SAFETY DATA SHEET
L-Tryptophan [Feed Grade (98%)]

1. IDENTIFICATION

1.1. Product identifier
Trade Name: L-Tryptophan 98% Feed Grade

1.2. Relevant identified uses of the product
Identified Uses: This product shall exclusively be used in animal nutrition. It shall not be used for any food application

1.3. Identification of the Company
Manufacturer and Distributer: Ajinomoto Animal Nutrition North America, Inc.
1116 Hwy 137
Eddyville, Iowa 52553
Phone: 641-969-4551 – Eddyville IA
773-380-7000 – Chicago, IL.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture
Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008.
Not a hazardous substance or mixture according to Directive 67/548/EEC

2.2. Label Elements

Labeling according to regulation (EC) No 1272/2008 [EU-GHS/CLP]

- Signal Word: Warning
- Hazard Statement: May form combustible concentrations in air
  H335: May cause respiratory irritation

Labeling according to Directive 67/548/EEC
- Symbol (s): None Defined

2.3. Other Hazards: None
3. COMPOSITION/INFORMATION ON INGREDIENTS

Components: L-Tryptophan content
Concentration: 98% (on a dry matter basis)
Crude Protein (%/16 g-N)
Concentration: 84% (on a dry matter basis)

Synonyms:
(S)-α*-amino-1-H-indole-3-propanoic acid (The Merck Index)
1-α-aminoindole-3-propionic acid (The Merck Index)
1-α-amino-3-indolepropionic acid (The Merck Index)
2-amino-3-indolylpropanoic acid (The Merck Index)
1-β-3-indolylalanine (The Merck Index)

Chemical Formula: C₁₁H₁₂N₂O₂
No CAS: 73-22-3
No EINECS: 200-795-6

4. FIRST AID MEASURES

4.1. Description of first aid measures

If inhaled:
In case of breathing trouble, immediately relocate to a fresh air environment. Seek medical attention.

In case of skin contact
In case of exposure, wash with soap and copious amounts of water. If irritation persists, seek medical attention.

In case of eye contact
Flush eyes with copious amounts of water for at least 15 minutes. Ensure adequate flushing by separating eyelids with fingers. If contact lenses are worn, remove lenses and continue rinsing. Seek medical attention.

If swallowed
Rinse mouth with water. If any trouble appears, seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed
No data available

4.3. Indication of any immediate medical attention and special treatment needed

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No data available

5. FIREFIGHTING MEASURES

5.1. Extinguishing media
Water spray, carbon dioxide, dry chemical powder/foam.

5.2. Special hazards arising from substance or mixture

Warning - Product may form combustible concentrations when dispersed in air

5.3. Advice for firefighters
Wear protective clothing and breathing mask to protect from fumes

5.4. Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
(See paragraph 8).

6.2. Environmental precautions
In case of release in large quantities, avoid releasing in sewers and water courses.

6.3. Methods and materials for containment and cleaning
Prevent spills from entering sewers and water courses. Avoid dust generation and ventilate the area. Collect the product and place it in bags or containers for later disposal and elimination as waste, according to local legislation. After material has been removed, rinse the spill site with water.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling
Follow good manufacturing practice and personal hygiene.

Standard precautions for powdered products or products generating dust:
- Avoid dust dispersion during grinding or blending operations
- Provide mechanical exhaust or ventilation
- Clean and eliminate dust from equipment regularly
- Use anti-static equipment
- Avoid heat sources and sparks.

7.2. Conditions for safe storage, including any incompatibilities

In the bags in which the product has been delivered. Keep in dry conditions. Keep away from ignition and heat sources. Avoid exposure to electrostatic discharge.

7.3. Specific end uses

No data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Components with workplace control parameters
Does not contain any substance subject to an exposure limit value.

8.2. Exposure controls

Engineering controls
No data available

Personal protective equipment

Eye/face protection Wear safety goggles in case of direct contact
Body protection Wear protective clothes covering skin. Discard or wash protective clothes after exposure to dust of the product.
Skin protection Wear gloves, especially in case of extended contact
Respiratory protection Wear a mask covering both nose and mouth.

Signal Word: Warning
Precautionary Statement: P261: Avoid breathing dust
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present
9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Yellowish – White, crystalline powder</td>
</tr>
<tr>
<td>Odor</td>
<td>No particular odor</td>
</tr>
<tr>
<td>pH</td>
<td>4.5 to 7 (5% solution)</td>
</tr>
<tr>
<td>Apparent Specific gravity</td>
<td>0.2 to 0.3 kg/l</td>
</tr>
<tr>
<td>Water solubility</td>
<td>20°C: 1.136 g/ 100g</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol / water</td>
<td>Log Pow = -1.04</td>
</tr>
<tr>
<td>Auto ignition</td>
<td>700°C [measure according to standards IEC-1241-2-1 Part 2, method B and EN 50281-2-1 (2000)]</td>
</tr>
<tr>
<td>Minimum ignition energy</td>
<td>MIE: 2.4 mJ</td>
</tr>
<tr>
<td>Cloud temperature</td>
<td>MCIT: &gt; 580°C</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Pmax: 8.1 bars</td>
</tr>
<tr>
<td></td>
<td>Kst: 250 bar.m.s⁻¹</td>
</tr>
<tr>
<td></td>
<td>MEC: 56 g/m3</td>
</tr>
<tr>
<td></td>
<td>The product is classified as an ST1 hazard</td>
</tr>
</tbody>
</table>

9.2. Other safety information

Warning: May form combustible concentrations in air when dispersed.

10. STABILITY AND REACTIVITY

10.1. Reactivity
Exothermic reaction between 340°C and 360°C

10.2. Chemical stability
Stable if stored in dry conditions.

10.3. Possibility of hazardous reactions
Warning: May form combustible concentrations in air when dispersed.

10.4. Conditions to avoid
Avoid electrostatic sparks and ignition sources.
10.5. Incompatible materials
No data available on incompatible materials.

10.6. Hazardous decomposition products
No data available.

11. TOXICOLOGICAL INFORMATION

11.1. Acute toxicity
Acute oral toxicity: Not harmful when ingested: acute oral LD50 > 2000mg/kg in rat.
Acute inhalation toxicity: Not harmful when inhaled: LC50 ≥ 5.26 g/m³

11.2. Skin corrosion / irritation
‘L-Tryptophan, technically pure’ is not irritating to (human) skin (according to EC standards, OJEC, L 110 A, Vol 36, 4 May 1993).

11.3. Serious eye damage / eye irritation
‘L-Tryptophan, technically pure’ is not irritating to (human) eyes (according to EC standards, OJEC, L 110 A, Vol 36, 4 May 1993).

11.4. Respiratory or skin sensitization.
Not sensitizing for the skin (LLNA test)

11.5. Germ cell mutagenicity
Not mutagenic (Bacterial reverse mutation test, Gene mutation test at the TK-locus of L5178Y cells, Chromosomal aberration test in cultured Chinese hamster Ovary (CHO) cells). In vitro micronucleus test in cultured human lymphocytes, Bone marrow (‘in vivo’) micronucleus test incorporated in a repeated-dose (13 week) oral toxicity study in rats.

11.6. Carcinogenicity
Not carcinogenic

11.7. Reproductive toxicity
To the best knowledge of Ajinomoto, no effect on fetal development.

11.8. Specific target organ toxicity – single exposure
No data available

11.9. Specific target organ toxicity – repeated exposure
No data available

11.10. Aspiration hazard
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No data available

11.11. Signs and symptoms of exposure
No data available

11.12. Additional information
NOAEL (No adverse effect level, oral administration) is conservatively: 628 mg/kg bw (90 days ingestion in rats).

12. ECOLOGICAL INFORMATION

12.1. Toxicity
Not toxic for animal and plant.

12.2. Persistence and degradability
Biodegradable

12.3. Bioaccumulative potential
None.

12.4. Mobility in soil
No data available.

12.5. Results of PBT and vPvB assessment
No data available

12.6. Other adverse effects
When a large quantity of the product is released in a river or waste treatment plant, the ecosystem or the functioning of the plant may be disturbed due to increased demand in oxygen required to degrade the product (increase of the biological oxygen demand – BOD - of water)

13. Disposal Consideration

Waste treatment method: Treat wastes in accordance with the local/national legislation and or environmental regulations that apply.

14. Transport Information

14.1. UN Number

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ADR / RID:  -
IMDG:  -
IATA:  -

14.2. UN proper shipping name
ADR / RID:  Not dangerous goods
IMDG:  Not dangerous goods
IATA:  Not dangerous goods

14.3. Transport hazard class (es)
ADR / RID:  -
IMDG:  -
IATA:  -

14.4. Packing group
ADR / RID:  -
IMDG:  -
IATA:  -

14.5. Environmental hazards
ADR / RID:  No
IMDG Marine pollutant:  No
IATA:  No

14.6. Special precautions for user
No data available

15. REGULATORY INFORMATION

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

15.2. Chemical Safety Assessment
No data available

16. OTHER INFORMATION : None