



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

June 14, 2019

Brian L. Bret, Ph.D
Regulatory Leader
Dow AgroSciences LLC.
9330 Zionsville Road
Indianapolis, IN 46268

Subject: Registration Review Label Mitigation for Nitrapyrin
Product Name: Vindicate
EPA Registration Number: 62719-684
Application Date: June 28, 2018
Decision Number: 551854

Dear Dr. Bret:

The Agency, in accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended, has completed reviewing all of the information submitted with your application to support the Registration Review of the above referenced product in connection with the Nitrapyrin Interim Decision, and has concluded that your submission is acceptable. The label referred to above, submitted in connection with registration under FIFRA, as amended, is acceptable.

Should you wish to add/retain a reference to the company's website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance.

A copy of your label stamped "Accepted" is enclosed. Products shipped after 12 months from the date of this amendment must bear the new revised label. Your release for shipment of the product bearing the amended label constitutes acceptance of these conditions. If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA section 6.

If you have any questions about this letter, please contact Srijana Shrestha by phone at 703-305-6471, or via email at Shrestha.srijana@epa.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Linda Arrington", with a long horizontal flourish extending to the right.

Linda Arrington, Branch Chief
Risk Management and Implementation Branch 4
Pesticide Re-Evaluation Division
Office of Pesticide Programs

Enclosure

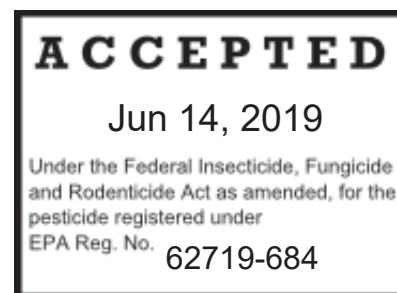
(Base label):

Vindicate™**NITROGEN STABILIZER
OPTINYTE™ TECHNOLOGY****Use to delay nitrification of ammoniacal and urea nitrogen fertilizer compositions
in the soil by controlling the nitrification process**

Active Ingredient:

nitrapyrin: 2-chloro-6-(trichloromethyl) pyridine.....	17.67%
Other Ingredients	82.33%
Total	100.00%

Contains petroleum distillates
Contains 1.85 lb of active ingredients per gallon.

**Keep Out of Reach of Children****CAUTION**

Precautionary Statements

Hazards to Humans and Domestic Animals

Avoid contact with skin or clothing.

Note to Physician: May pose an aspiration pneumonia hazard. Contains petroleum distillate.

Personal Protective Equipment (PPE)**Mixers, loaders, applicators and other handlers must wear:**

- Coveralls worn over short-sleeved shirt and short pants
- Chemical-resistant gloves made of barrier laminate or viton ≥ 14 mils
- Chemical-resistant footwear plus socks
- When mixing and loading, or cleaning equipment, wear a chemical-resistant apron

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.

User Safety Recommendations

Users should:

- Wash hands thoroughly with soap and water after handling and 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.
- 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.

Environmental Hazards

This pesticide is toxic to oysters/shrimp. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

This product may contaminate water through runoff. This product has a high potential for runoff for several weeks after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product.

A level well-maintained vegetative buffer strip between areas to which this product is applied and surface water such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination.

Non-target Organism Advisory Statement

It is unclear how this product may impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated area. Protect the forage and habitat of non-target organisms by minimizing spray drift. For further guidance and instructions on how to minimize spray drift, refer to the Spray Drift Advisories section of this label

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

(Storage and Disposal for rigid containers 5 gal or less)

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Do not freeze.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

(Storage and Disposal for refillable rigid containers larger than 5 gal)

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Do not freeze.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

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Refer to label booklet for Directions for Use.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

EPA Reg. No. 62719-684

EPA Est. _____

®™ Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

**Produced for
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268**

NET CONTENTS _____

(Cover, shipping container):

Vindicate™

NITROGEN STABILIZER OPTINYTE™ TECHNOLOGY

Use to delay nitrification of ammoniacal and urea nitrogen fertilizer compositions in the soil by controlling the nitrification process.

Active Ingredient:

nitrapyrin: 2-chloro-6-(trichloromethyl)	
pyridine.....	17.67%
Other Ingredients	82.33%
Total	100.00%

Contains petroleum distillates
Contains 1.85 lb of active ingredients per gallon.

Keep Out of Reach of Children

CAUTION

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Refer to inside of label booklet for additional precautionary information including Directions for Use.

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(Page 1 through end):

Precautionary Statements

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CAUTION

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Note to Physician: May pose an aspiration pneumonia hazard. Contains petroleum distillate.

Personal Protective Equipment (PPE)

Mixers, loaders, applicators and other handlers must wear:

- Coveralls worn over short-sleeved shirt and short pants
- Chemical-resistant gloves made of barrier laminate or viton ≥ 14 mils
- Chemical-resistant footwear plus socks
- When mixing and loading, or cleaning equipment, wear a chemical-resistant apron

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.

User Safety Recommendations

Users should:

- Wash hands thoroughly with soap and water after handling and 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.
- 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.

First Aid

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

Note: Contains petroleum distillate – vomiting may cause aspiration pneumonia.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

This pesticide is toxic to oysters/shrimp. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

This product may contaminate water through runoff. This product has a high potential for runoff for several weeks after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product.

A level well-maintained vegetative buffer strip between areas to which this product is applied and surface water such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination.

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It is unclear how this product may impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated area. Protect the forage and habitat of non-target organisms by minimizing spray drift. For further guidance and instructions on how to minimize spray drift, refer to the Spray Drift Advisories section of this label

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

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.

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, restricted-entry interval, and notification to workers (as applicable). 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 worker entry into treated areas during the restricted entry interval (REI) of 24 hours.

Exception: If the product is soil-injected or soil incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

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:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks
- Protective eyewear

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Do not freeze.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds

after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Refillable containers 5 gallons or larger:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

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Product Information

Vindicate™ nitrogen stabilizer is a water-based microencapsulated formulation of nitrapyrin that may be used in the application of aqua ammonia, other liquid ammoniacal or urea nitrogen fertilizer compositions such as 28%, 30% or 32% UAN. Vindicate is not a substitute for fertilizer.

Vindicate may be mixed with liquid fertilizer, insecticides, fungicides, herbicides, and/or water and applied as a preplant incorporated or preemergence (pre to corn), or postplant, application. Incorporation may occur at any time up to 10 days after application and may be either by mechanical means or by moisture (rainfall or overhead irrigation). For moisture incorporation, a minimum of 0.5 inch of moisture is necessary. If 0.5 inch of moisture does not occur within the 10-day window, incorporate mechanically with light tillage.

Precautions and Restrictions

Vindicate is no more corrosive to standard liquid fertilizer equipment than liquid fertilizer alone.

Spray Drift Advisories

THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT.
BE AWARE OF NEARBY NON-TARGET SITES AND ENVIRONMENTAL CONDITIONS.

IMPORTANCE OF DROPLET SIZE

An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.

Controlling Droplet Size – Ground Boom

- Volume – Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate.
- Pressure – Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size.
- Spray Nozzle – Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift.

Controlling Droplet Size – Aircraft

Adjust Nozzles – Follow nozzle manufacturer's recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight.

BOOM HEIGHT – Ground Boom

Use the lowest boom height that is compatible with the spray nozzles that will provide uniform coverage. For ground equipment, keep the boom level with the crop and minimize bounce.

RELEASE HEIGHT – Aircraft

Higher release heights increase the potential for spray drift. When applying aurally to crops, do not release the spray at a height greater than 10 feet above the crop canopy unless a greater application height is necessary for pilot safety.

SHIELDED SPRAYERS

Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area.

TEMPERATURE AND HUMIDITY

When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation.

TEMPERATURE INVERSIONS

Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions.

WIND

- Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS.
- Applicators must be familiar with local wind patterns and terrain that could affect spray drift.

Application Directions

Ground Application

Vindicate may be applied through ground application equipment that may be used in the application of ammoniacal dry or liquid fertilizers, or liquid manure.

Chemigation

Vindicate may be applied through properly equipped chemigation systems at a preplant or preemerge application timing, yet prior to crop emergence in corn. Vindicate may be applied through properly equipped chemigation systems preplant up to 1st detectable joint (Feekes 6 or Zadock 31 growth stage) in wheat. Vindicate may be applied through properly equipped chemigation systems for other crops listed on this label. Unless otherwise indicated in specific use directions, the application rates for chemigation are the same as those specified for broadcast applications.

Directions for Chemigation

Vindicate may be applied through the following irrigation systems: center pivot, lateral move, end tow, side (wheel) roll, traveler, big gun, solid set, micro sprinkler, drip, or hand move. Do not apply through sprinkler systems that deliver a low coefficient of uniformity such as certain water drive units.

Chemigation Equipment Preparation

Thoroughly clean the chemigation system and tank of any fertilizer or chemical residues, and dispose of the residues according to state and federal laws. Flush the injection system with soap and/or a cleaning agent and water. Determine the amount of Vindicate needed to cover the desired acreage. Mix according to instructions in the Mixing Direction section and bring mixture to desired volume. Maintain continuous agitation during mixing and throughout the application period.

Chemigation Equipment Calibration

In order to calibrate the irrigation system and injector to apply the mixture containing Vindicate, determine the following.

- Calculate the number of acres irrigated by the system.
- Calculate the amount of Vindicate required and other crop inputs such as fertilizers, insecticides, or herbicides
- Determine the irrigation rate and determine the number of minutes for the system to cover the intended treatment area.
- Divide the total gallons of Vindicate mixture needed by the number of minutes (minus time to flush out) to cover the treatment area. The following value equals the gallons per minute output that the injector or inductor must deliver. Convert the gallons per minute to milliliters or ounces per minute, if needed.
- Calibrate the injector pump with the system in operation at the desired irrigation rate. It is suggested that the timed output of the injector pump be checked at least twice before operation and the system monitored during operation.

Chemigation Equipment Requirements

- The system must contain an air gap, an approved backflow prevention device, a functional check valve, vacuum relief valve (including inspection port), and/or low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back flow. Refer to the American Society of Agricultural Engineer's Engineering Practice 409 for more information or state specific regulations.
- The Vindicate mixture injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
- The Vindicate mixture injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
- The system must contain functional interlocking controls to automatically shut off the Vindicate mixture injection pump when the water pump motor stops.

- The irrigation line or water pump must include a functional pressure switch that will stop the water pump when the water pressure decreases to the point where the Vindicate mixture distribution is adversely affected.
- Systems must use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of materials that are compatible with the Vindicate mixture and capable of being fitted with a system interlock.
- To ensure uniform mixing of the Vindicate mixture into the water line, inject the mixture through a nozzle placed in the fertilizer injection port or just ahead of an elbow or tee in the irrigation line so that the turbulence will assist in mixing. The injection point must be located after all back-flow prevention devices on the water line.
- The tank holding the Vindicate mixture must be free of rust, sediment, and foreign material and equipped with an in-line strainer situated between the tank and the injector point.

Chemigation Operation

Start the water pump and irrigation system and let the system achieve the desired pressure and speed before starting the injector. Check for leaks and uniformity and make repairs before any chemigation takes place. Start the injector system and calibrate according to manufacturer's specifications. The following procedure is necessary to deliver the desired rate per acre in a uniform manner. When the application is finished, flush and clean the entire irrigation and injector system prior to shutting down the system to remove any Vindicate, herbicide, fungicide, insecticide or fertilizer residue from the chemigation system.

Chemigation Precautions

- Crop injury, lack of effectiveness, or illegal pesticide residues in crop can result from non-uniform distribution of treated fertilizer or water.
- If you have questions about calibration, contact state extension service specialist, equipment manufacturers, or other experts.
- A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall operate the system and make necessary adjustments should the need arise and continuously monitor the injection.

Chemigation Restrictions

- The Vindicate mixture pipeline must contain a functional, automatic quick-closing check valve to prevent the flow fluid back toward the injection.
- The Vindicate mixture injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
- The system must contain functional interlocking controls to automatically shut off the Vindicate mixture injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where Vindicate mixture distribution is adversely affected.
- Systems must use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of materials that are compatible with the Vindicate mixture and capable of being fitted with a system interlock.
- Do not allow irrigation water to collect or runoff and pose a hazard to livestock, wells, or adjoining crops.
- Do not apply through sprinkler systems that deliver a low coefficient of uniformity such as certain water drive units.
- Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.

Mixing Directions

Mix or shake well before use.

Liquid Fertilizers

Vindicate may be mixed with liquid fertilizers, such as aqua ammonia or other liquid ammoniacal or urea nitrogen fertilizers. Vindicate can be added to urea ammonium nitrate liquid fertilizer without a compatibility agent, although when mixing Vindicate with fertilizer plus herbicides or insecticides, a jar test may indicate that a compatibility agent is needed.

There are two methods which may be used to create a stable emulsion with Vindicate plus a compatibility agent in liquid fertilizer:

Premix Method: The compatibility agent and Vindicate may be mixed together in a separate container and then added to the liquid fertilizer. Continuously agitate as the mixture is added to the fertilizer.

Sequential Method: The compatibility agent may be added to the fertilizer and thoroughly agitated. While the agitation continues, the required amount of Vindicate may be added to the tank.

Most phosphate ester types of compatibility agents are suitable for use in these mixtures. Follow the label directions for the compatibility agent to determine rates and any use precautions.

Liquid Manure

Vindicate may be applied with liquid manure at the specified rates outlined within a given crop use section on the label.

The best practice for fertilization using manure is to inject the liquid manure into the soil ensuring soil coverage or surface application followed by immediate incorporations. Check local laws and regulations on acceptable manure practices and applicability for a given crop and for the area where manure is to be applied for a given crop.

Granular Ammonium and Urea

Vindicate may be impregnated on urea and most dry ammoniacal fertilizers or fertilizer blends containing ammoniacal fertilizers. Uniform impregnation on fertilizer and uniform application in the field is necessary to insure optimum results.

Various equipment can be used to impregnate Vindicate onto dry fertilizers, including vertical and horizontal mixers. Once impregnated, fertilizer may be applied with either spinner, airflow, or other suitable equipment.

Use a minimum of 100 lb of dry fertilizer per acre. With lower rates of fertilizer (higher concentrations of Vindicate), the fertilizer may not readily absorb all of the liquid. For a suitable free-flowing mixture, add a drying agent to the mixture. Use a minimum of 1 lb of drying agent per pint of Vindicate unless experience indicates a different amount works well. Do not apply more than 1 lb ai nitrapyrin per acre per year.

Apply bulk fertilizers impregnated with Vindicate within 24 hours of impregnation for optimal results. Do not store the impregnated fertilizer. All individual state regulations, including those related to dry bulk blending registration, labeling, and application, are the responsibility of the individual and/or company selling mixtures of Vindicate and fertilizer.

Do not mix seed with dry fertilizers impregnated with Vindicate.

Tank Mixing

Vindicate may also be applied in tank mixtures with preplant incorporated or preemergence herbicides, fungicides, or insecticides registered for use on the labeled crop. The tank mixes may be in water or in

most urea-ammonium nitrate solutions, N-P-K solutions, slurries, or suspensions. Check the physical compatibility of tank mixtures as indicated below before mixing in the tank. Maintain constant agitation during both mixing and application processes to ensure uniformity of the spray mixture. It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

For best results, add the herbicide(s) to the tank after Vindicate and the compatibility agent (if used) have been thoroughly mixed. Add wettable powders or flowables before emulsifiable concentrates. Continuously agitate during the mixing cycle.

Tank Mix Compatibility Test: To test the compatibility of Vindicate with liquid fertilizers and/or herbicide, fungicide, or insecticide mixes, add proportionate amounts of each ingredient to a small jar, cap, shake, and let stand for 15 minutes. Formation of precipitates or layers that do not readily redisperse indicates an incompatible mixture and should not be used.

Note: Vindicate has shown compatibility issues with some ammonium thiosulfate and liquid fertilizers containing boron.

- Allow time for complete dispersion/mixing before adding another product to the spray mixture. Add products to the tank mixture in the following order.
- To start, add one-half of the required amount of liquid fertilizer, water, or other urea-ammonium nitrate solutions. Begin agitation.
- Add Vindicate (Compatibility agent if needed)
- Products in water soluble packaging. Important: Products in water soluble packaging must be premixed with water (slurried) prior to addition to the spray tank
- Wettable powders or dry flowables (slurry if recommended by tank-mix product label)
- Liquid flowables
- Emulsifiable concentrates
- Suspension concentrates
- Soluble liquids
- Add other nutrients
- Finish filling spray tank to required spray volume.

Note: For all tank-mixtures, maintain agitation during mixing. Some tank-mixtures may require agitation throughout application to ensure spray mixture remains, uniformly suspended. If spray mixture is allowed to settle at any time, thorough agitation is required to re-suspend the mixture before application is resumed.

Directions for Use

Corn (field corn, seed corn, silage corn, sweet corn, popcorn)

Vindicate may be mixed in combination with dry fertilizers (urea, AMS, MAP, DAP), liquid manures, liquid fertilizers, such as UAN, aqua ammonia, other liquid ammoniacal or urea nitrogen fertilizers, insecticides, fungicides, herbicides, and/or water.

Preplant, Preemergence, At-Plant Row or Band Injection Application

Liquid Fertilizers: Use Vindicate at the rate of 35 to 70 fl oz per acre at a preplant, preemergence, or band injection application.

Liquid Manure: Use Vindicate at the rate of up to 70 fl oz per acre when fall applied. For spring applications with liquid manure apply Vindicate at 35 fl oz per acre. Apply Vindicate and manure as a preplant, preemergence, or band injection application.

The best practice for fertilization using manure is to inject the liquid manure into the soil ensuring soil coverage or surface application followed by immediate incorporations. Check local laws and regulations on acceptable manure practices and for the area where manure is to be applied.

Dry Fertilizers: Use Vindicate at a the rate of up to 35 fl oz per acre impregnated on dry fertilizers and may be applied preplant, preemergence, or at-plant. Applications can be applied broadcast, injected (knived) or banded.

Restrictions:

- Do not apply more than a total of 70 fl oz of Vindicate (1.0 lb ai nitrapyrin) per acre per year on corn.
- Replant restriction:** All crops (except for leafy vegetables and root and tuber crops) may be planted 30 days or more after last Vindicate application. Leafy vegetable crops are not to be planted less than 120 days after last application. Root and tuber crops are not to be planted less than one year after last application.
- An enclosed cab must be used for ground boom application to corn.

Postplant (Side Dress) Application

Apply 18 to 35 fl oz of Vindicate per acre after corn emergence. The application may be injected, dribbled, or applied as a band with sidedress liquid fertilizer. Vindicate may also be impregnated onto dry fertilizer and applied.

Restrictions:

- Any postplant application of Vindicate must be applied prior to V6 stage of growth.
- Do not apply more than a total of 70 fl oz of Vindicate (1 lb ai nitrapyrin) per acre per year on corn.
- **Replant restriction:** All crops (except for leafy vegetables and root and tuber crops) may be planted 30 days or more after last application. Leafy vegetable crops are not to be planted less than 120 days after last application. Root and tuber crops are not to be planted less than one year after last application.

Wheat (including Spring and Winter)

Vindicate may be mixed in combination with liquid ammoniacal fertilizer (such as UAN, aqua ammonia, or urea fertilizers), liquid manure, dry ammoniacal fertilizers (such as urea, AMS, MAP, DAP), insecticides, fungicides, herbicides and/or water.

Preplant, Preemergence, At-Plant Row or Band Injection Application

Use Vindicate at the rate of 35 to 70 fl oz per acre.

Liquid Fertilizers: Use Vindicate at the rate of 35 to 70 fl oz per acre at a preplant, preemergence, or band injection application. Vindicate may also be applied at 35 to 70 fl oz per acre to actively growing wheat from emergence through 1st detectable joint (Feekes 6 or Zadock 31 growth stage). These applications may be injected, dribbled, or broadcast applied to the crop. Liquid fertilizers broadcast across actively growing wheat can cause leaf necrosis.

Restrictions:

- Do not apply more than a total of 70 fl oz of Vindicate (1.0 lb ai nitrapyrin) per acre per year on wheat.
- Any postplant application of Vindicate must be applied prior to 1st detectable joint (Feekes 6 or Zadock 31 growth stage).
- **Replant restriction:** All crops (except for leafy vegetables and root and tuber crops) may be planted 30 days or more after last application. Leafy vegetable crops are not to be planted less than 120 days after last application. Root and tuber crops are not to be planted less than one year after last application.

Postplant Application

Vindicate may be applied at 35 fl oz per acre to actively growing wheat from emergence and up to 1st detectable joint (Feekes 6 or Zadock 31 growth stage). The Vindicate application may be broadcast, injected, dribbled, or applied as a band with sidedress liquid fertilizers. Vindicate may also be impregnated onto dry fertilizer and applied.

Restrictions:

- Any postplant application of Vindicate must be applied prior to 1st detectable joint (Feekes 6 or Zadock 31 growth stage).
- Do not apply more than a total of 70 fl oz of Vindicate (1 lb ai nitrapyrin) per acre per year on wheat.
- **Replant restriction:** All crops (except for leafy vegetables and root and tuber crops) may be planted 30 days or more after last application. Leafy vegetable crops are not to be planted less than 120 days after last application. Root and tuber crops are not to be planted less than one year after last application.

Tree Nuts (Crop Group 14-12)¹

¹ Tree nuts (crop group 14-12) including almonds, beech nut, Brazil nut, cashew, chestnut, Chinquapin, filbert (hazelnut), hickory nut, macadamia nut, pecan, pistachio, walnut.

Vindicate may be applied in combination with dry ammoniacal fertilizers (such as urea, AMS, MAP, DAP), liquid fertilizers (such as UAN, aqua ammonia, other liquid ammoniacal or urea nitrogen fertilizers), insecticides, fungicides, herbicides, and/or water applied prior to bloom through nut development on orchard floors.

Use Vindicate at the rates of 18 to 70 fl oz per acre per application applied as a broadcast or banded application applied to the soil or through chemigation equipment, outlined in this label, to orchard floors prior to bloom through nut development up to 30 days prior to harvest. *[Note to reviewer: narrower ranges of rates within that overall range may be used on printed labels]*

Restrictions:

- The 70 fl oz rate may be split into two or three separate applications. Do not apply more than 70 fl oz (1.0 lb ai of nitrapyrin) per acre per year.
- Any application of Vindicate must be applied no later than 30 days prior to harvest.

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