

Fungicide



SERENADE[®] ASO

*For use as a foliar fungicide for the reduction of damage caused by various fungal diseases in a wide range of agricultural and horticultural crops. Also for use as a potato tuber treatment for the reduction of silver scurf (*Helminthosporium solani*).*

This product must only be used and sold in England, Scotland and Wales.

A suspension concentrate containing 1015.1 g/L *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713 (including fermentation residues and water). Containing a minimum of 1.05×10^{12} cfu/L

The (COSHH) Control of Substances Hazardous to Health Regulations may apply to the use of this product at work.

Authorisation Holder and Marketing Company:

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GROUP BM02 FUNGICIDE

MAPP 21020 F



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Safety Information

SERENADE ASO

UFI: QQU1-90KT-F00K-C9NR

Containing 1015.1 g/L *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713 (including fermentation residues and water) (a minimum of 1.05×10^{12} cfu/L).

Dispose of contents/container to a licensed hazardous waste disposal contractor or collection site except for triple rinsed empty containers which can be disposed of as non-hazardous waste.

To avoid risks to human health and the environment, comply with the instructions for use.

SAFETY INFORMATION

Operator Protection

Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:

When used as a foliar or soil application:

WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS), SUITABLE PROTECTIVE GLOVES AND SUITABLE RESPIRATORY PROTECTIVE EQUIPMENT* when handling the concentrate or applying the product.

*Disposable filtering face piece respirator to at least EN149 FFP3 or equivalent.

When used as a potato seed treatment:

WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS), SUITABLE PROTECTIVE GLOVES AND SUITABLE RESPIRATORY PROTECTIVE EQUIPMENT* when handling the concentrate, handling contaminated surfaces or handling treated seed.

*Disposable filtering face piece respirator to at least EN149 FFP3 or equivalent.

However, engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection.

1015.1 g/L *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713 (including fermentation residues and water) – Microorganisms may have the potential to provoke a sensitising reactions.

Environmental Protection

DO NOT CONTAMINATE WATER with the product or its container, (do not clean application equipment near surface water).

Avoid contamination via drains from farmyards and roads.

Use appropriate containment to avoid environmental contamination.

This material and its container must be disposed of in a safe way.

The use of this product in recirculating water systems in a glasshouse may result in dilute pesticide waste that requires disposal. All dilute pesticide waste must be disposed of safely and legally to protect humans, wildlife and the environment, especially groundwater and surface water. Pesticide disposal advice is detailed in the 'Code of Practice for Using Plant Protection Products (Section 5: Disposing of Pesticide Waste).

Do not use where bees are actively foraging.

Storage and Disposal

KEEP IN ORIGINAL CONTAINER tightly closed in a safe place.

WASH OUT CONTAINER THOROUGHLY, empty washings into spray tank, and dispose of safely.

PRECAUTIONS for treated seed potatoes

WEAR SUITABLE PROTECTIVE GLOVES when handling treated seed potatoes.

DO NOT HANDLE seed unnecessarily.

DO NOT USE TREATED SEED as food or feed.

KEEP TREATED SEED SECURE from people, domestic stock /pets and wildlife at all times during storage and use.

TO PROTECT BIRDS/WILD MAMMALS, treated seed should not be left on the soil surface.

BURY OR REMOVE SPILLAGES.

DO NOT RE-USE SACKS OR CONTAINERS THAT HAVE BEEN USED FOR TREATED SEED for food or feed.

WASH HANDS AND EXPOSED SKIN before meals and after work.



To access the **Safety Data Sheet** for this product scan the code or use the link below:

<https://croppscience.bayer.co.uk/our-products/fungicides/serenade-aso>

or alternatively contact your supplier

Bayer

IMPORTANT INFORMATION FOR USE ONLY AS A PROFESSIONAL FUNGICIDE

Crops	Maximum individual dose	Maximum number of treatments	Latest time of application
Foliar application:			
Strawberry (Outdoor and protected).	8.0 L/Ha	6 per crop	Before second harvest: more fruits coloured (BBCH 89).
Lettuce (Outdoor, and permanent protection with full enclosure).	8.0 L/Ha	6 per crop	Before typical size, form and firmness reached (BBCH 49).
Tomato, pepper and Aubergine (all permanent protection with full enclosure).	8.0 L/Ha	6 per crop	Before fully ripe (BBCH 89).
Table grapes (Outdoor) Wine grape (Outdoor)	4.0 L/ha	4 per crop	1 day before harvest
Outdoor Apple and pear	8.0 L/ha	6 per crop	1 day before harvest
Outdoor Oilseed rape	2.0 L/ha	2 per crop	1 day before harvest
Outdoor Carrot	8.0 L/ha	4 per crop	1 day before harvest
Soil application:			
Potato	5.0 L/ha	1 per crop	At planting
Carrot	10 L/ha	1 per crop	At planting
Seed treatment:			
Potato (seed)	1.0 L of product per tonne of seed tubers	One per batch	At planting

Other specific restrictions:

For crops grown under "Permanent protection with full enclosure" – Reasonable precautions must be taken to prevent access of birds, wild mammals and honey bees to treated crops.

For crops grown under "Permanent protection with full enclosure" – To minimise airborne environmental exposure, vents, doors and other openings must be closed during and after application until the applied product has fully settled.

Permanent protection with full enclosure – Protected crop situations which provide full enclosure (including continuous top and side barriers down to below ground level) and which are present and maintained over a number of years.

For use as a potato (seed) treatment:

Treated seed must not be used for food or feed.

Sacks containing treated seed must not be re-used for food or feed.

READ THE LABEL BEFORE USE. USING THIS PRODUCT IN A MANNER THAT IS INCONSISTENT WITH THE LABEL MAY BE AN OFFENCE. FOLLOW THE CODE OF PRACTICE FOR USING PLANT PROTECTION PRODUCTS.

DIRECTIONS FOR USE

IMPORTANT: This information is approved as part of the product label. All instructions

within this section must be read carefully in order to obtain safe and successful use of this product.

Serenade® ASO is a biofungicide containing *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713, a naturally occurring bacteria that are not genetically modified.

Serenade ASO prevents plant diseases by first creating a zone of inhibition on the leaf and preventing attachment and penetration of the pathogens. Biological compounds produced by *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713 act to destroy germ tubes and mycelia of pathogenic fungi by puncturing their cell membranes. By preventing spore germination and penetration into the plant, the

infection is stopped and disease is prevented from spreading to the rest of the plant. Furthermore, compounds produced *Bacillus amyloliquefaciens* (formerly *subtilis*) strain QST 713 induce the systemic resistance response of the plant, indicated by enhanced peroxidase activity.

Serenade ASO may be applied as a foliar spray alone or in alternating spray programmes with other registered crop protection products. Alternating with fungicides of different modes of action, along with the use of cultural control methods, is advisable for resistance management.

Restrictions and Warnings

CONSULT PROCESSOR BEFORE USING ON CROPS FOR PROCESSING. The effects of fermentation processes in wine and cider/perry production have not been fully tested.

Do not apply using irrigation equipment.

Diseases Targeted

Crops:	Diseases
Foliar Application:	
Strawberry (Outdoor & Protected).	Reduction of fruit damage caused by grey mould (<i>Botrytis cinerea</i>).
Lettuce (Permanent protection with full enclosure).	Reduction of damage caused by Grey mould (<i>Botrytis cinerea</i>), <i>Sclerotinia</i> (<i>Sclerotinia sp.</i>).
Lettuce (Outdoor).	Reduction of damage caused by Grey mould (<i>Botrytis cinerea</i>).
Tomato, pepper and Aubergine (Permanent protection with full enclosure).	Reduction of damage caused by Grey mould (<i>Botrytis cinerea</i>). Limited effectiveness data indicate some control of bacterial spots (<i>Pseudomonas syringae</i> , <i>Xanthomonas campestris</i>) in tomatoes.
Table grapes (outdoor) Wine grape (outdoor)	Reduction of fruit damage caused by grey mould (<i>Botrytis cinerea</i>).

Crops:	Diseases
Outdoor Apple and pear	Reduction of damage caused by Fire blight (<i>Erwinia amylovora</i>) – based on limited data.
Outdoor Oilseed rape	Reduction of damage caused by <i>Sclerotinia</i> (<i>Sclerotinia spp.</i>)
Outdoor Carrot	Reduction of damage caused by Leaf blight (<i>Alternaria sp.</i>), Powdery mildew (<i>Erysiphe sp.</i>)
Soil application:	
Potato	Reduction of damage caused by silver scurf (<i>Helminthosporium solani</i>)
Carrot	Reduction of damage caused by <i>Pythium sp.</i> Including Cavity spot (<i>Pythium violae</i>)
Seed treatment	
Potato (seed).	Reduction of silver scurf (<i>Helminthosporium solani</i>).

CROP SPECIFIC INFORMATION:

Foliar Application:

Strawberry (outdoor and protected):

Apply in a water volume of 300 – 1000 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Botrytis control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Serenade ASO works preventatively and with a contact mode of action, so for successful control of *Botrytis* it is vital to achieve complete cover on all flowers and fruitlets throughout the blossom period. Sprayers should be set up in such a way as to achieve maximum cover on these parts, with sprays directed over the crop rows (not applied overall). The first spray of a *botrytis* fungicide programme should be made from first flower set (BBCH 55). Apply Serenade ASO at a rate of 8 L/ha. Serenade ASO may be used up to a maximum of six applications. A minimum of five days should fall between applications of Serenade ASO.

Lettuce (Outdoor and permanent protection with full enclosure):

Apply in a water volume of 500 – 1000 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Botrytis control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Apply Serenade ASO at a rate of 8 L/ha, from 3 true leaves, (BBCH 13), from the early onset of disease. Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Serenade ASO may be used up to a maximum of six applications. A minimum of five days should fall between applications of Serenade ASO.

Serenade ASO can reduce the occurrence of *Sclerotinia* (*Sclerotinia sp.*) in lettuce crops grown under permanent protection when used in a programme of fungicide sprays.

***Tomato, pepper and aubergine
(Permanent protection with full enclosure):***

Apply in a water volume of 200 – 1500 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Botrytis control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Apply Serenade ASO at a rate of 8 L/ha, after the 3rd leaf on the main shoot has unfolded, (BBCH 13), from the early onset of disease. Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Apply Serenade ASO at a rate of 8 L/ha. Serenade ASO may be used up to a maximum of six applications. A minimum of five days should fall between applications of Serenade ASO.

Table grapes (outdoor) Wine grape (outdoor)

Apply in a water volume of 500 – 1500 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Botrytis control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Apply Serenade ASO at a rate of 4 L/ha, from full flowering, 50% fallen (BBCH 65), Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Serenade ASO may be used up to a maximum of four applications. A minimum of five days should fall between applications of Serenade ASO.

Apples and pears

Apply in a water volume of 300 – 1000 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Fire blight risk is greatest when temperatures exceed 18°C and there is rain. Apply Serenade ASO at a rate of 8 L/ha, from beginning of flowering (BBCH 60), targeting the primary blossom infection period for best results, though it may be used until fruit are 90% of their final size (BBCH 79) Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Serenade ASO may be used up to a maximum of six applications. A minimum of three days should fall between applications of Serenade ASO.

Oilseed rape

Apply in a water volume of 200 – 400 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Sclerotinia control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Apply Serenade ASO at a rate of 2 L/ha, during flowering (from BBCH 65 until BBCH 69). Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Serenade ASO may be used up to a maximum of two applications. A minimum of five days should fall between applications of Serenade ASO.

Carrot

Apply in a water volume of 200 – 500 Litres of water per hectare according to crop density. Apply as a MEDIUM quality spray (BCPC).

Alternaria and powdery mildew control usually requires a programme of fungicide sprays and Serenade may be used as part of such a programme. Apply Serenade ASO at a rate of 8 L/ha, from 5 true leaves (BBCH 15) until expansion of the root is complete (BBCH 49). Serenade ASO works preventatively and with a contact mode of action, so for optimum control it is vital to achieve complete cover when spraying. Serenade ASO may be used up to a maximum of four applications. A minimum of five days should fall between applications of Serenade ASO.

Soil application:

Potato

Apply in a water volume of 100 – 200 Litres of water per hectare.

Silver scurf (*Helminthosporium solani*) control usually requires a number of considerations including fungicides and Serenade may be used as part of such a programme primarily to reduce yield damage. A single application of Serenade ASO at a rate of 5 L/ha may be made as an in-furrow application at the time of planting. Serenade ASO works preventatively and with a contact mode of action including colonisation on the tuber, so for optimum control it is recommended to achieve contact with the tuber when spraying. All varieties of potato may be treated.

Carrot

Apply in a water volume of 200 – 500 Litres of water per hectare. Apply as a MEDIUM/COARSE quality spray (BCPC). Cavity spot control usually requires a number of considerations including fungicides and Serenade may be used as part of such a programme. A single application of Serenade ASO at a rate of 10 L/ha may be made as a broadcast spray application before drilling followed by incorporation ideally to 10 cm depth, with a maximum of 20 cm depth. All varieties of carrot may be treated.

Foliar and soil applications – Mixing and Spraying

Before use ensure that all spray equipment is clean.

Add half the volume of water required, and start agitating.

Agitate product container well and add the required amount of Serenade® ASO, continue filling spray tank with the required volume of water.

Apply as a MEDIUM quality spray (BCPC).

Keep agitating until spraying completed.

All application equipment must be thoroughly cleaned with water prior to storage or use on another crop.

Seed treatment application:

Serenade ASO should be applied to tubers before planting in the spring.

Application rate – Potato (seed)

Apply 1.0 litre of Serenade ASO per tonne of potatoes (seed). Serenade ASO may be diluted with up to 2.0 L water per tonne of tubers to ensure good coverage of the seed tubers.

Seed treatment application: Mixing and Spraying

Agitate product container well and add the required amount of Serenade ASO, continue filling spray tank with the required volume of water. Diluted product may separate and agitation is necessary.

Application should be carried out over a roller table, most conveniently at the end of grading and before planting using standard roller table spray equipment.

Serenade may be applied at up to 3.0 litres of spray solution (1.0 litres Serenade ASO + 2.0 litres water) per tonne of treated tubers.

Seed Tubers should be dry and free of soil deposits at treatment.

To achieve complete and even coverage of tubers with Serenade ASO it is vital that roller tables be set up to achieve proper rotation of the tubers at the point of application.

During spray application, roller tables should not be allowed to become so wet that smearing of the tubers occurs as this will reduce tuber rotation due to slippage and result in uneven deposits. Over wetting will also encourage bacterial soft rot. Tubers must be air-dried after treatment.

Calibrate metering equipment carefully (using the product or prepared spray rather than water) so that spray output of the product matches the average throughput of potato tubers. It is important to position the spray applicator so that good, even distribution of the spray over the whole surface of the tubers is achieved. The equipment should be shrouded to contain the spray cloud.

Consult equipment manufacturers (such as Team Sprayers Ltd) to ensure appropriate nozzle selection and application.

Clean the spray application equipment after use with clean water.

Treated tubers – Use of

Treated tubers may only be used as seed. They must not be used for human or animal consumption.

Tuber handling damage

Any damage occurring to tubers or sprouts/chits during handling, treatment or planting may adversely affect their subsequent performance and cropping.

Product Storage

Serenade® ASO is a biological product and so should be treated with some care. It can be stored at room temperature for two years, storage at higher temperatures may reduce its shelf-life.

COMPANY ADVISORY INFORMATION

This section is not part of the Product Label under Regulation 1107/2009. It provides additional advice on product use at the discretion of the applicant.

Serenade® ASO is a naturally occurring biological control agent suitable for use in organic growing systems. It is approved for use in organic farming under EC Regulation No.834/2007 & 889/2008 by ECOCERT Switzerland.

However, it is advisable to check with your organic certification scheme before use.

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