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MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name	MultiZyme 6 Enzyme Powder
Chemical Name	Enzyme Blend
Declared activity	Cellulase, Protease (Subtilisin), Alpha-amylase, Pectate Lyase, Lipase, Mannanase (Mannan endo-1,4-beta-mannosidase)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Ecozyme's, enzyme preparations are biocatalysts used in a variety of industrial processes and in certain consumer products

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Skin corrosion/irritation	Category 3
Acute Aquatic toxicity	Category 3
Respiratory sensitisation	Category 1
Chronic aquatic toxicity	Category 3

2.2 Label elements



Signal word

Danger

Hazard statements

H316 - Causes mild skin irritation

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

H412 - Harmful to aquatic life with long term effects.

Precautionary Statements

P261 - Avoid breathing dust/fume/gas/mist/vapours/spray

P284 - In case of inadequate ventilation wear respiratory protection

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing

P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician

P402 – P404 – Store in a dry place. Store in a closed container.

P501 – Dispose of contents/containers in accordance with local regulations.

2.3 Other Information

Human health effects

Repeated inhalation of enzyme dust or aerosols resulting from improper handling may induce sensitization and may cause allergic type 1 reactions in sensitized individuals

Mild skin irritation

May cause eye irritation

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea

Physical and Chemical Hazards

None known

Specific hazards

None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS No	IUB No.	Weight-%
Cellulase (aep)	9012-54-8	3.2.1.4	1 - <1
Protease (aep)	9014-01-1	3.4.21.62	1 – <2.5
Alpha-amylase (aep)	9000-90-2	3.2.1.1	0.1 – <1
Zinc-Sulphate	7446-19-7		0.1 - >1
Lipase (aep)	9001-62-1	3.1.1.3	0.1 – <1

Active enzyme protein (aep) is the part of the enzyme concentrate contributing to the classification of the mixture.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation

Effects

May cause allergic respiratory reaction

Symptoms

Shortness of breath, wheezing and coughing. The effect of inhalation may be delayed

First Aid

Remove person to fresh air. If signs/symptoms continue, get medical attention. Show this safety data sheet to the doctor in attendance

Skin Contact

Effects	May cause slight irritation
Symptoms	Slight irritation
First Aid	Remove and wash contaminated clothing before re-use. Wash off immediately with plenty of water. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance.
Eye Contact	
Effects	Irritating to eyes
Symptoms	Irritation. Redness
First Aid	Hold eye open and rinse slowly and gently with water for 15-20 min. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance
Ingestion	
Effects	Ingestion may cause gastrointestinal irritation.
Symptoms	Irritation
First Aid	Rinse mouth with water and drink plenty of water. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance.

4.2 Most important symptoms and effects, both acute and delayed

See section 4.1

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician	Treat symptomatically
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5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	None.
Hazardous Combustion Products	None.

5.2 Special hazards arising from the substance or mixture

May cause allergic respiratory reaction.

5.3 Advice for firefighters

Self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection see section 8

6.2 Environmental Precautions

Collect spillage

6.3 Methods and material for containment and cleaning up

Avoid formation of dust and aerosols

Spilled preparation should be removed immediately to avoid formation of dust from dried preparation. Take up by mechanical means preferably by a vacuum cleaner equipped with a high efficiency filter. Flush remainder carefully with plenty of water. Avoid splashing and high pressure washing (avoid formation of aerosols). Ensure sufficient ventilation. Wash contaminated clothing.

6.4 Reference to other sections

For personal protection see section 8

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols

Ensure adequate ventilation

Liquid enzyme preparations are dust free preparations

However, inappropriate handling may cause formation of dust or aerosols

7.2 Conditions for safe storage, including any incompatibilities

Keep tightly closed in a dry and cool place 0-25 °C (32-77 °F)

In unbroken packaging - dry and protect from the sun. The product has been formulated for optimal stability. Extended storage or adverse conditions such as higher temperatures or higher humidity may lead to a higher dosage requirement.

7.3 Specific end use(s)

Handle in accordance with good industrial hygiene and safety practice

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Chemical name	ACGIH TLV		
Protease (Subtilisin) (aep)	Ceiling: 0.00006 mg/m ³ Ceiling (as crystalline active enzyme, listed under Subtillisins)		
DNEL/DMEL/PNEC			
Chemical name	DNEL Dermal Acute Local (Workers)		DMEL Inhalation Long term Local (Workers)
Protease (Subtilisin) (aep)	DNEL = 0.2% in mixture (W/W)		DMEL = 60 ng/m ³
Alpha-amylase (aep)	-		DMEL = 60 ng/m ³
Lipase (aep)			DMEL = 60 ng/m ³
Cellulase (aep)			DMEL = 60 ng/m ³
Pectate			DMEL = 60 ng/m ³
Chemical name	DNEL Dermal Acute Local (Professional/Consumers)	DMEL Inhalation Long term Local (Professionals/Consumers)	
Protease (Subtilisin) (aep)	DNEL = 0,2% in mixture (W/W)	DMEL = 15 ng/m ³	
Chemical name	Fresh Water	Sea Water	Impact on Sewage Treatment

Protease (Subtilisin) (aep)	PNEC aqua (fresh water) = 0.06 µg/l	PNEC aqua (marine water) = 0.006 µg/l	PNEC STP = 65000 µg/L
Alpha-amylase (aep)	PNEC aqua (fresh water) = 5.2 µg/l	PNEC aqua (marine water) = 0.52 µg/l	PNEC STP = 65000 µg/L

Derived No Effect Level (DNEL) - Derived Minimal

When enzymes are used for spray products or hard surface cleaning, exposure of enzymes may exceed the safety level (15ng/m³ DMEL).

8.2 Exposure controls

Ensure adequate ventilation, especially in confined areas

Personal Protective Equipment

Respiratory protection	In case of insufficient ventilation wear an approved mask with a particle filter type P3 used according to the manufactures instruction
Eye Protection	Wear safety glasses with side shields (or goggles)
Skin Protection	Long sleeved clothing
Hand Protection	Protective gloves of e.g. nitrile rubber or neoprene (thickness > 0.3 mm) according to EN 374-3. Expected breakthrough time: > 4 hours. The recommendation is a qualified estimate based on the knowledge of the components in the mixture
General Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Local authorities should be advised if significant spillages cannot be contained Waste water should be discharged to sewage treatment plant

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical State	Granulate
Colour	Off White
Odour	Slight fermentation odour
Melting point / freezing point	No information available
Initial boiling point and boiling range	Not available
Flammability (solid, gas)	Not available
Upper/lower flammability or explosive limits	Not available
Flash Point	Not available
Autoignition temperature	Not available
Decomposition temperature	Not available
pH	Adjusted to the range where active enzyme is stable – typically pH 4 – 9
Solubility	Readily soluble in application-relevant solutions at all levels of concentration, temperature and PH which may occur in normal usage.
Vapour Pressure	Not available

Density (g/ml)	1.17
Vapour density	Not available
Particle characteristics	Not applicable
Evaporation rate	Not available
Oxidising Properties	Not available

9.2 Other information

Other information	No information available
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10. STABILITY AND REACTIVITY

10.1 Reactivity

Not relevant

10.2 Chemical stability

Stable under recommended storage conditions

10.3 Possibility of hazardous reactions

None under normal processing

10.4 Conditions to avoid

None

10.5 Incompatible materials

None

10.6 Hazardous decomposition products

None

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Chemical name	Acute oral toxicity	Respiratory sensitisation	Genetic toxicity	Skin corrosion/irritation	Serious damage/eye irritation
Protease (Subtilisin) (aep)	LD50: 1800 mg/kg bw (OECD TG 401)	Sensitizer (Human experience)	No indication of mutagenic effects (OECD TG 471, 473, 476)	Slightly irritating (OECD TG 404)	Slightly irritating (OECD TG 405)
Alpha-amylase (aep)	LD50: > 2000 mg/kg bw (OECD TG 401, 420)	Sensitizer (Human experience)	No indication of mutagenic effects (OECD TG 471, 476)	Not irritating (OECD TG 404)	Not irritating (OECD TG 405)
Lipase (aep)	LD50: > 2000 mg/kg bw (OECD TG 401, 420)	Sensitizer (Human experience)	No indication of mutagenic effects (OECD TG 471, 476)	Not irritating (OECD TG 404)	Not irritating (OECD TG 405)

Zinc Sulphate	LD50: > 1.260mg/kg bw	No Data available	No indication of mutagenic effects	Not irritating	Risk of serious damage to eyes.
Chemical name	Acute inhalation toxicity		Specific target organ toxicity (single exposure)		
Protease (Subtilisin) (aep)	Exposure based waiving		Irritating, respiratory tract (ACGIH 2001)		
Lipase (aep)			No data available		

Carcinogenicity The product contains calcium carbonate limestone. The raw material may contain trace amounts of crystalline silica also known as quartz. Quartz is a suspected carcinogen If inhaled.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Chemical name	Daphnia, acute	Acute fish toxicity =	Algae, Acute
Protease (Subtilisin) (aep)	EC50 (48 hours): 586 µg aep/l (OECD TG 202)	LC50 (96 hours): 8.2 mg aep/l (OECD TG 203)	ErC50 (72 hours): 830 µg aep/l (OECD TG 201)
Alpha-amylase (aep)	EC50 (48 hours): 31.7 - 457 mg aep/l (OECD TG 202)	LC50 (96 hours): 58.3 - 326.7 mg aep/l (OECD TG 203)	ErC50 (72 hours): >= 5.2 mg aep/l (OECD TG 201)
Lipase (aep)	EC50 (48 hours): >37.4 mg aep/l (OECD TG 202)	LC50 (96 hours): >68.3 mg aep/l (OECD TG 203)	ErC50 (72 hours): > 18 mg aep/l (OECD TG 201)
Cellulase (aep)	EC50 (48 hours): >39.5 mg aep/l (OECD TG 202)	LC50 (96 hours): >39.5mg aep/l (OECD TG 203)	
Zinc Sulphate	No data available	LC50 (96 hours): 0.1mg/l	EC50(120 hours): 0.52mg/l

12.2 Persistence and degradability

Chemical name	Persistence and degradability	Partition coefficient (n-octanol/water)
Protease (Subtilisin) (aep)	Readily biodegradable (OECD TG 301B)	LogPow: <0
Alpha-amylase (aep)	Readily biodegradable (OECD 301F)	LogPow: <0
Lipase (aep)	Readily biodegradable (OECD 301)	LogPow: <0
Cellulase (aep)	Readily biodegradable (OECD301E/F)	LogPow: <0
Zinc Sulphate	Not Relevant	Not Applicable4

12.3 Bioaccumulative potential

Chemical name	Bioaccumulative potential
Protease (Subtilisin) (aep)	Does not bioaccumulate
Alpha-amylase (aep)	Does not bioaccumulate
Lipase (aep)	Does not bioaccumulate
Cellulase (aep)	Does not bioaccumulate
Zinc Sulphate	Does not bioaccumulate

12.4 Mobility in soil

Not relevant 12.5

Results of PBT and vPvB assessment

The components in this formulation do not meet the criteria for classification as PBT or vPvB

12.6 Other adverse effects

No information available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with local regulations

Waste water should be discharged to sewage treatment plant

Waste codes should be assigned by the user based on the application for which the product was used

14. TRANSPORT INFORMATION Transport Regulations

This product is not classified as dangerous goods according to UN GHS classification criteria.

IATA	Not regulated
IMDG/IMO No special precautions required	Not regulated

14.1

UN number	Not applicable
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14.2

UN proper shipping name	Not applicable
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14.3

Transport hazard class(es)	Not applicable
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14.4

Packing group	Not applicable
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14.5

Environmental hazards	Not applicable
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14.6

Special precautions for user	Not applicable
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14.7

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable
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15. REGULATORY INFORMATION

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

Please check the consequences of national regulations on this product yourself.

16. OTHER INFORMATION

GHS-Classification

The classification of eye effects is based on testing of a similar mixture.

The GHS calculation method has been used for classification of this mixture.

Disclaimer

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.