

Biogreen 3000™

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Section I

Important Health and Safety Information

BIOGREEN 3000™

SAFETY STATEMENT



Biogreen 3000™ is manufactured using scientifically, well-tested substances and Microgenix Technologies Limited attach great importance to the safety of our product to both man and the environment.

Biogreen 3000™ is free from substances such as pentachlorophenol, mercury, arsenic, formaldehyde and organotin.

Biogreen 3000™ is AOX-free and is readily degradable in biological waste water plants according to OECD 301A.

Biogreen 3000™ has been tested for skin sensitisation according to the international norm OECD 406 and passed successfully the '*Repeated Insult Patch Test (RIPT)*'. The tested product showed no skin irritation or sensitisation effect respectively.

The active ingredient of Biogreen 3000™ is a biostatic treatment and has been accepted for OEKO-Tex Standard 100, class 1 – 1V (ed.OI/2002 © OEKO-Tex, Zurich).

Biogreen 3000™, handled in accordance with proper guidelines, can be considered safe to man and the environment

Section 2

INVENTORIES AND REGISTRATIONS OF BIOGREEN 3000™

EC APPROVAL

All ingredients are listed in EINECS

1. Component

CAS REGISTRY NUMBER: 41591-87-1

EINECS NUMBER: 255-451-8

ENCS NUMBER: 2-2095X

FOR ENCS CHEMICAL CLASS OR CATEGORY NAME, REFER TO ENCS NUMBER: 2-2095

INVENTORY NAMES:

1-Tetradecanaminium, N,N-dimethyl-N-[3-(trimethoxysilyl)propyl], chloride (TSCA, NDSL, ENCS), Chlorure de dimethyltetradecyl [3-(trimethoxysilyl)propyl]ammonium (French) (NDSL, EINECS) dimethyltetradecyl [3-(trimethoxysilyl)propyl]ammonium chloride (EINECS), Dimethyltetradecyl[3-(trimethoxysilyl)propyl]ammoniumchlorid (German) EINECS), cloruro de dimethyltetradecil[3-(trimethoxysilyl)propyl]amonio (Spanish) (EINECS),

OTHER NAMES:

Tetradecyldimethyl(3-trimethoxysilylpropyl)ammonium chloride, Tetradecyldimethyl[3-(trimethoxysilyl)propyl]ammonium chloride, FORMULA: C₂₂H₅₀N₀₃Si.Cl

2. Component

CAS REGISTRY NUMBER: 67-56-1

EINECS NUMBER: 200-659-6

Encs number 2-201

ECL SERIAL NUMBER: KE-23193,

SWISS NUMBER: g-2063

ECL TOXIC CHEMICAL NUMBER: 97-1-80

INVENTORY NAMES:

Methanol (English, French, German) (TSCA, DSL, EINECS, ENCS, AICS, ECL, SWISS PICCS), Metanol (Spanish) (EINECS) Methyl alcohol (ECL, PICCS), WOOD ALCOHOL (PICCS)

OTHER NAMES:

Bielecki's solution, Carbinol, Methanol cluster, Methyl hydroxide, Methylol, Monohydroxymethane, Solutions, Bielecki's, UN 1230 (DOT), KOREAN TCCL DESIGNATION: ECL Toxic Chemical Number: 97-1-80, ENCS CLASSIFICATION: Low Molecular Chain-like Organic Compounds, SWISS CLASSIFICATION: Griffliste 1 (List of Toxic Substances 1), 31 May 1999, Toxic Category 3, Acute oral lethal dose of 50-500 mg/kg, FORMULA: CH₄O

Section 3

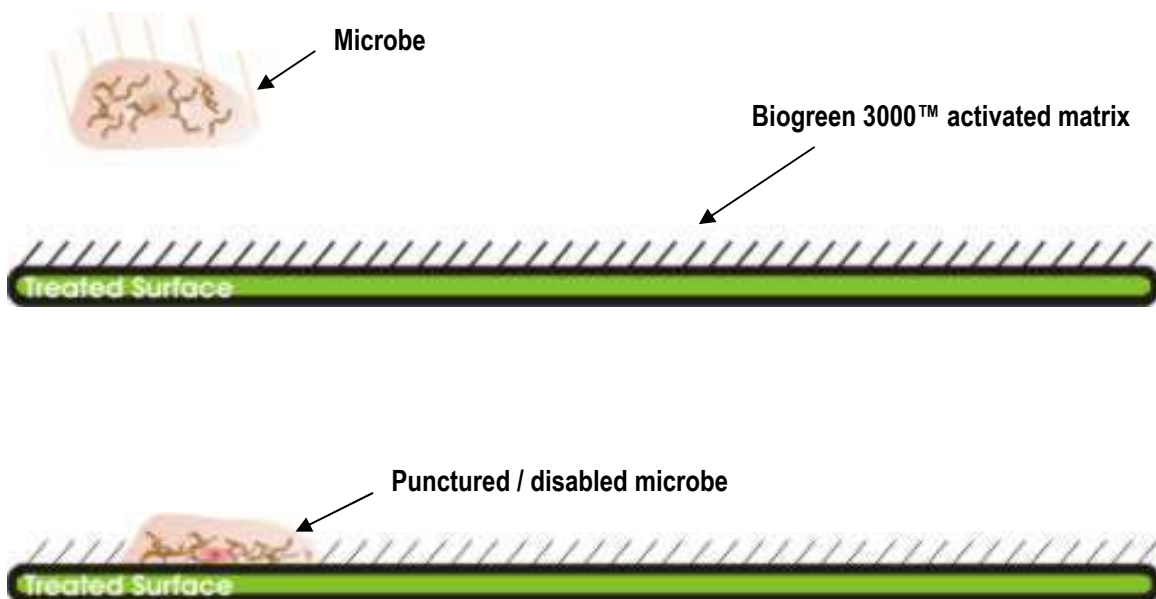
HOW IT WORKS - BIOGREEN 3000™

Biogreen 3000™ is an exceptional antimicrobial biocide (liquid) which is applied to the Microgenix matrix pad rendering the treated surface to have an exceptional, long lasting, germicidal property capable of killing airborne micro-organisms on contact.

Biogreen 3000™ has been carefully evaluated and thoroughly tested according to the highest standards by independent institutes. The Biogreen 3000™ activated matrix is highly bacteriostatic and is safe to man and the environment.

When dry, the Biogreen 3000™ liquid forms a microscopic spike-like structure creating a deadly pathway within the fabric of the matrix upon which the micro-organisms are impaled.

A simplistic view of Biogreen 3000™ in action



The above diagram shows the action of Biogreen 3000™ disrupting, puncturing the cell membrane. This is achieved by physical and ionic phenomena killing the micro-organisms. By employing an air flow rotation fixed impeller within the a vortex is created within the Microgenix™ chamber that ensures all particles come into contact with the treated surfaces.

Biogreen 3000™ does not 'poison' the micro-organism, the cell is physically ruptured upon contact and then electrocuted by a positively charged nitrogen molecule

Section 4

LIST OF ANTIMICROBIALS BIOGREEN 3000™ TESTED AGAINST

Biogreen 3000™ antimicrobial has been proven effective in controlling a wide range of gram positive and gram negative bacteria. The following list represents types of micro-organisms against which Biogreen 3000™ has been specifically tested

Acinetobacter calcoaceticus 1	Mycobacterium smegmatis
Bacillus cereus	Mycobacterium tuberculosis
Brucella abortus	Propionibacterium acnes
Brucella abortus	Proteus mirabilis
Brucella canis	Proteus vulgaris
Brucella canis	Pseudomonas aeruginosa
Brucella suis	Propionibacterium acnes
Citrobacter diversus 1	Proteus vulgaris
Clostridium perfringens	Pseudomonas cepacia
Escherichia coli 1	Pseudomonas fluorescens
Corynebacterium bovis	Salmonella Choleraesuis
Enterobacter agglomerans 1	Salmonella typhosa
Escherichia coli ATCC 23266	Staphylococcus aureus (non pigmented) 1
Klebsiella pneumonia ATOC43521	Staphylococcus aureus (pigmented) 1
Haemophilus influenzae	Staphylococcus epidermis
Haemophilus suis	Streptococcus faecalis
Lactobacillus casei	Streptococcus mutans
Leuconostoc lactis	Xanthomonas campestris
Listeria Monocytogenes	
Micrococcus sp	

Biogreen 3000™ has been proven effective in controlling all fungus including

Aspergillus flavus	Oospora lactis
Aspergillus fumigatus	Penicillium albicans
Aspergillus niger	Penicillium citrinum
Aspergillus versicolor	Penicillium elegans
Aspergillus terreus	Penicillium funiculosum
Aureobasidium pullulans	Penicillium humicola
Chaetomium globosum	Penicillium notatum
Cladosporium herbarum	Penicillium variable
Fusarium nigrum	Stachybotrys atra
Fusarium solani	Trichoderma flavus
Gliocladium reseau	Tricophyton interdigitalis
Mucor sp	Tricophyton mentagrophytes

Biogreen 3000™ has been proven effective in controlling yeast and algae including

Anabaena cylindrica	Pleurococcus sp.LB11
Candida albicans	Saccharomyces cerevisiae
Chlorella vulgaris	Schenedesmus quadricauda
Gonium sp. LB 9c	Selenastrum gracile B325

Section 5.

ACTIVE SUBSTANCE OF BIOGREEN 3000™

Dimethyl-tetradecyl –[3-(Trimethoxisilyl)-propyl}

Ammonium Chloride

CAS-Req-Nr: 41591-87-1: EINECS: 255-451-8

MECHANISM OF ACTION OF BIOGREEN 3000™

The active substance of Biogreen 3000™ belongs to a group of surface-active substances

The product group is comprised of membrane-active microbiostatics

The substances inhibit membrane enzymes and promote the outflow of substances contained in cells

As a result of the positively charged ammonium cation, quaternary ammonium compounds have an affinity for the negatively charged surface of microbe cells.

Section 6

TOXICOLOGICAL DATA OF BIOGREEN 3000™

TEST	STUDY TYPE	RESULT	SPECIES
Acute oral toxicity LD ₅₀ *	OECD 423	➤ 2000 mg/kg	Rat (2 weeks)
Acute toxicity to fish LC ₀ **	OECD 203	1.0 mg/l	Rainbow trout (96h)
Activated sludge respiration inhibition test NOEC (3h)	OECD 209	32 mg/l	Activated sludge
Acute toxicity to fish LC ₅₀ **	OECD 203	1.3 mg/l	Rainbow trout (96h)
Activated sludge respiration inhibition test NOEC (3h)	OECD 209	140 mg/l	Activated Sludge
Skin sensitisation	OECD 406	30% (6/20)	Guinea pig
Primary dermal irritation	ASTM F	Corrosive (6/6)	Rabbit
Ready biodegradation Inherent biodegradation	OECD 302b	101% after 28d	
Ames test	OECD 471	Negative	Product is non-mutagenic

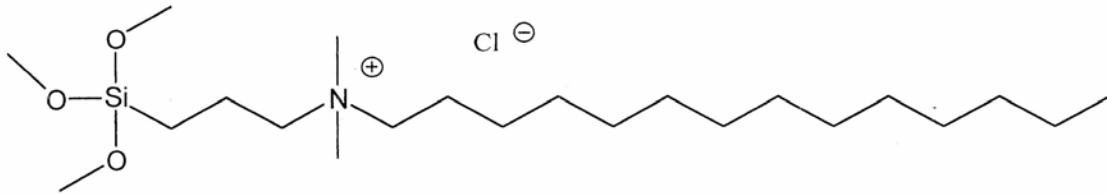
* Lethal dose

** Lethal concentration

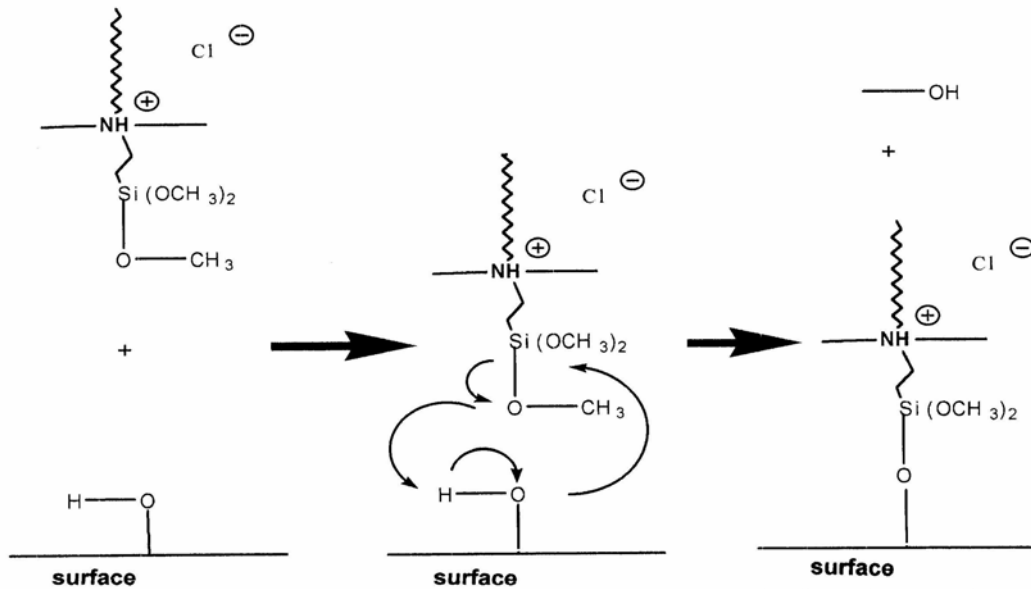
Section 7:1

TECHNICAL BREAKDOWN OF BIOGREEN 3000™

Structure of the active ingredient

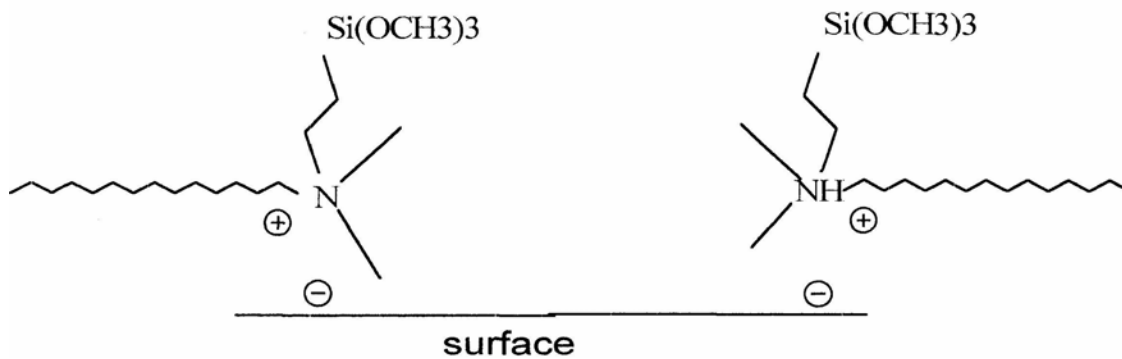


Covalent bond to the surface



Bonding to the surface of Biogreen 3000™

bond type: ionic bonds

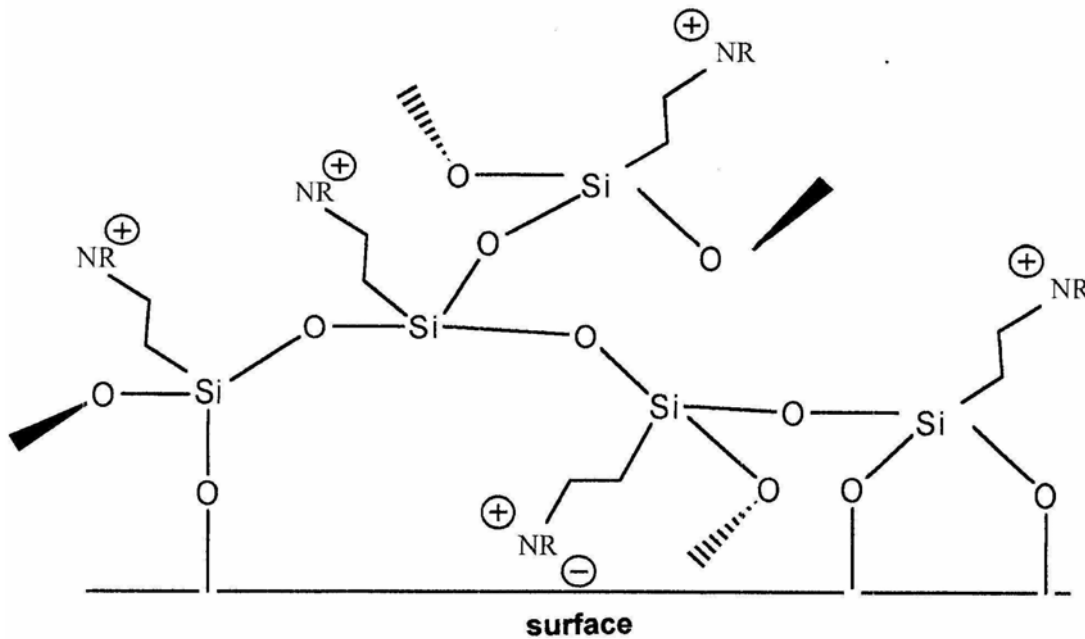


Section 7:2

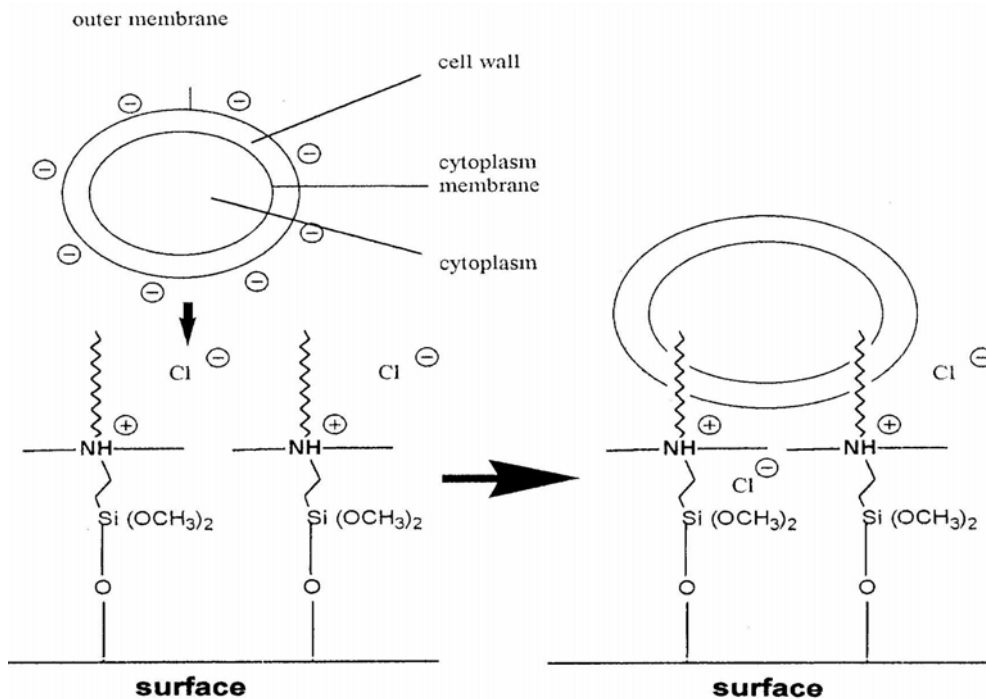
TECHNICAL BREAKDOWN OF BIOGREEN 3000™

Further bonding to the surface of Biogreen 3000™

crosslinking of Biogreen 3000™ on a surface



Mode of action of Biogreen 3000™



Section 8

MICROBIOLOGICALS TESTED WITH BIOGREEN 3000™ ON FABRIC

Fabric treated with 10% Biogreen 3000™. Tests method: Agar-diffusion test

TESTS ACCORDING TO SN 195 920 (BACTERIA)and SN 195 921 (FUNGI & YEAST)	
BACTERIA	PERCENTAGE DESTROYED
Staphylococcus aureus ATCC 6538	100%
Bacillus subtilis IPP 5262	100%
Escherichia coli ATCC 11229	100%
Klebsiella pneumoniae ATCC 4352 ¹⁾	100%
Proteus mirabilis ATCC 14153	100%
Proteus vulgaris ATCC 6896	100%
Salmonella choleraesuis NCTC10789	100%
Streptococcus faecalis IPP 5855	100%
FUNGI	
Trichophyton mentagrophytes EMPA 334	>95%
YEAST	
Candida albicans ATCC 10231	100%
Chaetomium globosum EMPA 1	100%
Humicola grisea ATCC 16298	100%

Section 9

QUESTIONS OFTEN ASKED ABOUT BIOGREEN 3000™/ACTIVATED MATRIX

Q. What is Biogreen 3000™?

A. Biogreen 3000™ is an exceptional antimicrobial biocide (liquid) which, when applied to the Microgenix matrix pad renders the treated surface to have an exceptional, long lasting, germicidal property which kills airborne micro-organisms on contact. When dry, the liquid forms a microscopic spike-like structure creating a deadly pathway upon which the micro-organisms are impaled.

Q. Does Biogreen 3000™ give off gases during or after application?

A. No. Once dry, Biogreen 3000 is stable and does not dissolve or break away

Q. Is the Biogreen 3000™ activated matrix toxic in any way?

A. No. it is neither volatile nor toxic

Q. How does Biogreen 3000™ actually work?

A. Biogreen 3000™ does not poison the micro-organism. Once applied to the matrix the liquid chemically bonds to the surface forming a colourless, odourless coating which is invisible to the naked eye. This coated surface resembles a bed of needles which physically ruptures the cell membrane upon contact. It is then electrocuted by a positively charged nitrogen molecule

Q. What is the Biogreen 3000™ matrix material made of?

A. Spun polyester fibre, sprayed with Biogreen 3000 antimicrobial liquid

Q. What is the lifespan of the Biogreen 3000™ activated matrix?

A. To retain full antimicrobial effectiveness the matrix should be replaced annually.

Q. How can I be sure the Biogreen 3000™ activated matrix is working efficiently?

A. Biogreen 3000™ has undergone extensive laboratory testing over many years and, providing the pre filter is kept relatively clean and the Biogreen 3000™ activated matrix is replaced annually, the Biogreen 3000™ will retain its antimicrobial effectiveness

Section 10

SAFETY DATA FOR BIOGREEN 3000™ ACTIVATED MATRIX (in accordance with 2001/58.EC)

1. IDENTIFICATION OF THE SUBSTANCE AND COMPANY

Trade name

Biogreen 3000™ (Activated Matrix)

Use of the substance

Industry sector: Air purification

Type of use: Anti-microbial property to non-woven reticulated polyester matrix

Identification of company

Microgenix Technologies Limited

Wolfelands

High Street

Westerham

Kent TN16 1RQ

England

Tel:+44 1959 565959

Fax:+44 1959 569933

2. COMPOSITION / INFORMATION ON INGREDIENTS

Non woven polyester fibers thermally bonded

Non hazardous

Chemical characterization

Class of additive: Anti-microbial

Hazardous ingredients

Tetradecylsiloxanquat

Concentration: <1%

CAS number: 41591-87-1

EINECS number: 255-451-8

Hazard symbols: C

3. HAZARDS INFORMATION

Non hazardous under normal operating conditions

May cause mild sensitization by skin contact.

Ingestion is unlikely due to the product's physical state. May cause choking if swallowed

4. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Water

Dry powder

Foam

Carbon dioxide

Special protective equipment for fire-fighting

In case of fire, wear respiratory protection

5. HANDLING AND STORAGE

Open and handle with care – store in dry conditions

6. PERSONAL PROTECTION

Handling protection:

Protective gloves (offered by various manufactures)

Eye protection:

Under normal conditions, eye protection is not required. But, If dust particles are produced during handling or processing, avoid eye contact by use of safety glasses.

First Aid Measures

Inhalation	N/A under recommended usage conditions
Ingestion	N/A under recommended usage conditions
Skin contact	N/A under recommended usage conditions
Eye contact	N/A under recommended usage conditions

7. PHYSICAL AND CHEMICAL PROPERTIES

State:	Residue of Biogreen 3000™ on non-woven polyester matrix
Appearance:	Fibrous material
Melting point	>250°C
Flammability	Not easily flammable
Solubility:	Practically insoluble in water
Odour:	Almost odourless

8. STABILITY AND REACTIVITY

Above 300°C carbon monoxide and other toxic gases may be released

9. TOXICOLOGICAL INFORMATION

Acute oral toxicity:	LD50 > 2,000 mg/kg (rat)
Irritant effect on skin:	non-irritant (rabbit)
Irritant effect on eyes:	non-irritant (rabbit eye)
Sensitization:	sensitizing (Guinea pig) Directive 1994/45/EC

10. ECOLOGICAL INFORMATION

Fish toxicity:	LC50 > 100mg/l
Bacterial toxicity:	LC50 > 1,000 mg/l

11 DISPOSAL CONSIDERATIONS

Product In accordance with current regulations may be taken to waste disposal site or incineration plant, after consultation with site operator and/or with the responsible authority.

12. TRANSPORT INFORMATION

ADR	not restricted	ADNR	not restricted
RID	not restricted	IARA	not restricted
IMDG	not restricted		

This information is based on our present state of knowledge, is given in good faith and is believed to be accurate. However, no warranty or guarantee is made as to accuracy or completeness and Microgenix Technologies Limited assumes no responsibility and disclaims any liability for any loss, damage or injury howsoever incurred in using this information.