

# The chemical residue free solution for *Botrytis* on protected strawberries

## SERENADE<sup>®</sup> ASO




### Foliar applied biological fungicide against *Botrytis* (Grey Mould)

- Zero chemical residue.
- Zero harvest interval.
- Ideal for use with Integrated Pest Management.
- Approved for protected strawberries (MAPP No: 14318).
- Ideal resistance management tool.
- For conventional and organic production.



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Ask the Specialists!



Strawberry contaminated with *Botrytis*



## Summary

- Serenade ASO contains a unique naturally occurring strain of *Bacillus subtilis* (QST 713).
- Serenade ASO is sold in 30 countries following initial commercialisation in the USA in 2000.
- Serenade ASO is approved for reduction of fruit damage caused by grey mould, *Botrytis cinerea* in protected strawberries.
- Serenade ASO is applied as a foliar spray either alone or as part of an IPM programme with conventional chemical pesticides.
- Uniquely among approved products, Serenade ASO leaves no chemical residue and is ideal for use right up to harvest.

## How it works

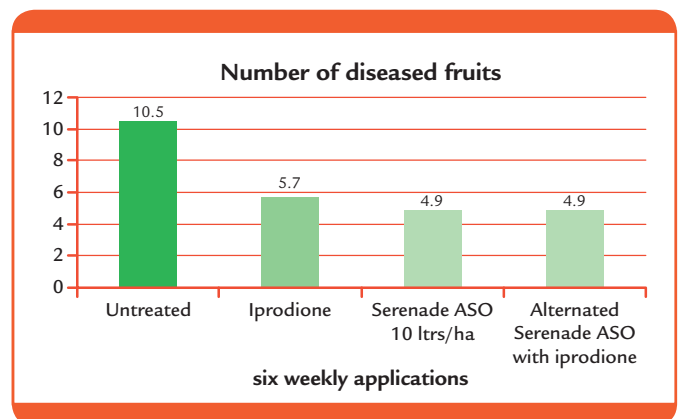
The *Bacillus subtilis* in Serenade ASO is a naturally occurring strain, not genetically modified, which has complex multi-site modes of action which prevent and destroy disease causing pathogens.

- It produces complex lipopeptides which directly attack the disease, destroying the spores and mycelium.
- It stimulates the plants own defence reactions.
- It colonises the leaf and out-competes the disease.

The unique patented strain of *Bacillus subtilis* in Serenade ASO produces a wider range and greater volume of lipopeptides than other non-approved *B. subtilis* strains.

## Efficacy

UK trials compared the efficacy of Serenade ASO against conventional chemical spray programmes. Five trials on protected everbearer strawberry crops compared Serenade ASO with a conventional standard fungicide containing iprodione and with a programme alternating Serenade ASO with a fungicide containing iprodione. Sprayed in 400 litres of water per hectare a total of six applications were made at 7 day intervals. The number of diseased fruit was reduced by 50% compared to the untreated controls, a result comparable with an iprodione fungicide program. There were no phytotoxic or yield effects recorded. Post-harvest control was provided for up to 21 days after the last spray. There was also a noticeable reduction in Anthracnose (*Colletotrichum*) within the crop.



## Resistance management

Conventional chemical fungicides are prone to the development of resistance by the disease if over-used. Growers are advised to use fungicides from different chemical groups in rotation to minimise the development of resistance. Serenade ASO has complex multi-site modes of action, unlike many chemical fungicides which have a vulnerable single-site mode of action. *Bacillus subtilis* has evolved naturally alongside the disease pathogen for millions of years and the potential for the development of resistance is extremely remote. Serenade ASO is ideal as part of a rotational programme with conventional fungicides, providing a uniquely strong partner for a resistance management programme.

## Residue reduction

Chemical residues are a major issue for growers supplying fresh edible produce. All chemical fungicides leave a chemical residue which potentially, depending on the circumstances, may still be present at marketing, albeit usually below any regulatory levels. Serenade ASO has no chemical residues and can be used right up to the point of harvest. This unique feature allows growers to use conventional fungicides earlier in the crop production cycle maximising the time between application and harvest and so minimising any residues at harvest. Serenade ASO provides an effective and safe control method close to harvest.

## Compatibility with biological controls

Serenade ASO is harmless to all commonly used biological controls and pollinators. Laboratory and field trials have shown no direct toxicity or behavioural effects on honey bees, bumble bees, parasitic wasps, predatory mites, ladybirds or lacewings.

Serenade ASO can be used alongside biological controls with no negative effects, making it ideal for Integrated Crop Management or Integrated Pest Management programmes.

Biological Control	IOBC* category (1 - Harmless)
<i>Amblyseius swirskii</i>	1
<i>Aphidius colemani</i>	1
<i>Chrysoperla carnea</i>	1
<i>Orius laevigatus</i>	1
<i>Phytoseiulus persmiliis</i>	1

\*IOBC is the International Organisation for Biological Control.

## Crop safety

Extensive trials and commercial experience have shown no crop safety issues with Serenade ASO, but as always users are advised to test under their conditions.

Harmless to all commonly used biologicals.



## Harvest interval and post-harvest

Serenade ASO has a zero harvest interval, meaning that it can be used right up to the time of harvest. There is considerable evidence that an application close to harvest provides post-harvest control or suppression of disease, leading to improved quality through a longer shelf-life. Serenade ASO can bring benefits to the retailer through good shelf-life and no chemical residue.





to help prevent disease spread as part of an Integrated Crop Management programme. When disease pressure is high use Serenade ASO in conjunction with other suitable approved fungicides.

### Spectrum of Activity

Serenade ASO is approved for the reduction of fruit damage caused by *Botrytis* in the UK. Elsewhere in the world *Bacillus Subtilis* strain QST 713 formulations are used against a wide variety of plant pathogens including Anthracnose (*Colletotrichum*) and powdery mildew which are both on-label in the United States.

### Application

Serenade ASO requires good crop coverage, in the same way that a conventional contact-acting pesticide requires good coverage. It is important to apply Serenade ASO to the parts of the crop where disease can attack, for example the flowers of strawberry are the site of *Botrytis* infection. Serenade ASO is best applied via a hydraulic sprayer with a minimum of 400 litres per ha, to ensure good crop coverage.

### Timing of application

For maximum effectiveness Serenade ASO is best used as a preventative treatment, applied before the disease is present when it can prevent the disease from establishing. Serenade ASO can be applied after disease establishment

### Compatibility

Serenade ASO can be tank mixed with most pesticides, fertilisers, adjuvants and surfactants but advice should be sought before use.

### Storage

Serenade ASO is a biological product but refrigerated storage is not necessary. Serenade ASO can be stored at room temperature for two years, storage at higher temperatures may reduce its shelf life.

### Crop recommendations

Serenade ASO is fully approved for the reduction of fruit damage caused by *Botrytis* on Protected Strawberry Crops. It is anticipated that Specific Off-Label Approvals (SOLA) will be issued for other crops.

Rate of use	10 litres / ha
Latest time of application	Nil
Maximum number of treatments	Up to 20 per crop
Pack sizes available	10 litre and 4 litre

Serenade ASO is marketed in the UK by:



Tel: **01903 721591**  
Fax: **01903 730737**  
Email: **promos@fargro.co.uk**  
Web: **www.fargro.co.uk**

Fargro Limited, Toddington Lane,  
Littlehampton, West Sussex BN17 7PP

Your nearest distributor is:



### Approval holder

AgraQuest Inc, 171 rue Pierre Valdo,  
69005 Lyon, France  
Tel: +33 (0) 478 59 95 51

Serenade ® is a registered trademark of AgraQuest.  
*Bacillus subtilis* strain QST 713 is patented.

An aqueous suspension concentrate containing 13.96 g/l *Bacillus subtilis* strain QST 713 (a minimum of  $1.042 \times 10^{12}$  cfu/L).  
MAPP 14318.

Always read the label. Use pesticides safely.

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