

69592-12

09/02/2004

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

SEP 02 2004

Mr. John E. Inouye  
Senior Pesticide Use Specialist  
Registration Branch  
1001 I Street  
P.O. Box 4015  
Sacramento, CA 95812-4015

Dear Mr. Inouye:

Subject: Registration Action Under Section 24 (c)  
Use of Serenade ASO for control of black rot, alternaria leaf blight, and  
bacterial leaf spot on carrots.  
EPA SLN No. CA-040014  
Your Submission Dated August 18, 2004

This will acknowledge receipt of your notification to the Agency of a registration,  
pursuant to section 24 (c) of the Federal Insecticide, Fungicide, and Rodenticide Act, as  
follows:

Product:	Serenade ASO
EPA Registration Number:	69592-12
24 (c) Registrant:	Agraquest 1530 Drew Avenue Davis, CA 95616

The Agency has determined that the subject Special Local Need (SLN) registration  
as requested for use of Serenade ASO is acceptable.

If you have any questions, please contact Tessa Milofsky at (703) 308-0455.

Sincerely,

A handwritten signature in black ink, appearing to read "Dennis Szuhay".

Dennis Szuhay, Branch Chief  
Microbial Pesticides Branch (7511C)  
Biopesticides and Pollution Prevention Division

cc: Gary Clark, AgraQuest



AgraQuest, Inc.

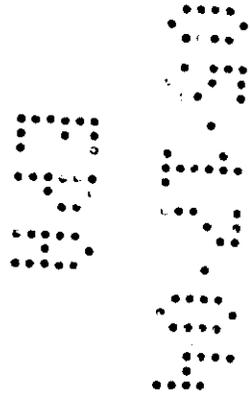
1530 Drew Avenue  
Davis, CA 95616-6320  
tel. 530.750.0150  
fax. 530.750.0153  
agraquest@agraquest.com  
www.agraquest.com

*Innovative natural product  
solutions for pest management*

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May 13, 2004

Ms. Susanne Cerrelli, R.A.L.  
Document Processing Desk  
Office of Pesticide Programs (7504C)  
U. S. Environmental Protection Agency  
Room 266A, Crystal Mall 2  
1921 Jefferson Davis Highway  
Arlington, VA 22202-4501



Subject: Serenade® ASO (EPA Reg. No. 69592-12)  
Submission of Final Printed labeling

Dear Ms. Cerrelli:

AgraQuest, Inc. has received the Environmental Protection Agency's March 18, 2004 letter granting conditional registration for Serenade ASO, EPA Reg. No. 69592-12. As required in that notice of registration, AgraQuest, is hereby submitting five (5) copies of the final printed Serenade ASO labeling for your files and use. This final printed labeling is identical in content to the Serenade ASO label approved by the Agency in its March 18, 2004 registration notice, with the single exception that the Organic Materials Review Institute (OMRI) logo has been added to the front panel. Please note that these labels contain only the agricultural uses for this product; the home and garden uses will be marketed as Serenade® Garden Disease Control Concentrate.

Should there be any questions concerning the enclosed final printed labeling, please contact me by telephone at (530) 750-0150, extension 149, by fax at (530) 750-0153, or by e-mail at [rriggs@agraquest.com](mailto:rriggs@agraquest.com).

Sincerely yours,

AgraQuest, Inc.

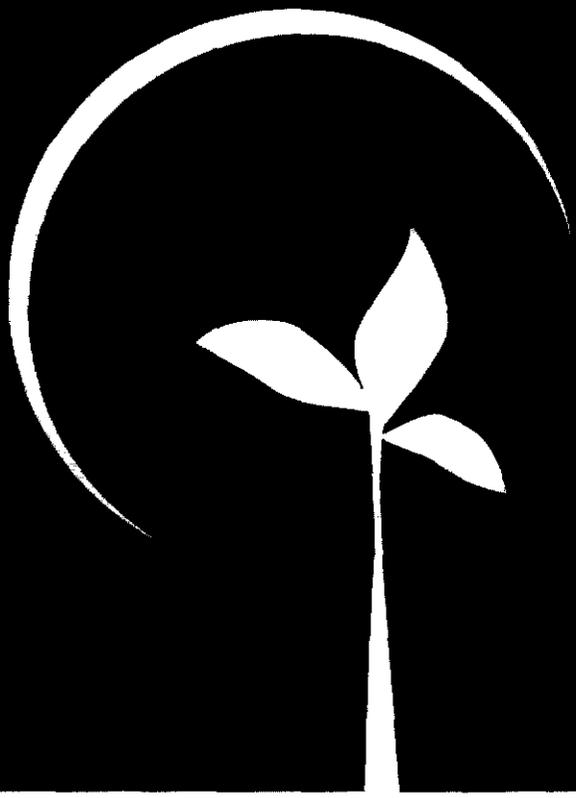
Ralph L. Riggs  
Manager, State Registrations

Enclosures

CC: Dr. Don Edgecomb, AgraQuest, Inc.

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# SERENADE



For Organic Production

**OMRI**  
Listed

An Aqueous Suspension Biofungicide

<b>ACTIVE INGREDIENT</b>	
QST 713 strain of <i>Bacillus subtilis</i> .....	1.34%
<b>INERT INGREDIENTS</b> .....	98.66%
Total .....	100.00%

Contains a minimum of  $1 \times 10^9$  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, and 6,417,163 on  
QST 713 strain of *Bacillus subtilis*

NET CONTENTS: **3 GAL.**

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

*See attached booklet for First Aid Statements*

	AgraQuest, Inc. 1530 Drew Avenue Davis, California 95616 info@agraquest.com www.agraquest.com
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180E-001 • PRODUCT OF MEXICO

## NOTIFICATION

Date Reviewed: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

# SERENADE<sup>®</sup> ASO

An Aqueous Suspension Biofungicide

For Organic Production

**ACTIVE INGREDIENT**

QST 713 strain of *Bacillus subtilis* .....1.34%

**INERT INGREDIENTS** ..... 98.66%

Total.....100.00%

Contains a minimum of  $1 \times 10^9$  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; and 6,417,163 on

QST 713 strain of *Bacillus subtilis*

18OK-001

NET CONTENTS: **3 GAL.**

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

See attached booklet for First Aid Statements.

AgraQuest, Inc.  
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info@agraquest.com  
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**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 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.

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

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

**PRECAUTIONARY STATEMENTS – Agricultural Use**

**HAZARDS TO HUMANS & DOMESTIC ANIMALS  
CAUTION**

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water.

**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 such instructions are available, use detergent and hot water for washables. Keep and wash PPE separately from other laundry.

**USER SAFETY RECOMMENDATIONS**

Users should:  
Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

**ENVIRONMENTAL HAZARDS – Agricultural Use**

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

**DIRECTIONS FOR USE – Agricultural 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 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.

**STORAGE AND DISPOSAL – Agricultural Use**

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.

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**GENERAL USE INFORMATION – Agricultural Use**

Serenade® ASO is a broad spectrum, preventative biofungicide 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.

**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 – Agricultural Use**

Carefully read and follow all label directions, use rates and restrictions. 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– Agricultural Use**

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

**APPLICATION INSTRUCTIONS – Agricultural Use**

**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:** Do not apply this product by air.

**CHEMIGATION:** Do not apply this product through any type of irrigation system.

**MIXING INSTRUCTIONS – Agricultural Use**

**MIXING:** Serenade ASO is intended for dilution with water for spray application. 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.

**COMPATIBILITY:** 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 mix must be in accordance with the more restrictive label limitations and precautions. If the user does not have prior experience with the tank mix combinations, conduct a jar test to determine physical compatibility and 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 – and thorough coverage of all above-ground plant parts is required – add to the spray tank an adjuvant known to be non-phytotoxic to the plant. Serenade ASO must not be mixed with any type of penetrant.

**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. To the extent permitted by state law, the Seller's liability for any breach of warranty shall not exceed the purchase price of the material as to which a claim is made.

To the extent permitted by state law, Buyers and users of this product are responsible for all loss or damage from use or handling of this product which results from conditions beyond the control of Seller, or without the fault or negligence of the Seller, or from failure to follow the label.

Serenade® is a registered trademark of AgraQuest.

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Product of Mexico



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1530 Drew Avenue  
Davis, California 95616  
www.agraquest.com

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**Recommended Application Rates for Selected Crops – Agricultural Use**  
 (Serenade ASO has a 0-Day PreHarvest interval for all crops contained on this label)

Crops	Disease	Rate gts./acre	Use Recommendations
Apple, Pear	Fire Blight <i>Erwinia amylovora</i>	6-8	For suppression begin applications 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, application of Serenade ASO should be made 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 – 7 days may be required. For apples and pears after petal fall, continue applications at 7-day intervals while environmental conditions favor rapid disease development. Apply in sufficient water to provide full coverage. For improved control, 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 caution when selecting spray adjuvants. Select only those adjuvants which through prior experience do not affect fruit finish when combined with Serenade ASO.
	Scab <i>Venturia</i> spp.	6-8	For suppression begin applications at green tip or when environmental conditions become favorable for primary scab development. When environmental conditions are conducive to rapid disease development, for improved control use Serenade ASO in a tank mix with other registered fungicides on a 7- to 10-day schedule.
	Powdery Mildew <i>Podosphaera leucotricha</i>	6-8	Begin application at tight cluster, or sooner, if conditions are conducive to onset of disease development. Continue applications through the second cover spray at 7- to 10-day intervals. 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.
Beans, snap*	Bean Rust <i>Uromyces appendiculatus</i>	4-8	For suppression, begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When conditions are conducive to rapid disease development use Serenade ASO in a rotational program with other registered fungicides.
	White Mold <i>Sclerotinia sclerotiorum</i>	4-8	Begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When conditions are conducive to rapid disease development use Serenade ASO in a rotational program with other registered fungicides.
Blueberries*	Mummy berry <i>Monilinia vaccinii-corymbosi</i>	8	For suppression, begin applications at the bud break stage of development and repeat at 7-day intervals or as needed.
Broccoli	Pin Rot <i>Alternaria/Xanthomonas</i> complex Downy Mildew <i>Peronospora parasitica</i>	3-6	For suppression, begin applications when environmental conditions are conducive to rapid disease development. Continue sprays at 7-day intervals.
Carrot	Black Root Rot/ Black Crown Rot <i>Alternaria</i> spp.	2-4	Begin applications when environmental conditions are conducive to rapid disease development. Continue sprays at 7-day intervals or as needed.
	Bacterial Leaf Blight <i>Xanthomonas campestris</i>	6-10	Begin applications when environmental conditions are conducive to rapid disease development. Continue sprays at 7-day intervals 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.
Cherry	Gray Mold <i>Botrytis cinerea</i>	6-8	Begin applications when environmental conditions and plant stage are conducive to rapid disease development. Continue at 7-day intervals.
	Powdery Mildew <i>Podosphaera clandestina</i>	6-8	For suppression, begin application at popcorn and repeat every 7 days as needed.
Cucurbits	Powdery Mildew <i>Erysiphe</i> spp. <i>Sphaerotheca</i> spp.	4-8	Begin applications soon after emergence or transplant and continue on a 7-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.

\*Not for use in California

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**Recommended Application Rates for Selected Crops – Agricultural Use**  
 (Serenade ASO has a 0-Day PreHarvest interval for all crops contained on this label)

Crops	Disease	Rate Qts./acre	Use Recommendations
Grape	Gray Mold <i>Botrytis cinerea</i> Sour Rot	4-8	Make applications at bloom, before bunch closure, at veraison and preharvest, up to day of harvest if necessary. Apply in sufficient water to provide full coverage.
	Powdery Mildew <i>Uncinula necator</i>	4-8	Start application when new shoots are 1/2- to 1 1/2- 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>	5-8	For suppression, apply at 10-inch shoot then at 7-day intervals until bunch closure (berry touch).
Leafy Vegetables (except Brassica)	Downy Mildew <i>Bremia lactucae</i> <i>Peronospora</i> spp.	3-6	For suppression, use as a preventative treatment in early crop stages in a tank mix or alternating spray program with other registered fungicides. Apply as a foliar spray and begin applications when conditions favor disease development. Continue sprays at 7- to 10- day intervals or as needed. Apply in sufficient water to ensure complete coverage of entire plant. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides for Downy Mildew and Powdery Mildew control.
	Powdery Mildew <i>Erysiphe cichoracearum</i>		
	Sclerotinia head and leaf drop <i>Sclerotinia</i> spp.	4-8	<u>For control of early Sclerotinia head and leaf drop:</u> 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. Additional applications should be made 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 <u>For control of Sclerotinia head and leaf drop:</u> 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. Additional applications should be made 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.
Mint	Rust <i>Puccinia menthae</i>	4-6	Begin applications when plants are 4 – 6 inches high.. Repeat applications at 7-day intervals or as needed.
Onion	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>	6-10	Begin applications when environmental conditions are conducive to disease development and continue as needed for disease control. Apply in sufficient water to provide complete coverage of plants. Continue sprays at 7-day intervals or as needed. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides for Botrytis neck rot control.
Garlic	Botrytis Neck Rot <i>Botrytis</i> spp.	6-10	Begin applications when environmental conditions are conducive to disease development and continue as needed for disease control. Apply in sufficient water to provide complete coverage of plants. Continue sprays at 7-day intervals or as needed. 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>	2-8	For suppression, use Serenade ASO as part of a preventative disease control program in alternation or tank mix with other registered fungicides. Apply in sufficient water to provide complete coverage of plants. Continue applications as needed.
Peanut*	Early Leaf Spot <i>Cercospora</i> spp. Late Leaf Spot <i>Cercosporidium personatum</i>	2-8	Begin applications when environmental conditions are conducive to rapid disease development. Continue applications at 14-day intervals or as needed. 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.

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**Recommended Application Rates for Selected Crops – Agricultural Use**  
(Serenade ASO has a 0-Day PreHarvest interval for all crops contained on this label)

Crops	Disease	Rate Qts./acre	Use Recommendations
Pepper	Gray Mold <i>Botrytis cinerea</i>	4-8	Begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides.
	Powdery Mildew <i>Oidiopsis taurica</i>	6-8	For suppression, begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides.
	Bacterial Spot <i>Xanthomonas</i> spp.	2-8	Begin applications 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, use Serenade ASO in a tank mix program with copper-based bactericides registered for control of bacterial spot at labeled rates.
Potato	Early Blight <i>Alternaria solani</i> Late Blight <i>Phytophthora infestans</i>	6	For suppression, begin applications when plants are 4- to 6-inches high. Repeat applications at 5- to 7-day intervals or as needed. Use Serenade ASO in a rotational program with other registered fungicides for foliar disease control. Use shorter spray intervals under conditions conducive to rapid disease development.
Tomato	Early Blight <i>Alternaria solani</i> Late Blight <i>Phytophthora infestans</i>	4-8	For suppression, begin applications when plants are 4- to 6-inches high. Repeat applications at 5- to 7-day intervals or as needed. Use Serenade ASO in a rotational program with other registered fungicides for foliar disease control. Use shorter spray intervals under conditions conducive to rapid disease development.
	Powdery Mildew <i>Leveillula taurica</i>	4-8	Begin applications soon after emergence or transplant and when environmental conditions are conducive to disease development. Continue applications on 5- to 7-day intervals or as needed. Use maximum label rates under conditions conducive to rapid disease development.
	Bacterial Spot <i>Xanthomonas</i> spp. Target Spot <i>Corynespora cassicola</i>	2-8	Begin applications 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, use Serenade ASO in a tank mix program with copper-based bactericides registered for control of bacterial spot at labeled rates.
Walnut	Walnut Blight <i>Xanthomonas campestris</i>	4-8	Apply no later than pistillate bloom and repeat at 7- to 10-day intervals depending on orchard disease history and environmental conditions. Make applications in advance of rain for maximum protection. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program and tank mixed with a copper-based bactericide registered for control of walnut blight at labeled rates.

**Recommended Application Rates for Hop**  
(Serenade ASO has a 0-Day PreHarvest interval for all crops contained on this label)

Crops	Disease	Rate Qts. Serenade ASO / 100 gal spray solution	Use Recommendations
Hop*	Powdery Mildew <i>Sphaerotheca macularis</i>	6-10 qts./ 100 gal	<p>Use the higher rates when moderate to high disease pressure is present or expected. Do not apply more than 10 qts./acre per application.</p> <p>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 6-10 qts. per 100 gallons of water using ground equipment.</p> <p>Minimum spray volume recommendations for hop growth stages are as follows:</p> <p>Emergence to training: Use 6-10 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.</p> <p>Training to wire touch: Use 6-10 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.</p> <p>Wire touch through harvest: Use 6-10 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.</p>

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### Recommended Application Rates for Selected Greenhouse Crops - Agricultural Use

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

Greenhouse Crops	Diseases	Rate Qts./100 gallons spray mix	Use Recommendations
Broccoli	Pin Rot <i>Alternaria</i> / <i>Xanthomonas</i> complex	3-6	For suppression, begin applications when environmental conditions in the greenhouse are conducive to rapid disease development. Continue sprays at 7- day intervals. Thorough coverage is essential. Do not apply more than 6 qts. of Serenade ASO per acre per application.
Carrot	Black Root Rot/ Black Crown Rot <i>Alternaria</i> spp.	2-4	Begin applications when environmental conditions in the greenhouse are conducive to rapid disease development. Continue sprays at 7- day intervals or as needed. Thorough coverage is essential. Do not apply more than 4 qts. of Serenade ASO per acre per application.
	Bacterial Leaf Blight <i>Xanthomonas campestris</i>	6-10	Begin applications when environmental conditions in the greenhouse are conducive to rapid disease development. Continue sprays at 7-day intervals or as needed. Use high rates and shorter intervals when conditions are conducive to rapid disease development. Thorough coverage is essential. Do not apply more than 10 qts. of Serenade ASO per acre per application.
Cucurbits	Powdery Mildew <i>Erysiphe</i> spp. <i>Sphaerotheca</i> spp.	4-8	Begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When environmental conditions in the greenhouse and plant stage are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides. Continue sprays at 7- day intervals or as needed. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
Leafy Vegetables (except Brassica)	Downy Mildew <i>Bremia lactucae</i> <i>Peronospora</i> spp. Powdery Mildew <i>Erysiphe cichoracearum</i>	3-6	For suppression, use as a preventative treatment in early crop stages in a tank mix or alternating spray program with other registered fungicides. Apply as a foliar spray and begin applications when conditions favor disease development. Continue sprays at 7- to 10- day intervals or as needed. Apply in sufficient water to ensure complete coverage of entire plant. When conditions are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides for downy mildew and powdery mildew control.
	Sclerotinia head and leaf drop <i>Sclerotinia</i> spp.	4-6	<b>For control of early Sclerotinia head and leaf drop:</b> 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. Additional applications should be made 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. Thorough coverage is essential. Do not apply more than 6 qts. of Serenade ASO per acre per application.  OR <b>For control of Sclerotinia head and leaf drop:</b> 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. Additional applications should be made 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. Thorough coverage is essential. Do not apply more than 6 qts. of Serenade ASO per acre per application.
Onion	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>	6-10	Begin applications when environmental conditions in the greenhouse are conducive to rapid disease development. Continue sprays at 7-day intervals or as needed. When conditions in the greenhouse are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides for Botrytis neck rot control. Thorough coverage is essential. Do not apply more than 10 qts. of Serenade ASO per acre per application.
Garlic	Botrytis Neck Rot <i>Botrytis</i> spp.	6-10	Begin applications when environmental conditions in the greenhouse are conducive to rapid disease development. Continue sprays at 7-day intervals or as needed. Under moderate to severe disease pressure, use Serenade ASO in a rotational program with other registered fungicides for Botrytis neck rot control. Thorough coverage is essential. Do not apply more than 10 qts. of Serenade ASO per acre per application.
	Rust <i>Puccinia porri</i>	2-6	For suppression, use Serenade ASO as a part of a preventative disease control program in alternation or tank mix with other registered fungicides. Continue applications as needed. Thorough coverage is essential. Do not apply more than 6 qts. of Serenade ASO per acre per application.

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**Recommended Application Rates for Selected Greenhouse Crops**  
 (Serenade ASO has a 0-Day PreHarvest interval for all crops contained on this label)

Greenhouse Crops	Diseases	Rate Qts./100 gallons spray mix	Use Recommendations
Pepper	Gray Mold <i>Botrytis cinerea</i>	4-8	Begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When environmental conditions in the greenhouse are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides. Continue sprays at 7-day intervals or as needed. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
	Powdery Mildew <i>Oidiopsis taurica</i>	6-8	For suppression, begin applications soon after emergence or transplant and continue on a 7-day interval or as needed. When environmental conditions in the greenhouse are conducive to rapid disease development, use Serenade ASO in a rotational program with other registered fungicides. Continue sprays at 7-day intervals or as needed. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
	Bacterial Spot <i>Xanthomonas</i> spp.	2-8	Begin applications 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, use Serenade ASO in a tank mix program with copper-based bactericides registered for control of bacterial spot at labeled rates. Continue sprays at 7-day intervals or as needed. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
Tomato	Early Blight <i>Alternaria solani</i> Late Blight <i>Phytophthora infestans</i>	4-8	For suppression, begin applications when plants are 4- to 6-inches high. Repeat applications at 5- to 7-day intervals or as needed. Use Serenade ASO in a rotational program with other registered fungicides for foliar disease control. Use shorter spray intervals under conditions conducive to rapid disease development. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
	Powdery Mildew <i>Leveillula taurica</i>	4-8	Begin applications soon after emergence or transplant and when environmental conditions in the greenhouse are conducive to rapid disease development. Continue applications on 5- to 7- day intervals or as needed. Use maximum label rates under conditions conducive to rapid disease development. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.
	Bacterial Spot <i>Xanthomonas</i> spp. Target Spot <i>Corynespora cassicola</i>	2-8	Begin applications 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, use Serenade ASO in a tank mix program with copper-based bactericides registered for control of bacterial spot at labeled rates. Continue sprays at 7-day intervals or as needed. Thorough coverage is essential. Do not apply more than 8 qts. of Serenade ASO per acre per application.