A fungicide for the reduction of fruit damage caused by grey mould (*Botrytis cinerea*) on protected strawberry crops.

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

**SERENADE® ASO**

10 litres e

**Risk and Safety Information**

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

MAY CAUSE SENSITISATION BY SKIN CONTACT

AVOID CONTACT WITH SKIN

IN CASE OF CONTACT WITH EYES, rinse immediately with plenty of water and seek medical advice

WEAR SUITABLE PROTECTIVE GLOVES

WHEN USING DO NOT EAT, DRINK OR SMOKE

WASH HANDS / EXPOSED SKIN before eating or drinking

KEEP AWAY FROM FOOD, DRINK AND ANIMAL FEEDING STUFFS

KEEP OUT OF REACH OF CHILDREN

Approval Holder: AgraQuest Inc., 171 rue Pierre Valdo., 69005 Lyon, France, Tel: +33 (0) 4 78 59 9551

Supplied by (UK): BASF plc, Crop Protection, PO Box 4, Earl Road, Cheadle Hulme, CHEADLE, Cheshire SK8 6QG, Tel: 0161 485 6222, Technical Enquiries: 0845 602 2553 (office hours)

Supplied by (Ireland): BASF Ireland Limited, P.O. Box 4, Earl Road, Cheadle Hulme, CHEADLE, Cheshire SK8 6QG, UK, Tel: 01 825 5701, Fax: 01 825 2038, Technical Enquiries: 0044 (0)845 602 2553 (office hours),

Emergency Information (24 hours freephone): 0049 180 227 3112

Lot number:

Manufacturing date:

This product is approved under S.I. No. 83 of 2003 (Ireland)
This product is approved under the Plant Protection Products Regulations 2005 (UK)

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

© = a registered trademark of AgraQuest, Inc.

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

Made in Mexico

81068080GB1062
Serenade® ASO

SAFETY PRECAUTIONS

Operator Protection
Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:
WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS) AND SUITABLE PROTECTIVE GLOVES when handling the concentrate.
However, engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection - UK ONLY.

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

Storage and Disposal
WASH OUT CONTAINER THOROUGHLY and dispose of safely.
PROTECT FROM FROST Do not store below 4°C.

COMPANY ADVISORY INFORMATION
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 IMO Switzerland. However, it is advisable to check with your organic certification scheme before use.

IMPORTANT INFORMATION
FOR USE ONLY AS A HORTICULTURAL FUNGICIDE, as directed below:

<table>
<thead>
<tr>
<th>Crops</th>
<th>Maximum individual dose</th>
<th>Maximum number of treatments</th>
<th>Latest time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry (protected)</td>
<td>10.0 litres of product per hectare</td>
<td>20 per crop</td>
<td>0 days before harvest</td>
</tr>
</tbody>
</table>

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.

This product is approved under S.I. No. 83 of 2003 (Ireland)

This product is approved under the Plant Protection Products Regulations 2005 (UK)
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 subtilis* QST 713, naturally occurring bacteria that are not genetically modified, for the reduction of fruit damage caused by grey mould (*Botrytis cinerea*) in protected strawberry crops. It 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.

1. Restrictions and Warnings
CONSULT PROCESSOR BEFORE USING ON CROPS FOR PROCESSING
Do not apply using irrigation equipment
For Professional Use only.

2. Disease Control
Serenade® ASO is for the reduction of fruit damage caused by grey mould (*Botrytis cinerea*) on protected strawberry crops. For maximum effectiveness, Serenade® ASO should be applied prior to or in the early stages of disease development. When disease pressure is high, use Serenade® ASO in rotation with suitable approved chemicals.

3. Crop Recommendations
Serenade® ASO is for use on protected strawberry crops
4. Application rates

Application rates of Serenade® ASO should be 10 l/ha, applied up to every 7 days or in rotation with a suitable approved chemical.

5. 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. Keep agitating until spraying completed. All application equipment must be thoroughly cleaned with water prior to storage or use on another crop. Serenade® ASO should be applied in sufficient water to ensure good crop cover, with a minimum of 400 l/ha.

6. 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.

7. Safety Data Sheet

The attached safety data sheet does not form part of the label approved under the Plant Protection Products Regulations 2005. Following the instructions on the pesticide product label for the specified uses should ensure that the product is used safely and efficaciously for those uses.
The following does not form part of the product label under the UK Plant Protection Products Regulations or the Irish S.I. No. 83 of 2003.

With many products there is a general risk of resistance developing to the active ingredients. For this reason a change in activity cannot be ruled out. It is generally impossible to predict with certainty how resistance may develop because there are so many crop and use connected ways of influencing this. We therefore have to exclude liability for damage or loss attributable to any such resistance that may develop. To help minimise any loss in activity the BASF recommended rate should in all events be adhered to.

Numerous, particularly regional or regionally attributable, factors can influence the activity of the product. Examples include weather and soil conditions, crop plant varieties, crop rotation, treatment times, application amounts, admixture with other products, appearance of organisms resistant to active ingredients and spraying techniques. Under particular conditions a change in activity or damage to plants cannot be ruled out. The manufacturer or supplier is therefore unable to accept any liability in such circumstances. All goods supplied by us are of high grade and we believe them to be suitable, but as we cannot exercise control over their mixing or use or the weather conditions during and after application, which may affect the performance of the material, all conditions and warranties, statutory or otherwise, as to the quality or fitness for any purpose of our goods are excluded and no responsibility will be accepted by us for any damage or injury whatsoever arising from their storage, handling, application or use; but nothing should be deemed to exclude or restrict any liability upon us which cannot be excluded or restricted under the provisions of the Unfair Contract Terms Act 1977 or any similar applicable law.
Safety Data Sheet

1. Identification of the substance/mixture and of the company/undertaking

   Product identifier
   SERENADE ASO

   Relevant identified uses of the substance or mixture and uses advised against
   Relevant identified uses: crop protection product, fungicide

Details of the supplier of the safety data sheet

   Company: BASF SE
   67056 Ludwigshafen
   GERMANY

   Contact address:
   BASF plc/BASF Ireland Ltd.
   PO Box 4, Earl Road, Cheadle Hulme, Cheadle, Cheshire
   SK8 6QG, UNITED KINGDOM
   Telephone: +44 161 485-6222
   E-mail address: product-safety-north@basf.com

   Emergency telephone number
   International emergency number: Telephone: +49 180 2273-112

2. Hazards Identification

   Label elements
   According to Directive 67/548/EEC or 1999/45/EC
   Classification/labelling in accordance with UK regulations.
   Hazard symbol(s)
   Xi Irritant
R-phrase(s)
R43 May cause sensitization by skin contact

S-phrase(s)
S2 Keep out of the reach of children
S13 Keep away from food, drink and animal feeding stuffs
S20/21 When using do not eat, drink or smoke
S24 Avoid contact with skin
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S37 Wear suitable gloves

Classification of the substance or mixture
According to Directive 67/548/EEC or 1999/45/EC.
Possible Hazards:
No specific dangers known, if the regulations/notes for storage and handling are considered.

Other hazards
According to Regulation (EC) No 1272/2008 [CLP]
Other Hazards (GHS):
See section 12 - Results of PBT and vPvB assessment.
If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

3. Composition/Information on Ingredients
Mixtures
Chemical nature
crop protection product, fungicide, suspension concentrate (SC)
Contains: Bacillus subtilis (Content (W/W): >= 1 % - <= 5 %)

4. First-Aid Measures
Description of first aid measures
Remove contaminated clothing.
Show container, label and/or safety data sheet to physician.
If inhaled: Keep patient calm, remove to fresh air.
On skin contact: Wash thoroughly with soap and water.
On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.
On ingestion: Rinse mouth and then drink plenty of water.

**Most important symptoms and effects, both acute and delayed**

**Indication of any immediate medical attention and special treatment needed**

Treatment: Symptomatic treatment (decontamination, vital functions).

5. **Fire-Fighting Measures**

**Extinguishing media**

Suitable extinguishing media:
water spray, carbon dioxide, foam, dry powder

**Special hazards arising from the substance or mixture**
carbon monoxide, carbon dioxide, nitrogen oxides

The substances/groups of substances mentioned can be released in case of fire.

**Advice for fire-fighters**

Special protective equipment:
Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:
In case of fire and/or explosion do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

6. **Accidental Release Measures**

**Personal precautions, protective equipment and emergency procedures**

Use personal protective clothing. Avoid contact with the skin, eyes and clothing. Remove contaminated clothes, undergarments and shoes immediately.

**Environmental precautions**

Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater.

Do not allow contamination of public drains or surface or ground waters. Inform local water plc if spillage enters drains and the Environment Agency (England & Wales), the Scottish Environmental Protection Agency (Scotland), or the Environment and Heritage Service (Northern Ireland) if it enters surface or ground waters.
Inform local water plc if spillage enters drains and the Environmental Protection Agency if it enters surface or ground waters. (Republic of Ireland only)
Keep people and animals away.

Methods and material for containment and cleaning up
For small amounts: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).
For large amounts: Dike spillage. Pump off product.
Collect waste in suitable containers, which can be labeled and sealed. Clean contaminated floors and objects thoroughly with water and detergents, observing environmental regulations. Incinerate or take to a special waste disposal site in accordance with local authority regulations.

Reference to other sections
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

7. Handling and Storage

Precautions for safe handling
No special measures necessary if stored and handled correctly. Ensure thorough ventilation of stores and work areas.

Conditions for safe storage, including any incompatibilities
Segregate from foods and animal feeds.
Further information on storage conditions: Keep away from heat. Protect against moisture. Protect from direct sunlight. Store protected against freezing.

Specific end use(s)
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

8. Exposure Controls/Personal Protection

Control parameters
Components with workplace control parameters:
none
Refer to the current edition of HSE Guidance Note EH40 Occupational Exposure Limits (United Kingdom only).
For normal use and handling refer to the product label/leaflet. In all other cases the following apply.
Exposure controls
Personal protective equipment
Respiratory protection:
Respiratory protection not required.
Hand protection:
Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact
(Recommended: Protective index 6, corresponding > 480 minutes of permeation time according
to EN 374): E.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), butyl rubber (0.7 mm)
and other
Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)
Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron,
protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN
ISO 13982 in case of dust).

General safety and hygiene measures
The statements on personal protective equipment in the instructions for use apply when
handling crop-protection agents in final-consumer packing. Avoid contact with the skin, eyes
and clothing.
Wearing of closed work clothing is recommended. Take off immediately all contaminated
clothing.
Store work clothing separately. Keep away from food, drink and animal feeding stuffs. No eating,
drinking, smoking or tobacco use at the place of work. Hands and/or face should be washed
before breaks and at the end of the shift.

9. Physical and Chemical Properties
Information on basic physical and chemical properties
Form: liquid
Colour: light brown
Odour: acidic
Odour threshold: not determined
pH value: approx. 4 - 6 (water, 1 %(m), 20 °C)
Melting point: approx. 0 °C
Boiling point: > 100 °C
Flash point: A flash point determination is unnecessary due to the high water content.
Evaporation rate: not applicable
Flammability: not determined
Lower explosion limit: not determined
Upper explosion limit: not determined
Ignition temperature: Based on the water content the product does not ignite.
Vapour pressure: Information based on the main components.
Density: approx. 1.04 g/cm³ (20 °C) (Directive 92/69/EEC, A.3)
Relative vapour density (air): not determined
Solubility in water: dispersible
Partitioning coefficient
n-octanol/water (log Kow): not applicable
Thermal decomposition: not determined
Viscosity, dynamic: not determined
Explosion hazard: Based on the water content the product has no explosive properties.
Fire promoting properties: not fire-propagating

**Other information**
If necessary, information on other physical and chemical parameters is indicated in this section.

### 10. Stability and Reactivity

**Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.
Corrosion to metals: No data available.

**Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**Possibility of hazardous reactions**
No hazardous reactions if stored and handled as prescribed/indicated.

**Conditions to avoid**
See MSDS section 7 - Handling and storage.

**Incompatible materials**
Substances to avoid: No data available.

**Hazardous decomposition products**
No hazardous decomposition products if stored and handled as prescribed/indicated.
11. **Toxicological Information**

**Information on toxicological effects**

**Acute toxicity**

Assessment of acute toxicity:
Virtually nontoxic after a single ingestion. Virtually nontoxic by inhalation. Virtually nontoxic after a single skin contact.

Experimental/calculated data:
- LD50 rat (oral): > 5,000 mg/kg (OECD Guideline 401)
  The product has not been tested. The statement has been derived from products of a similar structure or composition.
- LC50 rat (by inhalation): > 1.45 mg/l 4 h (other)
  The product has not been tested. The statement has been derived from products of a similar structure or composition. No mortality was observed. Highest concentration available for testing.
- LD50 rabbit (dermal): > 2,000 mg/kg (OECD Guideline 402)
  No mortality was observed.

**Irritation**

Assessment of irritating effects:
Not irritating to the skin. Not irritating to the eyes.

Experimental/calculated data:
- Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)
- Serious eye damage/irritation rabbit: non-irritant (OECD Guideline 405)

**Respiratory/Skin sensitization**

Assessment of sensitization:
There is no evidence of a skin-sensitizing potential.

Experimental/calculated data:
- Buehler test guinea pig: Skin sensitizing effects were not observed in animal studies. (OECD Guideline 406)
  The product has not been tested. The statement has been derived from products of a similar structure or composition.

**Germ cell mutagenicity**

Assessment of mutagenicity:
The product has not been tested. The statement has been derived from the properties of the individual components. Mutagenicity tests revealed no genotoxic potential.
**Carcinogenicity**
Assessment of carcinogenicity:
The product has not been tested. The statement has been derived from the properties of the individual components. The results of various animal studies gave no indication of a carcinogenic effect.

**Reproductive toxicity**
Assessment of reproduction toxicity:
The product has not been tested. The statement has been derived from the properties of the individual components. The results of animal studies gave no indication of a fertility impairing effect.

**Developmental toxicity**
Assessment of teratogenicity:
The product has not been tested. The statement has been derived from the properties of the individual components. Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.

**Repeated dose toxicity and Specific target organ toxicity (repeated exposure)**
Assessment of repeated dose toxicity:
The product has not been tested. The statement has been derived from the properties of the individual components. No substance-specific organotoxicity was observed after repeated administration of high doses to animals.

**Other relevant toxicity information**
Misuse can be harmful to health.

**12. Ecological Information**

**Toxicity**
Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms.
The product has not been tested. The statement has been derived from the properties of the individual components.

Toxicity to fish:
LC50 (30 d) 162 mg/l, Oncorhynchus mykiss (other)

Aquatic invertebrates:
LC50 (48 h) 108 mg/l, Daphnia magna (other)
Aquatic plants:
Lowest observed effect concentration > 100 mg/l, Scenedesmus subspicatus (OECD Guideline 201)
The ecological data given are those of the active ingredient.

**Persistence and degradability**
Assessment biodegradation and elimination (H2O):
The product has not been tested. The statement has been derived from the properties of the individual components.
Biodegradable.

**Bioaccumulative potential**
Assessment bioaccumulation potential:
The product has not been tested. The statement has been derived from the properties of the individual components.
Bioaccumulation potential:
At the present state of knowledge, no negative ecological effects are expected.
Mobility in soil (and other compartments if available)
Assessment transport between environmental compartments:
No data available.

**Results of PBT and vPvB assessment**
The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

**Other adverse effects**
The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

**Additional information**
Other ecotoxicological advice:
Do not discharge product into the environment without control.

13. **Disposal Considerations**

**Waste treatment methods**
Must be disposed of or incinerated in accordance with local regulations.
Contaminated packaging:
Contaminated packaging should be emptied as far as possible and disposed of in the same manner as the substance/product.
14. Transport Information

Land transport
ADR Not classified as a dangerous good under transport regulations
RID Not classified as a dangerous good under transport regulations

Inland waterway transport
ADN Not classified as a dangerous good under transport regulations

Sea transport
IMDG Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO Not classified as a dangerous good under transport regulations

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulations of the European union (Labelling) / National legislation/Regulations
To avoid risks to man and the environment, comply with the instructions for use.
The data should be considered when making any assessment under the Control of Substances Hazardous to Health Regulations (COSHH), and related guidance, for example, 'COSHH Essentials' (United Kingdom only).
This product is classified under the Chemicals (Hazard Information and Packaging) Regulations, (CHIP) (United Kingdom only).
This product may be subject to the Control of Major Accident Hazards Regulations (COMAH), and amendments if specific threshold tonnages are exceeded (United Kingdom only).
This product may be subject to the Seveso II Directive and amendments if specific threshold tonnages are exceeded. (Ireland only)

For further medical advice Doctors should contact the National Poisons Information Centre at Beaumont Hospital, Dublin. (Ireland only)

Chemical Safety Assessment
Advice on product handling can be found in sections 7 and 8 of this safety data sheet.
16. **Other Information**

For proper and safe use of this product, please refer to the approval conditions laid down on the product label.

Full text of the classifications, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, if mentioned in section 2 or 3:

**Hazard Symbol(s)**

Xi Irritant

**R-phrase(s)**

R43 May cause sensitization by skin contact

**S-phrase(s)**

S2 Keep out of the reach of children
S13 Keep away from food, drink and animal feeding stuffs
S20/21 When using do not eat, drink or smoke
S24 Avoid contact with skin
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S37 Wear suitable gloves

If you have any queries relating to this MSDS, its contents or any other product safety related questions, please write to the following e-mail address: product-safety-north@basf.com

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.
Serenade® ASO

SAFETY PRECAUTIONS

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

WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS) AND SUITABLE PROTECTIVE GLOVES when handling the concentrate.

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

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

Storage and Disposal

WASH OUT CONTAINER THOROUGHLY and dispose of safely.

PROTECT FROM FROST Do not store below 4°C.

COMPANY ADVISORY INFORMATION

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

IMPORTANT INFORMATION

FOR USE ONLY AS A HORTICULTURAL FUNGICIDE, as directed below:

<table>
<thead>
<tr>
<th>Crops</th>
<th>Maximum individual dose</th>
<th>Maximum number of treatments</th>
<th>Latest time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry (protected)</td>
<td>10.0 litres of product per hectare</td>
<td>20 per crop</td>
<td>0 days before harvest</td>
</tr>
</tbody>
</table>

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.