

BIOSOL®

GENERAL DESCRIPTION

MANUFACTURE:

During the manufacture of penicillin, a fungal biomass (mycelium) is obtained by the fermentation of raw materials such as: soybean meal, cottonseed meal, sucrose, lactose, trace elements and vitamins under constant sterile conditions. The fungus strain used is *Penicillium Chrysogenum*. After the penicillin is removed, the remaining biomass is dried at 110° to 130° C for 3 to 4 hours. During this process the residual antibiotic is eliminated and the moisture is reduced by 3 to 6%.

Biosol is listed with OMRI and approved for organic farming.
Biosol is a fermented plant based organic fertilizer, sterilized and free of weed seeds.

COMPOSITION:

95% fungal biomass (dry mycelium), 5% water

NUTRIENT RATIO:

N-P-K = 6-1-1

Specifications:

Guaranteed Analysis:

Total Nitrogen (N).....	6%
WATER SOLUBLE NITROGEN 0.50%	
WATER INSOLUBLE NITROGEN* 5.50%	
Available Phosphoric (P ₂ O ₅).....	1%
Soluble Potash (K ₂ O).....	1%

*5.5% Slowly Available Nitrogen from fermented organic material

Nutrients Derived from Fermented Cottonseed Meal and Soybean Meal

Organic Matter:	> 90%
Carbon/Nitrogen Ratio.....	5:1
pH level.....	4.0

Biosol does not contain any animal waste, animal by-products or chemicals.
Any heavy metal contents are within the tolerance limits for animal feed.

PROPERTIES:

Biosol's beneficial biomass enhances soil health and microbial life. This unique slow release nutrient formulation provides vital plant nutrients throughout the entire growing season due to the fermented organic material. There is an increased effect on the formation of humus, root mass and the living microbial biomass in the soils. Promoting a healthy balance of microbial life ensures long-term plant color and plant health. This results in far lower concentrations of nitrates or phosphorous in ground water than mineral fertilizers. Biosol will not burn seed or vegetation.

Biosol is safe to be used around pets, animals, children, lakes and streams.

MATERIAL COMPARISONS

<u>Product Benefits</u>	<u>Biosol</u>	<u>Biosol Forte</u>	<u>Poultry Manure</u>	<u>Chemical Fertilizer</u>	<u>Composted Fert/ Mix</u>	<u>Compost</u>
Positively affects soil fertility	+++	+++	+	---	--	++
Positively affects soil structure	+++	+++	+	---	--	++
Positively affects soil microorganisms	+++	+++	+	---	--	++
Derived from animal waste or chemicals	No	No	Yes	Yes	Yes	Some
Derived from 100% plant product	Yes	Yes	No	No	No	Some
Provides beneficial bacteria & fungal biomass	+++	+++	---	---	---	---
Topsoil alternative	+++	+++	--	---	-	+++
High content of organic matter	+++	+++	+	---	--	+
Effect on humus content	+++	+++	-	--	-	+++
High content of chitin	+++	+++	---	---	---	---
Nutrient content	+	+	+	+++	+++	-
Risk of burning seed or existing vegetation	---	---	-	+++	+++	---
Risk of nitrogen leaching	---	---	+	+++	+++	---
Positively affects root system	+++	+++	+	-	-	+
Positive effects in arid conditions	+++	+++	+	---	--	++
Nutrients available in 2 nd growing season	+++	+++	-	---	--	++
High in salts	---	---	+	+++	+++	--
Risk of plant disease / pathogens	---	---	+	+++	+++	+
EPA approved for water sensitive areas	+++	+++	--	---	---	---
Field tested, proven for long term plant growth	+++	+++	--	---	---	+
USDA Bio Preferred Product	Yes	Yes	Some	No	No	No
Certified for organic crop production	Yes	No	Some	No	No	Some
Animal and child friendly	+++	+++	-	---	--	++
Retains 3-4 times its weight in water	+++	+++	--	---	--	+++

Very, Very Strong +++
 Very Strong ++
 Strong +

Rating

Very, Very Low ---
 Very Low --
 Low -

APPLICATIONS:

Organic Farming

Biosol will contribute to stronger and healthier crops while enhancing the vitality of your soil, producing higher crop yields in an organic way. Biosol is regularly checked and OMRI listed for organic farming. Used in many areas, from arable farming to grassland, Biosol is particularly effective in organically grown vegetables, berries or apples. Biosol increases the plant's resistance to certain pathogens and suppresses the ability of soil-borne pathogens to affect plant life and soil health.



Viticulture (Grape Cultivation)

In viticulture, Biosol has been used all over the world for many years with superior results. During thirteen years of experiments and trials (from 1988 to 2001), Biosol was proven to increase sugar yields in grapes. The average yearly sugar yield increased by approximately 13%.

Lawns, Gardens, Flowers, Trees, etc.

Biosol will not burn vegetation, should always be applied topically and should be watered in (if possible) for best results.

Application Rates:

Lawns and Playing Fields:	13 - 25 lbs. per 1,000 sq. feet twice per year
Garden Preparation:	2 oz. per sq. yard (1/3 cup)
Seeded Row Crops:	1 1/3 lbs. per 100 sq. feet (3 3/4 cups)
Potted Flowers and Compost:	1/2 oz. per gallon (1/8 cup)
Vegetables:	2 oz. per sq. yard (1/3 cup)
Ornamental Trees, Shrubs:	6 oz. per sq. yard (1 cup)
Soil Mixes:	8 1/2 lbs. per cu yard

Fertilizing Young Plants

Good & proper farming practices should always be followed when using Biosol. It is very important that Biosol is spread on the soil surface. If you want to plant young plants, add Biosol to the soil at least two weeks before planting actually occurs. This is especially important with tomatoes and peppers.

Biosol is used for the following qualities:

- Enriches soil with quality nutrients.
- Stimulates micro-organism activity in the soil.
- Improves plant health (chlorosis, stem disease, blossom drop).
- Increases crop yields.
- Increases the sugar content (content is expressed as degree Oechsle, Brix, or Balling).
- It promotes quality ripening of fruits and vegetables.

OUR DISTRIBUTION CENTERS:

- ◆ California (Carson, Livermore, Oakland, Carpinteria)
- ◆ Colorado (Denver, Longmont)
- ◆ Idaho (Nampa)
- ◆ Maryland
- ◆ Minnesota
- ◆ Missouri (St. Peters, St. Louis)
- ◆ New Hampshire
- ◆ North Carolina
- ◆ Oregon (Portland)
- ◆ Washington (Seattle, Spokane)
- ◆ Canada (Vancouver)



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Safety Data Sheet (GHS)

according to Regulation (EC) No.1907/2006

Date of issue: 16-JAN-2013

Replaces version of: 16-JAN-2013

BIOSOL FORTE 141985 (KUNDL)



1. Identification of the substance/preparation and of the company

Product name BIOSOL FORTE
Usage Fertilizer
Company name Sandoz GmbH
Biochemiestrasse 10
6250 Kundl / Tirol
Austria
Emergency phone number +43 5338 200 0, E-Mail: sds.support@novartis.com

2. Hazards identification

Pictogram, Signal Word No classification required according REGULATION (EC) NO 1272/2008

Hazard statements

Specific hazards In case of moisture exothermal biogenic processes possible.

Classification according EU Directive 67/548/EEC or 1999/45/EC see chapter 15

3. Composition / information on ingredients

Chemical characterisation of the substance / preparation:

Chemical Name Bacterial Biomass

For TLV values of declared components, see chapter 8

Full text of H-Phrases see under chapter 16

4. First aid measures

Inhalation Remove the victim from danger zone, avoid further exposure.
Skin Contact Rinse contaminated skin with plenty of water.
Eye Contact Immediately rinse eyes thoroughly with running water as long as possible (approx. 15 min).
Take injured quickly to factory medical center or call an ambulance (code word: eye accident).
Ingestion Clean mouth with water and drink afterwards plenty of water. Call a physician.

5. Fire fighting measures

Suitable Extinguishing Media Water spray or fog, foam, dry chemical powder, CO2, dry sand
Unsuitable Extinguishing Media No restrictions
Protective equipment for firefighters Wear self-contained breathing apparatus and fire protective suite.

6. Accidental release measures

Personal precautions Avoid contact with skin, eyes and clothing.
Environmental precautions Must not be released into sewers, drains or wells.
Methods for cleaning Transfer large quantities into a container, rinse the rest with plenty of water.
For personal protection see chapter 8; for disposal considerations see chapter 13

7. Handling and storage

Storage and Handling Precautions Keep dry.

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BIOSOL FORTE 141985 (KUNDL)



For industrial hygiene measures see chapter 8

Preventive Precautions (fire/explosion) Take precautionary measures against static discharges. Avoid formation of dust.

Maximum Storage Temperature (safety) 70 °C

8. Exposure controls / Personal protection

Occupational Exposure Controls

Industrial Hygiene After finishing work wash hands and face with water and soap

Open Handling

Respiration	: Disposable fine dust protection mask (EN149) or reusable halfmask (EN140)
Eye	: Safety glasses (EN166)
Hand	: Disposable gloves or chemical-resistant gloves, normal length (EN374/EN388)

These values are derived from experiments, literature and information from the glove manufacturer.

They can also be derived from similar materials. In daily work please be aware that the using time depends on several factors and can be shorter than the officially tested permeation time.

9. Physical and chemical properties

Appearance

Formulation amorphous solid
Physical state solid
Colour dark grey
Odour characteristic

Safety relevant basic data

Melting point/range unknown
Boiling Point unknown
Bulk Density 950 kg/m³
Solubility (Aqueous Solvents) not available
Solubility (Solvents) not available
pH 6 - 7 (Concentration: 100 g/l, Temperature: 20 °C)
pKa not available
Specific Resistivity 1.6 - 2.2 * 10E11 Ohm m

Safety Tests

Autoignition Temperature: 450 °C
Method: BAM (fluidized dust)

Dynamic Decomposition Exothermy: 150 °C
Method: Grewer test method, air stream, as is (temp.progr. 1,2°C/min, examined up to 350°C)
Exothermy: 170 °C
Method: Lütolf, open cup, as is (Temp.progr. 2.5°C/min, examined up to 350°C)

Combustibility Test Standard conditions: 2 = after ignition the fire dies out rapidly (Temperature: 20 °C)
Method: Combustibility test Safety Institute
Standard conditions: 2 = after ignition the fire dies out rapidly (Temperature: 100 °C)
Method: Combustibility test Safety Institute

Dust Explosion Positive Minimum Ignition Energy: > 1000 mJ

Isoperibolic Decomposition (>8h) Stable up to: 110 °C
Method: long duration test open cup (8h)

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Flammable Gases over Temperature: > 350 °C (Gas volume: 20 l/kg)
Explosivity/Reactivity Deflagration: No suspect of deflagration based on thermal data
Drop-Weight Test: Negative

10. Stability and reactivity

Dangerous Combustion Products Carbon dioxide
carbon monoxide
nitrogen oxides
sulfur dioxide

11. Toxicological information

Acute Toxicity unknown
Irritation, Corrosion unknown
Sensitisation unknown
Additional advice Based on the present knowledge, the product needs not be classified as toxic for humans.
Mutagenicity unknown

12. Ecological information

Ecotoxicity Summary Easily biodegradable.

Environmental Toxicity

Fish acute toxicity unknown
Aquatic invertebrate acute toxicity unknown
Algae Toxicity unknown
Bacterial Respiration Inhibition unknown

Persistence and degradability

Biological Elimination unknown

13. Disposal considerations

Disposal Requirements May be incinerated if local official regulations are observed.

14. Transport information

Regulation	Class	UN No.	PG	Label	LQ
RID/ADR:	not restricted	0			N.A.
IMDG-Code:	not restricted	0			
ICAO/IATA-DGR:	not restricted	0			

ICAO/IATA-DGR: no dangerous good
Proper shipping name: -

15. Regulatory information

EC Label assessment: No labelling requirements according to EC Directives.

Chemical Safety Assessment not required.

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BIOSOL FORTE 141985 (KUNDL)



16. Other information

Changes since the previous version in chapter 14. Transport information

Abbreviations used

Recipient To whom it may concern

Product should be stored, handled and used in accordance with good industrial hygiene practices and in conformity with legal regulations. The information contained herein is based on the present state of our knowledge and is intended to describe our products from the point of view of safety requirements. It should therefore not be construed as guaranteeing specific properties.

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according to Regulation (EC) No.1907/2006

Date of issue: 16-JAN-2013

Replaces version of: 16-JAN-2013

BIOSOL 141021 (KUNDL)



1. Identification of the substance/preparation and of the company

Product name BIOSOL
Usage Fertilizer
Company name Sandoz GmbH
Biochemiestrasse 10
6250 Kundl / Tirol
Austria
Emergency phone number +43 5338 200 0, E-Mail: sds.support@novartis.com

2. Hazards identification

Pictogram, Signal Word No classification required according REGULATION (EC) NO 1272/2008

Hazard statements

Specific hazards In case of moisture exothermal biogenic processes possible.

Classification according EU Directive 67/548/EEC or 1999/45/EC see chapter 15

3. Composition / information on ingredients

Chemical characterisation of the substance / preparation:

Chemical Name Dry Mycelium

For TLV values of declared components, see chapter 8

Full text of H-Phrases see under chapter 16

4. First aid measures

Inhalation Remove the victim from danger zone, avoid further exposure.
Skin Contact Rinse contaminated skin with plenty of water.
Eye Contact Immediately rinse eyes thoroughly with running water as long as possible (approx. 15 min).
Take injured quickly to factory medical center or call an ambulance (code word: eye accident).
Ingestion Clean mouth with water and drink afterwards plenty of water. Call a physician.

5. Fire fighting measures

Suitable Extinguishing Media Water spray or fog, foam, dry chemical powder, CO2, dry sand
Unsuitable Extinguishing Media No restrictions
Protective equipment for firefighters Wear self-contained breathing apparatus and fire protective suite.

6. Accidental release measures

Personal precautions Avoid contact with skin, eyes and clothing.
Environmental precautions Must not be released into sewers, drains or wells.
Methods for cleaning Transfer large quantities into a container, rinse the rest with plenty of water.
For personal protection see chapter 8; for disposal considerations see chapter 13

7. Handling and storage

Storage and Handling Precautions Keep dry.

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For industrial hygiene measures see chapter 8

Preventive Precautions (fire/explosion) Take precautionary measures against static discharges. Avoid formation of dust.

Maximum Storage Temperature (safety) 70 °C

8. Exposure controls / Personal protection

Occupational Exposure Controls

Industrial Hygiene After finishing work wash hands and face with water and soap

Open Handling

Respiration	: Disposable fine dust protection mask (EN149) or reusable halfmask (EN140)
Eye	: Safety glasses (EN166)
Hand	: Disposable gloves or chemical-resistant gloves, normal length (EN374/EN388)

These values are derived from experiments, literature and information from the glove manufacturer.

They can also be derived from similar materials. In daily work please be aware that the using time depends on several factors and can be shorter than the officially tested permeation time.

9. Physical and chemical properties

Appearance

Formulation amorphous solid
Physical state solid
Colour yellow brown
Odour characteristic

Safety relevant basic data

Melting point/range unknown
Boiling Point unknown
Bulk Density 750 kg/m³
Solubility (Aqueous Solvents) not available
Solubility (Solvents) not available
pH 3 - 5 (Concentration: 100 g/l, Temperature: 20 °C)
pKa not available
Specific Resistivity 9.4 - 9.8 * 10⁸ Ohm m

Safety Tests

Autoignition Temperature: 400 °C
Dynamic Decomposition Exothermy: 170 °C
Method: Grever test method, air stream, as is (temp.progr. 1,2°C/min, examined up to 350°C)
Exothermy: 170 °C
Method: Lütolf, open cup, as is (Temp.progr. 2.5°C/min, examined up to 350°C)
Combustibility Test Standard conditions: 2 = after ignition the fire dies out rapidly (Temperature: 20 °C)
Standard conditions: 2 = after ignition the fire dies out rapidly (Temperature: 100 °C)
Dust Explosion Positive Minimum Ignition Energy: 300 - 1000 mJ
Isoperibolic Decomposition (>8h) Stable up to: 130 °C
Method: long duration test open cup (8h)
Flammable Gases over Explosivity/Reactivity Temperature: > 350 °C (Gas volume: 30 l/kg)
Deflagration: No suspect of deflagration based on thermal data
Drop-Weight Test: Negative

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BIOSOL 141021 (KUNDL)



10. Stability and reactivity

Dangerous Combustion Products carbon monoxide
sulfur dioxide
nitrogen oxides
Carbon dioxide

11. Toxicological information

Acute Toxicity unknown
Irritation, Corrosion unknown
Sensitisation unknown
Additional advice Based on the present knowledge, the product needs not be classified as toxic for humans.
Mutagenicity unknown

12. Ecological information

Ecotoxicity Summary Easily biodegradable.

Environmental Toxicity

Fish acute toxicity unknown
Aquatic invertebrate acute toxicity unknown
Algae Toxicity unknown
Bacterial Respiration Inhibition unknown

Persistence and degradability

Biological Elimination unknown

13. Disposal considerations

Disposal Requirements May be incinerated if local official regulations are observed.

14. Transport information

Regulation	Class	UN No.	PG	Label	LQ
RID/ADR:	not restricted	0			N.A.
IMDG-Code:	not restricted	0			
ICAO/IATA-DGR:	not restricted	0			

ICAO/IATA-DGR: no dangerous good
Proper shipping name: -

15. Regulatory information

EC Label assessment: No labelling requirements according to EC Directives.

Chemical Safety Assessment not required.

16. Other information

Changes since the previous version in 2. Hazards identification
11. Toxicological information

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Abbreviations used

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