

SERENADE® ASO

An Aqueous Suspension Biofungicide

 Can be Used for Organic Production



ACTIVE INGREDIENT

QST 713 strain of *Bacillus subtilis* 1.34%

INERT INGREDIENTS 98.66%

Total 100.00%

Contains a minimum of 1×10^9 CFU/g

EPA Reg. No. 69592-12

EPA Est. No.: 69592-MEX-1

U.S. Patent Nos. 6,060,051; 6,103,228; 6,291,426; 6,417,163
on QST 713 strain of *Bacillus subtilis*

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

FIRST AID

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 doctor or a poison control center for further treatment advice. Have the product label with you when calling doctor or poison control center.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS & DOMESTIC ANIMALS CAUTION

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before use.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- NIOSH approved respirator with any N, P, R or HE filter.

Follow manufacturer's instructions for cleaning and maintaining PPE. If no instructions are available, use detergent and hot water for washables. Keep and wash PPE separately from other laundry.

ENGINEERING CONTROLS: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing/PPE immediately if pesticides get 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

Do not apply directly to water or 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. Do not apply when weather conditions favor drift or runoff from treated areas.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

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 emergencies such as leaks or spills, call 24-hour toll-free CHEMTREC hotline at 1.800.424.9300.

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 intervals. 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 4 hours.

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, waterproof gloves, shoes plus socks.

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.

STORAGE & DISPOSALS

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

STORAGE: Store in a dry area inaccessible to children. Store in original containers only. Keep container closed when not in use.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Do not contaminate water when disposing of equipment rinsate.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

GENERAL USE INFORMATION

Serenade® ASO is a broad spectrum, preventative product for the control or suppression of many important plant diseases. Serenade ASO is an ideal resistance management tool given its unique, multiple modes of action. It may be applied as a foliar spray alone, in alternating spray programs or in tank mixes with other registered crop protection products. For maximum effectiveness, apply Serenade ASO prior to or in the early stages of disease development. When conditions are conducive to heavy disease pressure, use Serenade ASO in a rotational program with other registered fungicides. Serenade ASO may be applied with spray equipment commonly used for making ground or aerial applications and sprinkler/irrigation systems commonly used for chemigation. Serenade ASO can be used for organic production.

Serenade ASO is most effectively used in a preventive disease management program. For improved performance use Serenade ASO in a tank-mix or rotational program with other registered fungicides. When using Serenade ASO alone for the first time a rate of 4 quarts per acre is recommended. Depending upon disease pressure the rate can be increased and/or spray intervals decreased. To enhance performance it is recommended that a surfactant, known

to be safe to the target crop, be added to the spray tank to improve penetration and coverage of above-ground portions of the plant.

INTEGRATED PEST MANAGEMENT (IPM)

For disease resistance management, Serenade ASO can be integrated into an overall disease and pest management strategy whenever fungicide use is necessary. Follow practices known to reduce disease development. Consult local agricultural authorities for specific IPM strategies developed for your crop(s) and location.

Be sure use of this product conforms to resistance management strategies, which may include rotating and/or tank-mixing with other products with different modes of action.

USE RATE DETERMINATION

Carefully read and follow all label directions, use rates and restrictions. Apply Serenade ASO prior to or in the early stages of disease development. Use maximum label rates and shortened spray intervals for conditions conducive to rapid disease development. For proper application, determine the number of acres to be treated, the recommended label use rate and select appropriate application volume to give good canopy penetration and coverage of plant parts to be protected. Prepare only the amount of spray solution required to treat the measured acreage. Accurate spray equipment calibration is essential prior to use.

PREHARVEST INTERVAL

Serenade ASO can be applied up to and including the day of harvest.

APPLICATION INSTRUCTIONS

GENERAL: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower/treatment coordinator are responsible for considering all of these factors when making decisions. Where states have more stringent regulations, they should be observed. Note: This section is advisory in nature and does not supersede the mandatory label requirements.

GROUND: Be sure to maintain agitation during mixing and application to assure uniform product suspension. Thorough coverage of all foliage is essential for effective disease control. Serenade ASO can be applied in commonly used ground equipment, hose-end, pressurized, greenhouse, and hand-held sprayers. To achieve good coverage use proper spray pressure, gallonage per acre, nozzles, nozzle spacing and ground speed. Consult spray nozzle and accessory catalogues for specific information on proper equipment calibration.

AERIAL: This product can be applied by aerial application. Refer to the Aerial Drift Reduction Advisory Information section of this label for general directions and precautions. Use the application rate indicated for the appropriate crop in sufficient water to achieve thorough coverage, or a minimum of 3 gallons of water per acre.

CHEMIGATION: This product can be applied through sprinkler or drip type irrigation systems, including center pivot, lateral move, end tow, side wheel roll, traveler, solid set, and hand move. Refer to the Chemigation Directions for Use section of this label for general directions and precautions. Use the application rate indicated for the appropriate crop as specified in the Use Recommendations section of this label.

MIXING INSTRUCTIONS

MIXING: Serenade ASO must be diluted with water for spray application and may be used in spray equipment commonly used for making ground applications. Partially fill the spray tank with clean water and begin agitation. Add the specified amount of Serenade ASO to the tank. Finish filling the tank to the desired volume to obtain the proper spray concentration. It is critical that the spray solution be agitated during mixing and application to assure a uniform suspension. Do not allow spray mixture to stand overnight or for prolonged periods. Maintain a spray solution pH between 4.5 and 8.5.

Serenade ASO may be tank mixed with other registered pesticides to enhance plant disease control. Do not exceed recommended dosage rates. This product cannot be mixed with any product with prohibition against such mixing. Use of the resulting tank mix must be in accordance with the more restrictive label limitations and precautions.

COMPATIBILITY: Do not combine Serenade ASO in the spray tank with pesti-

cides, surfactants or fertilizers if there has been no previous experience or use of the combination to show it is physically compatible, effective and non-injurious under your use conditions.

Serenade ASO is compatible with many commonly used pesticides, fertilizers, adjuvants and surfactants but has not been fully evaluated with all of these. To ensure compatibility of tank-mix combinations they should be evaluated prior to use, as follows: Using a suitable container add proportional amounts of product to water. Add wettable powders first, followed by water dispersible granules, then by liquid flowables and lastly, emulsifiable concentrates. Mix thoroughly and let stand for at least five minutes. If the combination stays mixed or can be remixed, it is physically compatible. Test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

ADDITIVES: Serenade ASO is compatible with a wide range of additives. Since the product is primarily a protectant, thorough coverage of all above-ground plant parts is required for effective product performance. To improve plant surface coverage, add a non-phytotoxic adjuvant to spray tank.

CHEMIGATION DIRECTIONS FOR USE

General Requirements:

1. Apply this product only through sprinkler or drip type irrigation systems including center pivot, lateral move, end tow, side wheel roll, traveler, solid set or hand move systems. Do not apply this product through any other type of irrigation system.
2. Crop injury or lack of effectiveness can result from non-uniform distribution of treated water.
3. Ensure that the irrigation system used is properly calibrated and if you have questions, call the State Extension Service specialists or the equipment manufacturer or other experts.
4. 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.
5. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make any necessary adjustments should the need arise.

Equipment Requirements:

1. Public water supply means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of 25 individuals daily at least 60 days throughout the year.
2. Chemigation systems connected to the public water systems must contain a functional, reduced-pressure zone (RPZ), backflow preventer or the functional equivalent in the water supply upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top of the overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
3. The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back flow.
4. The pesticide injection pipeline must contain a functional, automatic, quick closing check valve to prevent the flow of fluid back towards the injection pump.
5. The pesticide 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.
6. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
7. The system must contain functional interlocking controls to automatically shut off the pesticide 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 pesticide distribution is adversely affected.
8. 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 pesticides and capable of being fitted with a system interlock.
9. Do not apply when wind speed favors drift beyond the area intended for treatment.

Application Instructions:

1. Remove scale, pesticide residues, and other foreign matter from the chemical supply tank and entire injector system. Flush with clean water.

Failure to provide a clean tank, void of scale or residues may cause product to lose effectiveness or strength.

2. Do not combine Serenade ASO with pesticides, surfactants or fertilizers for application through chemigation equipment unless prior experience has shown the combination physically compatible, effective and non-injurious under conditions of use. Serenade ASO has not been fully evaluated for compatibility with all adjuvants or surfactants. It is advisable to conduct a spray compatibility test if mixture with adjuvants or surfactants is planned.

Center-pivot, Lateral Move, End Tow, and Traveler Irrigation Equipment (Use only with electric or oil hydraulic drive systems which provide a uniform water distribution):

- Determine size of area to be treated.
- Determine the time required to apply no more than 1/4 inch of water (6,750 gallons water per acre) over the area to be treated when the system and injection equipment are operated at normal pressures recommended by the equipment manufacturer. Run system at 80 to 95% of manufacturer's rated capacity.
- Using only water, determine the injection pump output when operated at normal line pressure.
- Determine the amount of Serenade ASO fungicide required to treat area.
- Add required amount of Serenade ASO fungicide and sufficient water to meet the injection time requirements of the solution tank.
- Maintain constant solution tank agitation during the injection period.
- Stop injection equipment after treatment is completed. Continue to operate the system until Serenade ASO fungicide solution has cleared the sprinkler head.

Solid-set, Side (wheel) Roll, and Hand Move Irrigation Equipment:

- Determine acreage covered by sprinkler.
- Fill injector solution tank with water and adjust flow rate to use contents over a 10- to 30-minute interval.
- Determine the amount of Serenade ASO fungicide required to treat area.
- Add the required amount of Serenade ASO fungicide into the same quantity of water used to calibrate the injection equipment.
- Maintain constant solution tank agitation during the injection period.
- Operate system at normal pressures recommended by the manufacturer of the injection equipment and used for the time interval established during calibration.
- Inject Serenade ASO fungicide at the end of the irrigation cycle or as a separate application to maximize foliar fungicide retention.
- Stop injection equipment after treatment is completed. Continue to operate the system until Serenade ASO fungicide solution has cleared the last sprinkler head.

AERIAL DRIFT REDUCTION ADVISORY INFORMATION

General: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. Where states have more stringent regulations, they should be observed. Note: This section is advisory in nature and does not supersede the mandatory label requirements.

INFORMATION ON DROPLET SIZE: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

CONTROLLING DROPLET SIZE: Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets. Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When high flow rates are needed, use higher flow rate nozzles instead of increasing pressure. # of Nozzles - Use the minimum number of nozzles that provide uniform coverage. Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential. Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

BOOM WIDTH: For aerial applications, the boom width must not exceed 75% of the wingspan or 90% of the rotary blade. Use upwind swath displacement and apply only when wind speed is 3 - 10 mph as measured by an anemometer. Use medium or coarser spray according to ASAE 572 definition for

standard nozzles or VMD for spinning atomizer nozzles. If application includes a no-spray zone, do not release spray at a height greater than 10 feet above the ground or the crop canopy.

APPLICATION HEIGHT: Do not make application at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

SWATH ADJUSTMENT: When applications are made with a crosswind, the swath will be displaced downward. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

WIND: Drift potential is lowest between wind speeds of 2 - 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

TEMPERATURE INVERSIONS: Do not apply during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small, suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified 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.

SENSITIVE AREAS: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas). Do not allow spray to drift from the application site and contact people, structures people occupy at any time and the associated property, parks and recreation areas, non-target crops, aquatic and wetland areas, woodlands, pastures, rangelands, or animals.

CONDITIONS FOR SALE AND WARRANTY

AgraQuest warrants to those persons lawfully purchasing this product that at the time of the first sale of this product by Seller that this product conformed to its description and was reasonably fit for the purposes stated on the label when used in accordance with Seller's directions. Buyers and users of this product assume the risk of any use contrary to such directions. EXCEPT AS PROVIDED ELSEWHERE IN WRITING CONTAINING AN EXPRESS REFERENCE TO THIS WARRANTY AND LIMITATION OF DAMAGES, SELLER MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OR GUARANTY, INCLUDING ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR OF MERCHANTABILITY AND NO AGENT OF SELLER IS AUTHORIZED TO DO SO. Except to the extent prohibited by applicable law, AgraQuest offers this product with the following conditions: 1) buyers and users of this product assume the risk of any storage, handling or use contrary to AgraQuest's label and directions and 2) AgraQuest's liability shall in no case exceed the purchase price of the applicable AgraQuest product.

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AGRAQUEST 

RECOMMENDED APPLICATION RATES FOR SELECTED CROPS – AGRICULTURAL USE

(Serenade ASO has a 0-Day PreHarvest Interval for all crops contained on this label)

Under moderate to severe disease pressure, for improved performance, increase rates and reduce spray intervals or use Serenade ASO in a tank mix or rotational program with other registered fungicides.

CROPS	DISEASE	RATE Qts./acre	APPLICATION INSTRUCTIONS
Asparagus	Botrytis Blight <i>Botrytis cinerea</i>	2 - 6	Begin application soon after emergence and when conditions are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. Serenade ASO may be applied up to and including the day of harvest.
Berry Crops Blueberries Blackberry Raspberry Loganberry Huckleberry Cranberry Gooseberry Elderberry Currant Caneberry Bushberry and other berry crops	Mummy Berry <i>Monilinia vaccinii-corymbosi</i> Botrytis Blight <i>Botrytis cinerea</i> Bacterial Canker <i>Pseudomonas</i> spp.	2 - 6	Mummy Berry - For suppression, begin application at the bud break stage of development and repeat on a 7 to 10 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for mummy berry control. Bacterial Canker – Apply before fall rains and again during dormancy before spring growth. Botrytis Blight - Begin application prior to disease development and repeat on a 7 to 10 day interval or as needed. For improved performance of Serenade ASO, add a surfactant to the spray tank to improve coverage. Cranberries - Make applications to non-flooded fields only. Serenade ASO may be applied to fruit up to and including the day of harvest.
Brassica Vegetables (Cole Crops) Broccoli Cabbage Cauliflower Brussel Sprouts Collards Kale Mustard Greens Kohlrabi and other brassica crops	Pin Rot Complex <i>Alternaria/Xanthomonas</i> Xanthomonas Leaf Spot <i>Xanthomonas campestris</i> Alternaria Leaf Spot <i>Alternaria</i> spp. Downy Mildew <i>Peronospora parasitica</i> <i>Peronospora</i> spp. Powdery Mildew <i>Erysiphe polygoni</i>	2 - 6	Pin Rot / Downy Mildew - For suppression, begin application when environmental conditions are conducive to disease development and repeat on 7 to 10 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for pin rot control. For all other diseases - Begin application soon after emergence or transplant and when conditions are conducive to disease development. Repeat on a 7 to 10 day interval or as needed.
Bulb Vegetables Onion Garlic Shallots and other bulb vegetables	Botrytis Neck Rot <i>Botrytis</i> spp. Botrytis Leaf Blight <i>Botrytis squamosa</i> Onion Purple Blotch <i>Alternaria porri</i> Onion Downy Mildew <i>Peronospora destructor</i> Downy Mildew <i>Peronospora</i> spp. Powdery Mildew <i>Erysiphe</i> spp.	2 - 6	Begin application when environmental conditions are conducive to disease development and repeat sprays on 7 to 10 day intervals or as needed. Apply in sufficient water to provide complete coverage of plants. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides for Botrytis Neck Rot control.
	Rust <i>Puccinia porri</i>	2 - 6	For suppression, begin application when conditions are conducive to disease development and repeat on a 7 to 10 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for rust control.
Citrus Orange Grapefruit Lemon Tangerine Tangelo Pummelo and other citrus crops	Greasy spot <i>Mycosphaerella citri</i> Post Bloom Fruit Drop <i>Colletotrichum acutatum</i> Scab <i>Elsinoe fawcetti</i> Melanose <i>Diaporthe citri</i> Alternaria Leaf Spot <i>Alternaria alternata</i>	2 - 6	Greasy spot - For suppression, begin applications at first new foliar flush, and repeat with subsequent new flushes. When conditions are conducive to rapid disease development, Serenade ASO must be used in a tank mix program with other registered products, such as spray oil or copper-based fungicides, at labeled rates. Post bloom fruit drop – For suppression, begin applications at early bloom and when conditions are conducive to disease development. Repeat on a 7 to 10 day interval or as needed. Utilize the shorter spray interval between applications if warm, wet conditions persist. Citrus scab – For suppression, begin applications at first new foliar flush and repeat at petal fall and at ½ inch diameter fruit. Melanose – For suppression, begin applications at petal fall and repeat on a 7 to 10 day interval. Alternaria Leaf Spot – Begin applications when environmental conditions and plant stage are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. For improved performance on post bloom fruit drop, scab and melanose, use Serenade ASO in a tank mix or rotational program with other registered fungicides.

RECOMMENDED APPLICATION RATES FOR SELECTED CROPS – AGRICULTURAL USE

(Serenade ASO has a 0-Day PreHarvest Interval for all crops contained on this label)

Under moderate to severe disease pressure, for improved performance, increase rates and reduce spray intervals or use Serenade ASO in a tank mix or rotational program with other registered fungicides.

CROPS	DISEASE	RATE Qts./acre	APPLICATION INSTRUCTIONS
Corn Sweet Corn Popcorn Seed Corn Silage Corn Field Corn and other corn crops	Common rust <i>Puccinia sorghi</i> Southern Corn Leaf Blight <i>Bipolaris maydis</i> <i>Helminthosporium maydi</i> <i>Cochliobolus heterostrophus</i>	2 - 6	Begin applications when environmental conditions are conducive to disease development. Continue applications on 7 to 10 day intervals or as needed. Use higher rates and shorter application intervals under heavy disease pressure.
Cucurbits Cucumber Cantaloupe Melon Muskmelon Squash Watermelon and other cucurbit crops	Powdery Mildew <i>Erysiphe</i> spp. <i>Sphaerotheca</i> spp. Gummy Stem Blight <i>Didymella bryoniae</i> <i>Phoma cucurbitacearum</i> Downy Mildew <i>Pseudoperonospora cubensis</i>	2 - 6	Begin applications soon after emergence or transplant and continue on a 7 to 10 day interval or as needed. When environmental conditions and plant stage are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides.
Fruiting Vegetables Pepper Tomato Eggplant Ground Cherry Tomatillo Okra and other fruiting vegetables	Bacterial Spot <i>Xanthomonas</i> spp. Target Spot <i>Corynespora cassiicola</i>	2 - 6	Begin application soon after emergence or transplant and when environmental conditions are conducive to disease development. Continue applications on a 5 to 7 day interval or as needed. When conditions are conducive to rapid disease development, for improved control, use Serenade ASO in a tank mix program with copper-based bactericides registered for control of bacterial spot at labeled rates.
	Bacterial Speck <i>Pseudomonas syringae</i> pv tomato	2 - 6	Begin application soon after emergence or transplant and when environmental conditions are conducive to disease development. Continue applications on a 5 to 7 day interval or as needed. Use higher rates when conditions are conducive to rapid disease development.
	Early Blight <i>Alternaria solani</i> Late Blight suppression <i>Phytophthora infestans</i>	2 - 6	For suppression, begin application when plants are 4 to 6 inches high. Repeat applications on a 5 to 7 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for late blight control. Use shorter spray intervals under conditions conducive to rapid disease development.
	Powdery Mildew <i>Leveillula taurica</i> <i>Oidiopsis taurica</i> <i>Erysiphe</i> spp. <i>Sphaerotheca</i> spp.	2 - 6	For suppression, begin application soon after emergence or transplant when environmental conditions are conducive to disease development. Repeat on a 7 to 10 day interval or as needed. Use maximum label rates under conditions conducive to rapid disease development. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides.
	Gray Mold <i>Botrytis cinerea</i>	2 - 6	Begin application soon after emergence or transplant and repeat on a 7 to 10 day interval or as needed. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides.
Grape	Gray Mold <i>Botrytis cinerea</i> Sour Rot [a complex of pathogens <i>Aspergillus niger</i> , <i>Alternaria tenuis</i> , <i>Botrytis cinerea</i> , <i>Cladosporium herbarum</i> , <i>Rhizopus arrhizus</i> , <i>Penicillium</i> spp., and others]	2 - 6	Begin application at bloom, before bunch closure, at veraison and preharvest, up to day of harvest if necessary. Apply in sufficient water to provide thorough coverage. Serenade ASO may be applied to fruit up to and including the day of harvest.
	Powdery Mildew <i>Uncinula necator</i>	2 - 6	Begin application when new shoots are ½ to 1½ inches long. Repeat when shoots are 3 to 5 inches long, when shoots are 8 to 10 inches long and then at 7 to 10 day intervals until disease conditions no longer exist. Use high rates and shorter intervals when conditions are conducive to rapid disease development. Apply in sufficient water to provide thorough coverage.
	Downy Mildew <i>Plasmopara viticola</i>	2 - 6	For suppression, apply at 10 inch shoot, then at 7 to 10 day intervals until bunch closure (berry touch). For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for downy mildew control.
	Phomopsis <i>Phomopsis viticola</i>	2 - 6	Begin applications when shoots are ½ to 1 inch long and repeat when shoots are 6 to 8 inches long.
	Eutypa <i>Eutypa lata</i>	2 – 5% Solution	Apply solution to pruning wounds. Sanitation is critical. All wood from infected plants must be removed from the vineyard and destroyed (either buried or burned).

RECOMMENDED APPLICATION RATES FOR SELECTED CROPS – AGRICULTURAL USE

(Serenade ASO has a 0-Day PreHarvest Interval for all crops contained on this label)

Under moderate to severe disease pressure, for improved performance, increase rates and reduce spray intervals or use Serenade ASO in a tank mix or rotational program with other registered fungicides.

CROPS	DISEASE	RATE Qts./acre	APPLICATION INSTRUCTIONS
Hop	Powdery Mildew <i>Sphaerotheca macularis</i>	4 - 6 qts./ 100 gal.	Use the higher rates when moderate to high disease pressure is present or expected. Begin applications when environmental conditions are conducive to rapid disease development. Continue sprays at 7 day intervals or as needed. Apply at a rate of 4 to 6 qts. per 100 gallons of water using ground equipment. Minimum spray volume recommendations for hop growth stages are as follows: Emergence to training: Use 4 to 6 qts. of product per 100 gallons of water. Apply using a minimum spray volume of 20 gallons per acre. Coverage will vary with the size of the vines and the type of spray equipment. Apply adequate spray volume to achieve complete spray coverage. Training to wire touch: Use 4 to 6 qts. of product per 100 gallons of water. Apply using a minimum spray volume of 50 gallons per acre. Coverage will vary with the size of the vines and the type of spray equipment. Apply adequate spray volume to achieve complete spray coverage. Wire touch through harvest: Use 4 to 6 qts. of product per acre. Apply in a minimum spray volume of 100 gallons per acre. Higher water volumes may be necessary to achieve thorough coverage after side arms develop. Do not apply more than 10 qts. of product per acre per application. Apply adequate spray volume to achieve complete spray coverage. Use the higher rates when moderate to high disease pressure is present or expected.
Leafy Vegetables Lettuce Celery Spinach Parsley Radicchio and other leafy vegetable crops	Downy Mildew <i>Bremia lactucae</i> <i>Peronospora</i> spp. Powdery Mildew <i>Erysiphe cichoracearum</i>	2 - 6	For suppression, begin application when conditions are conducive to disease development and repeat on 7 to 10 day intervals or as needed. Apply in sufficient water to ensure complete coverage of of entire plant. For improved performance or as a preventative treatment in early crop stages use Serenade ASO in a tank mix or rotational program with other registered fungicides.
	Pink Rot <i>Sclerotinia sclerotiorum</i>	2 - 6	Begin application approximately 8 weeks before harvest and repeat on a 14 day interval. Apply Serenade ASO as a directed spray in sufficient water to ensure thorough coverage of the base of the plants and the surrounding soil surface. Light irrigation following application to incorporate Serenade ASO may improve disease control.
	Bacterial Blight <i>Xanthomonas campestris</i>	2 - 6	Begin applications when environmental conditions are conducive to disease development. Repeat on 7 to 10 day intervals or as needed.
	Sclerotinia Head and Leaf Drop <i>Sclerotinia</i> spp.	2 - 6	For control of early Sclerotinia head and leaf drop: Apply at planting or immediately following planting but prior to crop emergence as a 4 to 6 inch seed line treatment. Make a second application as a directed spray with multiple nozzles per each seed line in sufficient water to ensure thorough coverage of lower plant leaves and surrounding soil surface within 7 days of thinning. Repeat applications on 10 to 14 day intervals if conditions for disease development persist. Use higher rates under conditions conducive to moderate to severe disease pressure. Light irrigation after application to incorporate the product may improve disease control. - OR - For control of Sclerotinia head and leaf drop: Apply as a directed spray with multiple nozzles per each seed line in sufficient water to ensure thorough coverage of lower plant leaves and surrounding soil surface within 7 days of thinning or transplanting. Repeat applications on 10 to 14 day intervals if conditions for disease development persist. Use higher rates under conditions conducive to moderate to severe disease pressure. Light irrigation after application to incorporate the product may improve disease control.
Legumes/Vegetables (succulent and dried beans and peas) Beans Green beans Snap beans Shell beans Soybeans Dry Beans Garbanzo beans Lima beans Peas Chick peas Split peas Lentils and other legume/ vegetable crops	Rust <i>Uromyces appendiculatus</i>	2 - 6	For suppression, begin application soon after emergence or transplant and when conditions are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides.
	Rust <i>Puccinia</i> spp.	2 - 6	Begin applications when environmental conditions and plant stage are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. Use higher rates and shorter application intervals under heavy disease pressure.
	White Mold (Sclerotinia Stem Rot) <i>Sclerotinia sclerotiorum</i>	2 - 6	Begin application soon after emergence or transplant and when conditions are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. When conditions are conducive to rapid disease development use Serenade ASO in a rotational program with other registered fungicides.
Mint	Rust <i>Puccinia menthae</i>	2 - 6	Begin application soon after emergence and when conditions are conducive to disease development. Repeat on 7 to 10 day intervals or as needed. Use higher rates and shorter application intervals under heavy disease pressure.

RECOMMENDED APPLICATION RATES FOR SELECTED CROPS – AGRICULTURAL USE

(Serenade ASO has a 0-Day PreHarvest Interval for all crops contained on this label)

Under moderate to severe disease pressure, for improved performance, increase rates and reduce spray intervals or use Serenade ASO in a tank mix or rotational program with other registered fungicides.

CROPS	DISEASE	RATE Qts./acre	APPLICATION INSTRUCTIONS
Peanut	Early Leaf Spot <i>Cercospora</i> spp. <i>Cercospora arachidicola</i> Late Leaf Spot <i>Cercosporidium personatum</i> White Mold <i>Sclerotinia sclerotiorum</i>	2 - 6	Begin application when environmental conditions are conducive to disease development. Repeat applications on 14 day intervals or as needed. For improved control, use Serenade ASO in a tank mix program with copper-based fungicides registered for control of peanut leaf spot at labeled rates. Peanut hay may be fed to livestock.
Pome Fruit Apple Crabapple Pear Quince Mayhaw and other pome fruit	Fire Blight <i>Erwinia amylovora</i>	2 - 6	For suppression begin application at 1 – 5% bloom and repeat as necessary to protect open, untreated blossoms when conditions favoring disease development are likely to occur. For maximum control, use Serenade ASO prior to and as close as possible to fire blight infection events. During periods of rapid bloom development and frequent infection periods, spray intervals of 3 to 7 days may be required. After petal fall, continue applications on a 7 day interval while environmental conditions favor disease development. Apply in sufficient water to provide full coverage. For improved performance, use Serenade ASO in a rotational program with antibiotics registered for fire blight control such as but not limited to oxytetracycline or streptomycin. Proper orchard cultural practices are essential to eliminate fire blight-infected tissue from the orchard to assure good performance of any crop protection product. Care must be taken to remove and destroy dead and diseased wood from the orchard prior to and during the growing season. Use of Serenade ASO alone has not been shown to affect fruit finish. Use caution when selecting spray adjuvants. Select only those adjuvants which through prior experience do not affect fruit finish when combined with Serenade ASO.
	Brooks Spot ° <i>Mycosphaerella pomi</i> Cedar Apple Rust ° <i>Gymnosporangium juniperi-virginianae</i> Flyspeck ° <i>Schizothyrium pomi</i> Sooty Blotch ° <i>Gloeodes pomigena</i> Bot Rot ° <i>Botryosphaeria dothidea</i> Bitter Rot ° <i>Colletotrichum</i> spp. Bull's Eye Rot ° <i>Neofabraea</i> spp.	2 - 6	For control of Brooks Spot, Cedar Apple Rust, Flyspeck, Sooty Blotch, Bot Rot, Bitter Rot, and Bull's Eye Rot: Begin applications pre-bloom when environmental conditions are conducive to disease development. Repeat applications at 7 to 14 day intervals or as needed. Apply in sufficient spray volume to ensure thorough coverage. Use higher application rates and shorter spray intervals when conditions are conducive to rapid disease development or heavy disease pressure. For improved performance of Serenade ASO add a surfactant, known to be safe to the target crop, to the spray tank to improve coverage and wetting of plant surfaces. Serenade ASO may be applied up to and including the day of harvest (0-day PHI). ° NOT FOR USE IN CALIFORNIA
	Scab <i>Venturia</i> spp.	2 - 6	For suppression, begin application at green tip or when environmental conditions become favorable for primary scab development and repeat on 7 to 10 day intervals or as needed. When environmental conditions are conducive to rapid disease development, for improved performance use Serenade ASO in a tank mix or rotational program with other registered fungicides.
	Powdery Mildew <i>Podosphaera leucotricha</i>	2 - 6	Begin application at tight cluster, or sooner, if conditions are conducive to disease development. Repeat applications through the second cover spray on a 7 to 10 day interval. Additional sprays beyond second cover may be needed on susceptible varieties or when environmental conditions are conducive to rapid disease development. Use high label rate and shorter spray intervals when conditions are conducive to rapid disease development.
	Root / Tuber and Corm Vegetables Carrot Potato Sweet Potato Cassava Beets Ginger Horseradish Radish Gingseng Turnip and other root / tuber and corn crops	Black Root Rot / Black Crown Rot <i>Alternaria</i> spp.	2 - 6
	Bacterial Leaf Blight <i>Xanthomonas campestris</i> Downy Mildew <i>Peronospora</i> spp. Powdery Mildew <i>Erysiphe</i> spp. White Mold <i>Sclerotinia sclerotiorum</i> Gray Mold <i>Botrytis</i> spp.	2 - 6	Begin application soon after emergence or transplant and when conditions are conducive to disease development. Repeat on a 7 to 10 day interval or as needed. Use high rates and shorter intervals when conditions are conducive to rapid disease development. Apply in sufficient water to provide thorough coverage.
	Early Blight <i>Alternaria solani</i> Late Blight suppression <i>Phytophthora infestans</i>	2 - 6	For suppression, begin application soon after emergence and when conditions are conducive to disease development. Repeat on a 5 to 7 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for late blight control.

RECOMMENDED APPLICATION RATES FOR SELECTED CROPS – AGRICULTURAL USE

(Serenade ASO has a 0-Day PreHarvest Interval for all crops contained on this label)

Under moderate to severe disease pressure, for improved performance, increase rates and reduce spray intervals or use Serenade ASO in a tank mix or rotational program with other registered fungicides.

CROPS	DISEASE	RATE Qts./acre	APPLICATION INSTRUCTIONS
Stone Fruit Apricot Cherry Nectarine Peach Plum Prune and other stone fruit crops	Powdery Mildew <i>Sphaerotheca pannosa</i> <i>Podosphaera clandestine</i> <i>Podosphaera</i> spp. Bacterial Canker <i>Pseudomonas</i> spp. Brown Rot Blossom Blight <i>Monolinia laxa</i> Fruit Brown Rot suppression <i>Monilinia fruticola</i> Gray Mold <i>Botrytis cinerea</i> Bacterial Leaf Spot/Bacterial Spot ° <i>Xanthomonas arboricola</i>	2 - 6	Powdery Mildew - For suppression, begin application at popcorn stage and repeat on a 7 day interval or as needed. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for powdery mildew control. Bacterial Canker – Apply post harvest before fall rains and again during dormancy before spring growth. Brown Rot Blossom Blight - Begin application at early bloom and repeat through petal fall on a 7 day interval or as needed. Bacterial Leaf Spot/Bacterial Spot - Begin applications at bud break and continue on a 7 to 14 day schedule or as needed until harvest. During periods of rapid disease development and frequent infection periods, use Serenade ASO in a program with other registered antibiotics and/or copper bactericides. For improved performance of Serenade ASO, add a surfactant to the spray tank to improve coverage. For all other diseases – Begin application prior to disease development when environmental conditions and plant stage are conducive to rapid disease development and repeat on a 7 to 10 day interval or as needed. Use higher rates and shorter application intervals under heavy disease pressure. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides. Serenade ASO may be applied to fruit up to and including the day of harvest.
Strawberry	Powdery Mildew <i>Sphaerotheca macularis</i> <i>Erysiphe</i> spp. Anthracnose <i>Colletotrichum acutatum</i> Botrytis <i>Botrytis cinerea</i> Gray Mold <i>Botrytis</i> spp.	2 - 6	Botrytis/Powdery mildew - For suppression, begin application at or before flowering and repeat on 7 to 10 day intervals or as needed through harvest. Use higher rates and shorter application intervals under heavy disease pressure. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides for powdery mildew and botrytis control. Anthracnose – Begin application prior to disease development and repeat on 7 to 10 day intervals or as needed. Use higher rates and shorter application intervals under heavy disease pressure. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicide. Serenade ASO may be applied up to and including the day of harvest.
Tree Nuts Almond Pistachio Pecan Walnut Filberts Chestnut Cashew Beechnut Butternut Macadamia and other tree nut crops	Walnut Blight <i>Xanthomonas campestris</i> Anthracnose - suppression <i>Colletotrichum acutatum</i> Bacterial Canker <i>Pseudomonas syringae</i> Shot Hole - suppression <i>Wilsonmyces carpophilus</i> <i>Xanthomonas pruni</i> <i>Blumeriella gaapi</i> <i>Cercospora</i> spp. Brown Rot - suppression <i>Monilinia</i> spp.	2 - 6	Walnut Blight – Begin application no later than pistillate bloom and repeat on 7 to 10 day intervals or as needed. Apply in advance of rain for maximum protection. Under conditions conducive to heavy disease pressure, for improved control, use Serenade ASO in a tank-mix or rotational program with a copper-based bactericide registered for control of walnut blight. For all other diseases – Begin application prior to disease development and repeat on 7 to 10 day intervals or as needed. Use higher rates and shorter application intervals under heavy disease pressure. For improved performance, use Serenade ASO in a tank mix or rotational program with other registered fungicides.
Tropical Fruits Avocado Bananas Plantains Mango Papaya Pineapple and other tropical fruits	Anthracnose <i>Colletotrichum gloeosporioides</i> <i>Colletotrichum ananas</i> Bacterial Canker <i>Xanthomonas campestris</i>	2 - 6	Avocado/Mango – Begin application at budbreak and repeat on a 14 to 21 day interval or as needed through harvest. Papaya/Pineapple – Begin application at flowering and repeat on a 14 to 21 day interval or as needed through harvest. Bacterial Canker – Begin applications when environmental conditions are conducive to disease development.Repeat on 7 to 10 day intervals or as needed. Serenade ASO may be applied to fruit up to and including the day of harvest.
	Sigatoka <i>Mycosphaerella fijiensis</i>	2 - 6	Begin application when leaves first appear and repeat on a 7 to 21 day interval or as needed. Apply in sufficient water to obtain thorough coverage of foliage. For improved disease control, Serenade ASO may be tank-mixed with oil or other fungicides registered for control of Sigatoka at labeled rates. When conditions are conducive to rapid disease development and/or heavy disease pressure, higher application rates and rotational spray programs with other fungicides registered for control of Sigatoka are recommended.
Watercress	Cercospora leafspot <i>Cercospora</i> spp.	2 - 6	Begin applications when conditions are conducive to disease development. Continue applications on 7 to 10 day intervals or as needed.