1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Avizyme® 1510 Alpha-amylase liquid / DAN Liquid Alpha Amylase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Number</td>
<td>1514</td>
</tr>
<tr>
<td>Chemical nature</td>
<td>Enzyme Preparation</td>
</tr>
<tr>
<td>Formula</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Synonyms</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Recommended Use</td>
<td>Animal feed</td>
</tr>
<tr>
<td>Company/undertaking identification:</td>
<td>Danisco Animal Nutrition</td>
</tr>
<tr>
<td></td>
<td>PO Box 777</td>
</tr>
<tr>
<td></td>
<td>Marlborough</td>
</tr>
<tr>
<td></td>
<td>Wiltshire SN81XN</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
</tr>
<tr>
<td></td>
<td>Tel: +441672 517777</td>
</tr>
<tr>
<td></td>
<td>Fax: +441672 517778</td>
</tr>
<tr>
<td>E-mail Address</td>
<td><a href="mailto:SDS.Genencor@Danisco.com">SDS.Genencor@Danisco.com</a></td>
</tr>
<tr>
<td>Emergency telephone</td>
<td>+1 (319) 368-7657</td>
</tr>
</tbody>
</table>

2. HAZARDS IDENTIFICATION

Potential Health Effects: Inhalation of enzyme mist/dust may cause allergic respiratory reactions, including asthma, in susceptible individuals on repeated exposure.

- Eyes: May cause slight irritation.
- Skin: May cause slight irritation.
- Inhalation: May cause slight irritation.
- Ingestion: Not expected to be toxic by ingestion.

Aggravated Medical Conditions: Atopy. Asthma.

Environmental Hazard: See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>%</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha Amylase (Bacterial)</td>
<td>9000-90-2</td>
<td>1-5</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Proprietary</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>7647-14-5</td>
<td>Proprietary</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>Proprietary</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

Eye Contact
Flush eyes with water at least 15 minutes. Get medical attention if eye irritation develops or persists.

Skin Contact
Flush skin with large amounts of water. If irritation develops and persists, get medical attention.

Inhalation
Remove person to fresh air. If signs/symptoms continue, get medical attention.

Ingestion
Rinse mouth with water. Get medical attention immediately if symptoms occur.

Notes to Physician
May cause allergic respiratory reaction.

5. FIRE-FIGHTING MEASURES

Flammable Properties
Not flammable.

Suitable Extinguishing Media

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Use only with adequate ventilation/personal protection. Avoid breathing dust or spray mist. Avoid formation of dust and aerosols. For personal protection see section 8.

Methods for Containment
Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up
Contain and remove spilled product by mechanical means or with a vacuum cleaner equipped with a high efficiency filter. Avoid formation of aerosol.
7. HANDLING AND STORAGE

Handling
Avoid breathing vapors or mists. Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice. For personal protection see section 8.

Storage
Keep container tightly closed in a dry and well-ventilated place. Additional information available from product literature.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines
Contains no substances with occupational exposure limit values.

Occupational Exposure Controls

- **Engineering Measures**
  - Ventilation systems.

- **Hygiene Measures**
  - Handle in accordance with good industrial hygiene and safety practice.

Personal Protective Equipment

- **Eye/Face Protection**
  - Safety glasses with side-shields.

- **Skin and Body Protection**
  - Impervious gloves.

- **Respiratory Protection**
  - Use NIOSH approved respiratory protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Yellow to brown</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Flash Point</td>
<td>&gt;100°C / &gt;210°F</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>Not determined</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not determined</td>
</tr>
<tr>
<td>Flammability Limits in Air</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.21</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Odor</td>
<td>Typical odor of fermented product</td>
</tr>
<tr>
<td>pH</td>
<td>5.5-7.5</td>
</tr>
<tr>
<td>Method</td>
<td>PMCC.</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not determined</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>Not determined</td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Not determined</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Soluble</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not determined</td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

Stability

Stable under normal conditions.

Incompatible Products

None known.

Conditions to Avoid

None known.

Hazardous Decomposition Products

None known.

Hazardous Polymerization

Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute Toxicity

Oral
No data available

Dermal
No data available

Inhalation
No data available

Irritation

Eye irritation
No data available

Skin irritation
No data available

Respiratory irritation
No data available

Sensitization

Inhalation of enzyme mist/dust may cause allergic respiratory reactions, including asthma, in susceptible individuals on repeated exposure.

Systemic toxicity

There is no data available for this product

Mutagenic effects

There is no data available for this product

Reproductive effects

This product does not contain any known or suspected reproductive hazards.

Carcinogenicity

Not classified as a carcinogen by IARC, OSHA, or NTP.

Component Information

Component information below is as complete as possible. Any fields not shown indicate no data is presently available.

Alpha Amylase (Bacterial)

Oral
LD50/oral/rat 2000 mg/kg

Inhalation
Single dose rat LC50 3.9 mg/l

Eye irritation
Not an irritant.

Skin irritation
Not an irritant.

Systemic toxicity

In a 90-day study with rats, the NOEL was found to be 1000 ppm. In a 14-day feeding study with rats, a NOAEL was established at 5,000 ppm. Data from similar enzyme.
11. TOXICOLOGICAL INFORMATION

Mutagenic effects
Negative in Ames assay with and without metabolic activation up to 5000 ug/plate. Negative in chromosome aberration using human lymphocytes with and without metabolic activation up to 5000 mg/ml. Data from similar enzyme.

**Sodium Chloride**
- Oral: LD50/oral/rat 3000 mg/kg
- Eye irritation: Moderate eye irritation.
- Mutagenic effects: Negative in the Ames test.

**Propylene glycol**
- Oral: LD50/oral/rat 20 g/kg
- Dermal: LD50/dermal/rabbit = 20800 mg/kg
- Eye irritation: Mild eye irritation.
- Skin irritation: May cause moderate irritation.
- Sensitization: May cause sensitization of susceptible persons.
- Mutagenic effects: Negative in Ames assay up to 10,000 ug/plate.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects
Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

Mobility
Soluble.

Persistence and Degradability
Enzymes are considered readily biodegradable.

Bioaccumulation/Accumulation Component Information
Bioaccumulation is unlikely.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicity to algae</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia</th>
<th>Biodegradation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Chloride</td>
<td>EC50/72h/algae 4967 mg/l</td>
<td>LC50/96h/bluegill sunfish 9675 mg/l</td>
<td>LC50/48h/daphnia = 1000 mg/l</td>
<td>No data</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
In accordance with local and national regulations.

Packaging
If empty container retains product residues, all label precautions must be observed. Store away from ignition sources. Transport with all closures in place. Return for reuse or dispose according to national or local regulations.

Issuing Date 06/25/2009
Revision Date 07/23/2009
14. TRANSPORT INFORMATION

Harmonized Tariff Code: 3507.90.7000 (for enzymes).

DEPT. OF TRANSPORTATION UN OR NA NUMBER
Not classified as dangerous in the meaning of transport regulations.

Hazard Class
Not hazardous

Packing Group
Not applicable

Reportable Quantity (RQ)
Not applicable

15. REGULATORY INFORMATION

HAZARD RATING SYSTEMS:

HMIS (SCALE 0-4, WHERE 4=SEVERE HAZARD): Health: 2 Flammability: 1 Reactivity: 0

U.S. Federal Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>SARA 313 - Threshold Values %</th>
<th>CERCLA/SARA - Section 302 Extremely Haz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha Amylase (Bacterial)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Water</td>
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<td>Not listed</td>
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<tr>
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</tr>
<tr>
<td>Propylene glycol</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

U.S. State Regulations

California Proposition 65 This product does not contain any Proposition 65 chemicals.
16. OTHER INFORMATION

Prepared By
M. Laura
SDS Coordinator

Revision Date
06/25/2009

Changes since last date of revision: None.

Disclaimer
The information provided on this MSDS 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.

END OF SDS