNING-AVISO
May be fatal if swallowed, inhaled or absorbed through the skin. Avoid contact with eyes, skin, or clothing. Avoid breathing spray mist. Causes moderate eye irritation.

PERSONAL PROTECTIVE EQUIPMENT (PPE)
Some materials that are chemical-resistant to this product are Barrier Laminate and Viton. If you want more options, follow the instructions for category H on an EPA chemical-resistance category selection chart.
Mixers, loaders, and applicators using engineering controls, including enclosed-cockpit aerial equipment and enclosed-cab ground equipment, and mixers, loaders, and applicators using handheld equipment or handheld nozzles must wear at least (see engineering control section of this labeling for more requirements and options):
- Long-sleeved shirt and long pants,
- Shoes plus socks,
- Chemical-resistant gloves when mixing and loading, and when applying with handheld equipment or handheld nozzles, and
- Chemical-resistant apron when mixing and loading.
Motorized ground equipment applicators not in an enclosed cab, applicators dipping pine seedlings, and handlers engaged in cleaning up a spill or leak, or cleaning or repairing contaminated equipment, must wear:
- Coveralls over long-sleeve shirt and long pants,
- Chemical-resistant gloves,
- Chemical-resistant footwear plus socks,
- Chemical-resistant headgear for overhead exposure,
- Chemical-resistant apron, if exposed to the concentrate or applying as a pine seedling dip, and
- A respirator with an organic-vapor cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH-approved respirator with an organic vapor (OV) cartridge or canister with any N, R or P or H prefilter.
See Engineering Controls for additional requirements and options.

NET CONTENTS _____ LBS.
EPA Reg. No. 10163-169
EPA Est. No. 67545-AZ-001
Gowan
The Go To Company
Produced For:
Gowan Company
P.O. Box 5669
Yuma, AZ 85366-5569

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product’s concentrate. Do not reuse them.

USER SAFETY RECOMMENDATIONS
Users should:
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are Barrier Laminate and Viton. If you want more options, follow the instructions for category H on an EPA chemical-resistance category selection chart.

Mixers, loaders, and applicators using engineering controls, including enclosed-cockpit aerial equipment and enclosed-cab ground equipment, and mixers, loaders, and applicators using handheld equipment or handheld nozzles must wear at least (see engineering control section of this labeling for more requirements and options):

- Long-sleeved shirt and long pants,
- Shoes plus socks,
- Chemical-resistant gloves when mixing and loading, and when applying with handheld equipment or handheld nozzles, and
- Chemical-resistant apron when mixing and loading.

Motorized ground equipment applicators not in an enclosed cab, applicators dipping pine seedlings, and handlers engaged in cleaning up a spill or leak, or cleaning or repairing contaminated equipment, must wear:

- Coveralls over long-sleeve shirt and long pants,
- Chemical-resistant gloves,
- Chemical-resistant footwear plus socks,
- Chemical-resistant headgear for overhead exposure,
- Chemical-resistant apron, if exposed to the concentrate or applying as a pine seedling dip, and
- A respirator with an organic-vapor cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH-approved respirator with an organic vapor (OV) cartridge or canister with any N, R or P or He prefilter.

See Engineering Controls for additional requirements and options.

NET CONTENTS ______ LBS.

Gowan
The Go To Company

EPA Reg. No. 10163-169
EPA Est. No. 87545-AZ-001

Produced For:
Gowan Company
P.O. Box 5569
Yuma, AZ 85366-5569
ENGINEERING CONTROLS

Engineering Controls for Mixers and Loaders:
Water-soluble packets when used correctly qualify as a closed mixing/loading system under the Worker Protection Standard for Agricultural Pesticides [40 CFR 170.240(d)(4)]. Mixers and loaders using water-soluble packets must:

- Wear the personal protective equipment required in the PPE section of this labeling for mixers and loaders using engineering controls, and
- Be provided and have immediately available for use in an emergency, such as a broken package, spill, or equipment breakdown:
  1. Chemical-resistant footwear, and
  2. A respirator of the type specified in the PPE section of this labeling.

Engineering Controls for Applicators using Enclosed Cab Motorized Ground Equipment:
When applicators use motorized groundboom or airblast equipment with an enclosed cab that meets the definition in the Worker Protection Standard for Agricultural Pesticides [40 CFR 170.240(d)(5)] for dermal protection, they must:

- Wear the PPE specified on this labeling for applicators using enclosed cabs, and
- Either wear a respirator of the type specified in the PPE section of this labeling OR use an enclosed cab that is declared in writing by the manufacturer or by a government agency to provide at least as much respiratory protection as the respirator specified above,
- Be provided and must have immediately available for use in an emergency when they must exit the cab in the treated area:
  1. Coveralls,
  2. Chemical-resistant gloves,
  3. Chemical-resistant footwear,
  4. Chemical-resistant headgear if overhead exposure, and
  5. If using an enclosed cab that provides respiratory protection, a respirator of the type specified in the PPE section of this labeling.
- Take off any PPE that was worn in the treated area before reentering the cab, and
- Store all such PPE in a chemical-resistant container, such as a plastic bag, to prevent contamination of the inside of the cab.

Engineering Controls for Aerial Applications:
Pilots must use an enclosed cockpit in a manner than meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)]. Human flagging is prohibited.

ENVIRONMENTAL HAZARDS
<table>
<thead>
<tr>
<th>CROP</th>
<th>PEST</th>
<th>USE RATE lbs/acre</th>
<th>COMMENTS</th>
</tr>
</thead>
</table>
| APPLES (7) | Apple Maggot, Codling Moth, Elm Spanworm, Dock Sawfly, European Corn Borer, European Sawfly, Fruittree Leafroller, Green Fruitworm, Gypsy Moth, Japanese Beetle, Mealybug, Orange Tortrix, Oriental Fruit Moth, Plum Curculio, Redbanded Leafroller, Redhumped Caterpillar, Rose Chafer, San Jose Scale, Spotted Wing Drosophila | 2 1/8 – 5 3/4  
(1.5 – 4 lbs ai)  
(or 3/4 - 1 lb per 100 gals not to exceed  
5 3/4 lbs product or 4 lbs ai per acre) | For heavy insect infestations and areas west of the Rockies, use higher dosage rates (3 1/2 – 5 3/4 lbs product or 2.45 – 4 lbs ai per acre). Repeat applications as necessary in accordance with insect infestations and local and State spray programs. |

- **East of the Rockies**: Do not enter or allow entry into treated areas during the restricted entry interval (REI) of 4 days.
- **West of the Rockies**: Do not enter or allow entry into treated areas during the restricted entry interval (REI) of 7 days.
- Do not apply more than 22 1/8 lbs Imidan 70-W (15.5 lbs ai) per acre per crop season.
- Do not authorize any person who is not covered by the Worker Protection Standard (WPS), such as members of the general public involved in “pick-your-own,” “U-pick,” or similar operations, to enter a treated area for 14 days after application of this product.
- Limit spray drift; turn airblast spray nozzles inward on row ends; and do not apply when bees are in the area.
- Applications during the dormant season are prohibited.
- For groundboom and airblast applications, do not apply this product within 25 feet of (1) buildings occupied by humans for residential, commercial, or business purposes, including but not limited homes, farmworker housing, or other residential buildings, schools, daycare centers, nursing homes, hospitals, and (2) outdoor recreational areas such as school grounds, athletic fields, and parks. Non-residential agricultural buildings, including barns, livestock facilities, sheds, and outhouses are not included in this prohibition.
- For aerial applications, do not apply this product within 50 feet of (1) buildings occupied by humans for residential, commercial, or business purposes, including but not limited homes, farmworker housing, or other residential buildings, schools, daycare centers, nursing homes, hospitals, and (2) outdoor recreational areas such as school grounds, athletic fields, and parks. Non-residential agricultural buildings, including barns, livestock facilities, sheds, and outhouses are not included in this prohibition.
## Altacor vs Imidan

<table>
<thead>
<tr>
<th>Altacor</th>
<th>Imidan</th>
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</thead>
<tbody>
<tr>
<td>• Low mammalian toxicity</td>
<td>• Higher mammalian toxicity.</td>
</tr>
<tr>
<td>• Minimal PPE requirements</td>
<td>• Full PPE required</td>
</tr>
<tr>
<td>• Short REI (4 hours)</td>
<td>• 7-day REI</td>
</tr>
<tr>
<td>• Specific mode of action</td>
<td>• Broad spectrum insecticide.</td>
</tr>
<tr>
<td>• Spray timing is critical</td>
<td>• More flexible spray timing</td>
</tr>
</tbody>
</table>


Summary

• U.S. regulatory system is protective of human health for both consumers and workers when products are applied according to the label.