## 1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Alcalase® 2.4 L FG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>Enzyme preparation</td>
</tr>
<tr>
<td>Declared activity</td>
<td>Protease (Subtilisin)</td>
</tr>
<tr>
<td>Use of the substance/preparation</td>
<td>Novozymes' enzyme preparations are biocatalysts used in a variety of industrial processes within food manufacturing</td>
</tr>
<tr>
<td>Contact Manufacturer</td>
<td>Novozymes North America, Inc.</td>
</tr>
<tr>
<td></td>
<td>77 Perry Chapel Church Rd., Box 576</td>
</tr>
<tr>
<td></td>
<td>Franklinton, NC 27525</td>
</tr>
<tr>
<td></td>
<td>E-mail: <a href="mailto:SafetyDataSheet@novozymes.com">SafetyDataSheet@novozymes.com</a></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.novozymes.com">www.novozymes.com</a></td>
</tr>
<tr>
<td>Information Telephone Number</td>
<td>1-919-494-3000, 8 am - 4:30 pm EST M-F</td>
</tr>
<tr>
<td>Emergency Telephone Number</td>
<td>1-800-424-9300 (Chemtrec) 24 hours every day</td>
</tr>
</tbody>
</table>
2. HAZARDS IDENTIFICATION

See Section 4 for first aid

**OSHA Regulatory Status**
This material is covered under the OSHA Hazard Communication Standard (29 CFR 1910.1200)

**Physico-chemical properties**
The data available do not support any physical or chemical hazard

**Environmental Effects**
The data available do not support any environmental hazard

**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
Mild eye irritation

**Effects of overexposure**
See Section 4

See Section 11 for additional Toxicological information

3. COMPOSITION/INFORMATION ON INGREDIENTS

**Hazardous Components**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EC No.</th>
<th>IUB No.</th>
<th>Weight %**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>9014-01-1</td>
<td>232-752-2</td>
<td>3.4.21.62</td>
<td>10 - 20</td>
</tr>
</tbody>
</table>

**: Enzymes are defined as enzyme concentrate (dry matter basis)

4. FIRST AID MEASURES

In case of unintended overexposure, the following measures apply

**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**
May cause slight irritation.

**Symptoms**
Slight irritation

**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, nausea, vomiting and diarrhea.

**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.

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5. **FIRE-FIGHTING MEASURES**

**Flammable Properties**
Slightly flammable according to HMIS criteria

**Suitable Extinguishing Media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

**Unsuitable Extinguishing Media**
None

**Hazardous Combustion Products**
None

**Specific Hazards Arising from the Chemical**
May cause allergic respiratory reaction

**Protective Equipment and Precautions for Firefighters**
Self-contained breathing apparatus and standard turnout apparel

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6. **ACCIDENTAL RELEASE MEASURES**

**Personal Precautions**
For personal protection see section 8

**Environmental Precautions**
No special environmental precautions required

**Methods for 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 HEPA (High Efficiency Particulate Air) filter. Flush remainder carefully with plenty of water. Avoid splashing, high pressure washing or compressed air cleaning to avoid formation of aerosols. Ensure sufficient ventilation. Wash contaminated clothing.

For personal protection see section 8

7. HANDLING AND STORAGE

Handling
Avoid formation of dust and aerosols
Ensure adequate ventilation
Liquid enzyme preparations are dustfree preparations. However, inappropriate handling may cause formation of dust or aerosols.

Storage
Keep tightly closed in a dry and cool place. Temperature 0-10°C (32°F-50°F)

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>Ceiling: 0.00006 mg/m³ Ceiling (as crystalline active enzyme, listed under Subtilisins)</td>
</tr>
</tbody>
</table>

Occupational exposure controls

Engineering Controls
Ensure adequate ventilation, especially in confined areas
Maintain good conditions of industrial hygiene. Some processes may require enclosures, local exhaust ventilation, or other engineering controls to control airborne levels. Additional handling and healthy/safety information is available upon request

Personal Protective Equipment

Respiratory Protection
In case of insufficient ventilation wear suitable respiratory equipment that meets HEPA/P100 specifications

Eye Protection
Safety glasses with side-shields

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 practices

Environmental exposure controls
Local authorities should be advised if significant spillages cannot be contained
9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Brown</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight fermentation odor</td>
</tr>
<tr>
<td>Density (g/ml)</td>
<td>1.17</td>
</tr>
<tr>
<td>pH</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Solubility</td>
<td>Active component is readily soluble in application-relevant solutions at all levels of concentration, temperature and pH which may occur in normal usage</td>
</tr>
</tbody>
</table>

Other information

No information available

10. STABILITY AND REACTIVITY

Reactivity

Not relevant

Chemical stability

Stable under recommended storage conditions

Possibility of Hazardous Reactions

None under normal processing

Conditions to Avoid

None

Incompatible materials

None

Hazardous Decomposition Products

None

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Acute oral toxicity</th>
<th>Respiratory sensitization</th>
<th>Genetic toxicity</th>
<th>Skin corrosion/irritation</th>
<th>Serious eye damage/eye irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>LD50: 1800 mg/kg bw (OECD TG 401)</td>
<td>Sensitizer (Human experience)</td>
<td>No indication of mutagenic effects (OECD TG 471, 473, 476)</td>
<td>Slightly irritating (OECD TG 404)</td>
<td>Slightly irritating (OECD TG 405)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Acute inhalation toxicity</th>
<th>Specific target organ toxicity – single exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>Exposure based waiving</td>
<td>Irritating, respiratory tract (ACGIH 2001)</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Daphnia, acute</th>
<th>Algae, acute</th>
<th>Fish, acute</th>
</tr>
</thead>
</table>

www.novozymes.com
### Chemical Name

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Daphnia, acute</th>
<th>Algae, acute</th>
<th>Fish, acute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>EC50 (48 hours): 586 μg aep/l (OECD TG 202)</td>
<td>ErC50 (72 hours): 830 μg aep/l (OECD TG 201)</td>
<td>LC50 (96 hours): 8.2 mg aep/l (OECD TG 203)</td>
</tr>
</tbody>
</table>

### Persistence/Degradability

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Persistence and degradability</th>
<th>Partition coefficient (n-octanol/water)</th>
<th>Bioaccumulative Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protease (Subtilisin)</td>
<td>Readily biodegradable (OECD TG 301B)</td>
<td>LogPow: &lt;0</td>
<td>Does not bioaccumulate</td>
</tr>
</tbody>
</table>

### Mobility in soil

Not relevant

### Other adverse effects

No information available

### 13. DISPOSAL CONSIDERATIONS

- **Waste Disposal Method**: Dispose of in accordance with local regulations
- **Contaminated Packaging**: Dispose of wastes in an approved waste disposal facility

### 14. TRANSPORT INFORMATION

- **Transport Regulations**: No dangerous goods according to transport regulations
- **Transport hazard class(es)**: not applicable
- **Packing group**: not applicable
- **Environmental hazards**: not applicable

### 15. REGULATORY INFORMATION

The product complies with the recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Food Chemical Codex (FCC).

**USA, Federal Regulations**

- **TSCA Inventory**: The active ingredient and all components of the enzyme preparation are listed on the TSCA inventory

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and 40 CFR Part 372.

**SARA 311/312 Hazardous Categorization**

- **Acute Health Hazard**: No
- **Chronic Health Hazard**: No
- **Fire Hazard**: No
Sudden Release of Pressure Hazard: No
Reactive Hazard: No

**USA, State Regulations**

**California Proposition 65**
This product does not contain any Proposition 65 chemicals

**Canada**

**WHMIS Hazard Class**
Controlled product hazard class D2 A (respiratory sensitizer)

**WHMIS Statement**
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

### 16. OTHER INFORMATION

**Training advice**

**Disclaimer**
The information provided on this SDS 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as 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 material or in any process, unless specified in the text. Furthermore, as the conditions of use are beyond the control of Novozymes, it is the responsibility of the customer to determine the conditions of safe use of these products.

*End of Safety Data Sheet*

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