

# SAFETY DATA SHEET



Amino Acid Supplement Kit - For R&D Only, Part Number 5062-2478

## Section 1. Identification

### 1.1 Product identifier

**Product name** : Amino Acid Supplement Kit - For R&D Only, Part Number 5062-2478  
**Part No. (Chemical Kit)** : 5062-2478  
**Part No.** : Sarcosine Not available.  
                                   L-Tryptophan Not available.  
                                   L-Norvaline Not available.  
                                   L-Glutamine Not available.  
                                   L-Asparagine Not available.  
                                   L-4-Hydroxyproline Not available.  
**Validation date** : 5/16/2017

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

**Material uses** : Analytical chemistry.  
                                   Analytical Standards  
                                   Sarcosine 1 g  
                                   L-Tryptophan 1 g  
                                   L-Norvaline 1 g  
                                   L-Glutamine 1 g  
                                   L-Asparagine 1 g  
                                   L-4-Hydroxyproline 1 g

### 1.3 Details of the supplier of the safety data sheet

**Supplier/Manufacturer** : Agilent Technologies, Inc.  
                                   5301 Stevens Creek Blvd  
                                   Santa Clara, CA 95051, USA  
                                   800-227-9770

### 1.4 Emergency telephone number

**In case of emergency** : CHEMTREC®: 1-800-424-9300

## Section 2. Hazards identification

### 2.1 Classification of the substance or mixture

<b>OSHA/HCS status</b> : Sarcosine	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
L-Tryptophan	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
L-Norvaline	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
L-Glutamine	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
L-Asparagine	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
L-4-Hydroxyproline	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

### Classification of the substance or mixture

## Section 2. Hazards identification

<b>Sarcosine</b>	
Comb. Dusts	COMBUSTIBLE DUSTS
<b>L-Tryptophan</b>	
Comb. Dusts	COMBUSTIBLE DUSTS
<b>L-Norvaline</b>	
Comb. Dusts	COMBUSTIBLE DUSTS
<b>L-Glutamine</b>	
Comb. Dusts	COMBUSTIBLE DUSTS
<b>L-Asparagine</b>	
Comb. Dusts	COMBUSTIBLE DUSTS
<b>L-4-Hydroxyproline</b>	
Comb. Dusts	COMBUSTIBLE DUSTS

### 2.2 GHS label elements

<b>Signal word</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Warning Warning Warning Warning Warning Warning
<b>Hazard statements</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	No Code(s) - May form combustible dust concentrations in air. No Code(s) - May form combustible dust concentrations in air. No Code(s) - May form combustible dust concentrations in air. No Code(s) - May form combustible dust concentrations in air. No Code(s) - May form combustible dust concentrations in air. No Code(s) - May form combustible dust concentrations in air.

### Precautionary statements

<b>Prevention</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.
<b>Response</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.
<b>Storage</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.

## Section 2. Hazards identification

<b>Disposal</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.
<b>Supplemental label elements</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation.

### 2.3 Other hazards

<b>Hazards not otherwise classified</b>	: <input checked="" type="checkbox"/> Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	None known. None known. None known. None known. None known. None known.
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## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Substance Substance Substance Substance Substance Substance
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Ingredient name	%	CAS number
<b>Sarcosine</b> Sarcosine	100	107-97-1
<b>L-Tryptophan</b> L-Tryptophan	100	73-22-3
<b>L-Norvaline</b> Norvaline	100	6600-40-4

## Section 3. Composition/information on ingredients

<b>L-Glutamine</b> Levoglutamide	100	56-85-9
<b>L-Asparagine</b> Asparagine	100	70-47-3
<b>L-4-Hydroxyproline</b> L-4-Hydroxyproline	100	51-35-4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

**Occupational exposure limits, if available, are listed in Section 8.**

## Section 4. First aid measures

### 4.1 Description of necessary first aid measures

<b>Eye contact</b>	: Sarcosine	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
	L-Tryptophan	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
	L-Norvaline	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
	L-Glutamine	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
	L-Asparagine	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
	L-4-Hydroxyproline	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
<b>Inhalation</b>	: Sarcosine	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a

## Section 4. First aid measures

L-Tryptophan

collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

L-Norvaline

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

L-Glutamine

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

L-Asparagine

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give

## Section 4. First aid measures

mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

L-4-Hydroxyproline

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

### Skin contact

: Sarcosine

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

L-Tryptophan

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

L-Norvaline

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

L-Glutamine

Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

L-Asparagine

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

L-4-Hydroxyproline

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

## Section 4. First aid measures

### Ingestion

: Sarcosine

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

L-Tryptophan

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

L-Norvaline

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

L-Glutamine

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never

## Section 4. First aid measures

L-Asparagine

give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

L-4-Hydroxyproline

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### 4.2 Most important symptoms/effects, acute and delayed

#### Potential acute health effects

##### Eye contact

: Sarcosine

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

L-Tryptophan

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

L-Norvaline

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

L-Glutamine

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

L-Asparagine

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

L-4-Hydroxyproline

Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.



## Section 4. First aid measures

<b>Inhalation</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
<b>Skin contact</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Ingestion</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b><u>Over-exposure signs/symptoms</u></b>		
<b>Eye contact</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	Adverse symptoms may include the following: irritation redness Adverse symptoms may include the following: irritation redness Adverse symptoms may include the following: irritation redness Adverse symptoms may include the following: irritation redness Adverse symptoms may include the following: irritation redness Adverse symptoms may include the following: irritation redness
<b>Inhalation</b>	: Sarcosine  L-Tryptophan  L-Norvaline	Adverse symptoms may include the following: respiratory tract irritation coughing Adverse symptoms may include the following: respiratory tract irritation coughing Adverse symptoms may include the following: respiratory tract irritation

## Section 4. First aid measures

	L-Glutamine	coughing Adverse symptoms may include the following: respiratory tract irritation
	L-Asparagine	coughing Adverse symptoms may include the following: respiratory tract irritation
	L-4-Hydroxyproline	coughing Adverse symptoms may include the following: respiratory tract irritation
<b>Skin contact</b>	: Sarcosine	No specific data.
	L-Tryptophan	No specific data.
	L-Norvaline	No specific data.
	L-Glutamine	No specific data.
	L-Asparagine	No specific data.
	L-4-Hydroxyproline	No specific data.
<b>Ingestion</b>	: Sarcosine	No specific data.
	L-Tryptophan	No specific data.
	L-Norvaline	No specific data.
	L-Glutamine	No specific data.
	L-Asparagine	No specific data.
	L-4-Hydroxyproline	No specific data.

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

<b>Notes to physician</b>	: Sarcosine	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	L-Tryptophan	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	L-Norvaline	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	L-Glutamine	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	L-Asparagine	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	L-4-Hydroxyproline	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>Specific treatments</b>	: Sarcosine	No specific treatment.
	L-Tryptophan	No specific treatment.
	L-Norvaline	No specific treatment.
	L-Glutamine	No specific treatment.
	L-Asparagine	No specific treatment.
	L-4-Hydroxyproline	No specific treatment.

## Section 4. First aid measures

<b>Protection of first-aiders</b>	: Sarcosine	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	L-Tryptophan	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	L-Norvaline	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	L-Glutamine	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	L-Asparagine	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	L-4-Hydroxyproline	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Use dry chemical powder. Use dry chemical powder. Use dry chemical powder. Use dry chemical powder. Use dry chemical powder. Use dry chemical powder.
<b>Unsuitable extinguishing media</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.

### 5.2 Special hazards arising from the substance or mixture

<b>Specific hazards arising from the chemical</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	May form explosible dust-air mixture if dispersed. May form explosible dust-air mixture if dispersed. May form explosible dust-air mixture if dispersed. May form explosible dust-air mixture if dispersed. May form explosible dust-air mixture if dispersed. May form explosible dust-air mixture if dispersed.
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## Section 5. Fire-fighting measures

### Hazardous thermal decomposition products

: Sarcosine	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
L-Tryptophan	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
L-Norvaline	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
L-Glutamine	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
L-Asparagine	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
L-4-Hydroxyproline	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides

### 5.3 Advice for firefighters

#### Special protective actions for fire-fighters

: Sarcosine	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
L-Tryptophan	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
L-Norvaline	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
L-Glutamine	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
L-Asparagine	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No

## Section 5. Fire-fighting measures

action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

### Special protective equipment for fire-fighters

L-4-Hydroxyproline

: Sarcosine

L-Tryptophan

L-Norvaline

L-Glutamine

L-Asparagine

L-4-Hydroxyproline

## Section 6. Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

#### For non-emergency personnel

: Sarcosine

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

L-Tryptophan

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

L-Norvaline

No action shall be taken involving any personal

## Section 6. Accidental release measures

L-Glutamine	<p>risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.</p>
L-Asparagine	<p>No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.</p>
L-4-Hydroxyproline	<p>No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.</p>
<b>For emergency responders :</b> Sarcosine	<p>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>
L-Tryptophan	<p>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>
L-Norvaline	<p>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>
L-Glutamine	<p>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>
L-Asparagine	<p>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>

## Section 6. Accidental release measures

L-4-Hydroxyproline      If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

### 6.2 Environmental precautions

: Sarcosine      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

L-Tryptophan      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

L-Norvaline      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

L-Glutamine      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

L-Asparagine      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

L-4-Hydroxyproline      Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### 6.3 Methods and materials for containment and cleaning up

**Methods for cleaning up** : Sarcosine      Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

L-Tryptophan      Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

L-Norvaline      Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

L-Glutamine      Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

## Section 6. Accidental release measures

L-Asparagine	Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
L-4-Hydroxyproline	Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

### 7.1 Precautions for safe handling

**Protective measures** : Sarcosine

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

L-Tryptophan

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

L-Norvaline

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame).



## Section 7. Handling and storage

L-Glutamine

Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid

L-Asparagine

L-4-Hydroxyproline

## Section 7. Handling and storage

all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

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### Advice on general occupational hygiene

: Sarcosine

L-Tryptophan

L-Norvaline

L-Glutamine

L-Asparagine

L-4-Hydroxyproline

## Section 7. Handling and storage

### 7.2 Conditions for safe storage, including any incompatibilities

:  Sarcosine

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

L-Tryptophan

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

L-Norvaline

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

L-Glutamine

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

L-Asparagine

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry,

## Section 7. Handling and storage

L-4-Hydroxyproline

cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

### 7.3 Specific end use(s)

#### Recommendations

: Sarcosine  
L-Tryptophan  
L-Norvaline  
L-Glutamine  
L-Asparagine  
L-4-Hydroxyproline

Industrial applications, Professional applications.  
Industrial applications, Professional applications.  
Industrial applications, Professional applications.  
Industrial applications, Professional applications.  
Industrial applications, Professional applications.  
Industrial applications, Professional applications.

#### Industrial sector specific solutions

: Sarcosine  
L-Tryptophan  
L-Norvaline  
L-Glutamine  
L-Asparagine  
L-4-Hydroxyproline

Not applicable.  
Not applicable.  
Not applicable.  
Not applicable.  
Not applicable.  
Not applicable.

## Section 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
<b>Sarcosine</b> Sarcosine	None.
<b>L-Tryptophan</b> L-Tryptophan	None.
<b>L-Norvaline</b> Norvaline	None.
<b>L-Glutamine</b> Levoglutamide	None.

## Section 8. Exposure controls/personal protection

<b>L-Asparagine</b> Asparagine	None.
<b>L-4-Hydroxyproline</b> L-4-Hydroxyproline	None.

### 8.2 Exposure controls

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

- Physical state** :
- |                    |                                      |
|--------------------|--------------------------------------|
| Sarcosine          | Solid. [Powder. Deliquescent solid.] |
| L-Tryptophan       | Solid. [Crystalline powder.]         |
| L-Norvaline        | Solid. [Crystalline powder.]         |
| L-Glutamine        | Solid. [Needles.]                    |
| L-Asparagine       | Solid. [Crystals.]                   |
| L-4-Hydroxyproline | Solid. [Crystals.]                   |

## Section 9. Physical and chemical properties

<b>Color</b>	: Sarcosine	Not available.
	L-Tryptophan	White to yellowish.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
<b>Odor</b>	L-4-Hydroxyproline	White.
	: Sarcosine	Not available.
	L-Tryptophan	Odorless.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
<b>Odor threshold</b>	L-Asparagine	Not available.
	L-4-Hydroxyproline	Odorless.
	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
<b>pH</b>	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.
	: Sarcosine	Not available.
	L-Tryptophan	5.5 to 7 [Conc. (% w/w): 1%]
<b>Melting point</b>	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.
	: Sarcosine	208 to 212°C (406.4 to 413.6°F)
<b>Boiling point</b>	L-Tryptophan	278.3 to 279.3°C (532.9 to 534.7°F)
	L-Norvaline	300°C (572°F)
	L-Glutamine	Decomposition temperature: 185°C (365°F)
	L-Asparagine	234 to 235°C (453.2 to 455°F)
	L-4-Hydroxyproline	274°C (525.2°F)
<b>Flash point</b>	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
<b>Evaporation rate</b>	L-4-Hydroxyproline	Not available.
	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
<b>Flammability (solid, gas)</b>	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.
	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.

## Section 9. Physical and chemical properties

<b>Lower and upper explosive (flammable) limits</b>	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
<b>Vapor pressure</b>	L-4-Hydroxyproline	Not available.
	: Sarcosine	Not available.
	L-Tryptophan	0 kPa (0 mm Hg) [room temperature]
	L-Norvaline	Not available.
	L-Glutamine	Not available.
<b>Vapor density</b>	L-Asparagine	0.000000064 kPa (0.000000048 mm Hg) [room temperature]
	L-4-Hydroxyproline	Not available.
	: Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
<b>Relative density</b>	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	4.5 [Air = 1]
	: Sarcosine	Not available.
	L-Tryptophan	1.34
<b>Solubility</b>	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.
	: Sarcosine	Soluble in the following materials: cold water and hot water.
	L-Tryptophan	Soluble in the following materials: cold water and hot water.
	L-Norvaline	Insoluble in the following materials: diethyl ether. Soluble in the following materials: cold water and hot water.
<b>Partition coefficient: n-octanol/water</b>	L-Glutamine	Easily soluble in the following materials: cold water and hot water.
	L-Asparagine	Partially soluble in the following materials: cold water and hot water.
	L-4-Hydroxyproline	Very slightly soluble in the following materials: methanol and diethyl ether.
	: Sarcosine	Soluble in the following materials: cold water and hot water.
	L-Tryptophan	-2.78
<b>Auto-ignition temperature</b>	L-Norvaline	-1.06
	L-Glutamine	-2.11
	L-Asparagine	-3.64
	L-4-Hydroxyproline	-3.82
	: Sarcosine	-3.17
<b>Auto-ignition temperature</b>	L-Tryptophan	Not available.
	L-Norvaline	>400°C (>752°F)
	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.

## Section 9. Physical and chemical properties

<b>Decomposition temperature</b>	Sarcosine	212°C (413.6°F)
	L-Tryptophan	289°C (552.2°F)
	L-Norvaline	Not available.
	L-Glutamine	185°C (365°F)
	L-Asparagine	Not available.
<b>Viscosity</b>	L-4-Hydroxyproline	275°C (527°F)
	Sarcosine	Not available.
	L-Tryptophan	Not available.
	L-Norvaline	Not available.
	L-Glutamine	Not available.
	L-Asparagine	Not available.
	L-4-Hydroxyproline	Not available.

## Section 10. Stability and reactivity

<b>10.1 Reactivity</b>	Sarcosine	No specific test data related to reactivity available for this product or its ingredients.
	L-Tryptophan	No specific test data related to reactivity available for this product or its ingredients.
	L-Norvaline	No specific test data related to reactivity available for this product or its ingredients.
	L-Glutamine	No specific test data related to reactivity available for this product or its ingredients.
	L-Asparagine	No specific test data related to reactivity available for this product or its ingredients.
	L-4-Hydroxyproline	No specific test data related to reactivity available for this product or its ingredients.

<b>10.2 Chemical stability</b>	Sarcosine	The product is stable.
	L-Tryptophan	The product is stable.
	L-Norvaline	The product is stable.
	L-Glutamine	The product is stable.
	L-Asparagine	The product is stable.
	L-4-Hydroxyproline	The product is stable.

<b>10.3 Possibility of hazardous reactions</b>	Sarcosine	Under normal conditions of storage and use, hazardous reactions will not occur.
	L-Tryptophan	Under normal conditions of storage and use, hazardous reactions will not occur.
	L-Norvaline	Under normal conditions of storage and use, hazardous reactions will not occur.
	L-Glutamine	Under normal conditions of storage and use, hazardous reactions will not occur.
	L-Asparagine	Under normal conditions of storage and use, hazardous reactions will not occur.
	L-4-Hydroxyproline	Under normal conditions of storage and use, hazardous reactions will not occur.

<b>10.4 Conditions to avoid</b>	Sarcosine	Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
	L-Tryptophan	Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame).



## Section 10. Stability and reactivity

L-Norvaline	Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
L-Glutamine	Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
L-Asparagine	Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
L-4-Hydroxyproline	Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.

<b>10.5 Incompatible materials</b> : Sarcosine	Reactive or incompatible with the following materials: oxidizing materials
L-Tryptophan	Reactive or incompatible with the following materials: oxidizing materials
L-Norvaline	Reactive or incompatible with the following materials: oxidizing materials
L-Glutamine	Reactive or incompatible with the following materials: oxidizing materials
L-Asparagine	Reactive or incompatible with the following materials: oxidizing materials
L-4-Hydroxyproline	Reactive or incompatible with the following materials: oxidizing materials

## Section 10. Stability and reactivity

<b>10.6 Hazardous decomposition products</b>	: Sarcosine	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	L-Tryptophan	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	L-Norvaline	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	L-Glutamine	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	L-Asparagine	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	L-4-Hydroxyproline	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
<b>L-Tryptophan</b> L-Tryptophan	LC50 Inhalation Dusts and mists	Rat - Male, Female	>5.17 mg/l	4 hours
	LD50 Oral	Rat	>16 g/kg	-
<b>L-Glutamine</b> Levoglutamide	LD50 Oral	Rat	7500 mg/kg	-

#### Irritation/Corrosion

Not available.

#### Sensitization

Not available.

#### Mutagenicity

Not available.

#### Carcinogenicity

Not available.

#### Reproductive toxicity

Not available.

#### Teratogenicity

Not available.

#### Specific target organ toxicity (single exposure)

Not available.

#### Specific target organ toxicity (repeated exposure)

Not available.

#### Aspiration hazard

Not available.

## Section 11. Toxicological information

<b>Information on the likely routes of exposure</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	Not available. Not available. Not available. Not available. Not available. Not available.
<b>Potential acute health effects</b>		
<b>Eye contact</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.
<b>Inhalation</b>	: Sarcosine  L-Tryptophan  L-Norvaline  L-Glutamine  L-Asparagine  L-4-Hydroxyproline	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
<b>Skin contact</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Ingestion</b>	: Sarcosine L-Tryptophan L-Norvaline L-Glutamine L-Asparagine L-4-Hydroxyproline	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

## Section 11. Toxicological information

### Symptoms related to the physical, chemical and toxicological characteristics

<b>Eye contact</b>	: Sarcosine	Adverse symptoms may include the following: irritation redness
	L-Tryptophan	Adverse symptoms may include the following: irritation redness
	L-Norvaline	Adverse symptoms may include the following: irritation redness
	L-Glutamine	Adverse symptoms may include the following: irritation redness
	L-Asparagine	Adverse symptoms may include the following: irritation redness
	L-4-Hydroxyproline	Adverse symptoms may include the following: irritation redness
<b>Inhalation</b>	: Sarcosine	Adverse symptoms may include the following: respiratory tract irritation coughing
	L-Tryptophan	Adverse symptoms may include the following: respiratory tract irritation coughing
	L-Norvaline	Adverse symptoms may include the following: respiratory tract irritation coughing
	L-Glutamine	Adverse symptoms may include the following: respiratory tract irritation coughing
	L-Asparagine	Adverse symptoms may include the following: respiratory tract irritation coughing
	L-4-Hydroxyproline	Adverse symptoms may include the following: respiratory tract irritation coughing
<b>Skin contact</b>	: Sarcosine	No specific data.
	L-Tryptophan	No specific data.
	L-Norvaline	No specific data.
	L-Glutamine	No specific data.
	L-Asparagine	No specific data.
	L-4-Hydroxyproline	No specific data.
<b>Ingestion</b>	: Sarcosine	No specific data.
	L-Tryptophan	No specific data.
	L-Norvaline	No specific data.
	L-Glutamine	No specific data.
	L-Asparagine	No specific data.
	L-4-Hydroxyproline	No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

## Section 11. Toxicological information

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

### Potential chronic health effects

**General** : Sarcosine Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
 L-Tryptophan Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
 L-Norvaline Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
 L-Glutamine Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
 L-Asparagine Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
 L-4-Hydroxyproline Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

**Carcinogenicity** : Sarcosine No known significant effects or critical hazards.  
 L-Tryptophan No known significant effects or critical hazards.  
 L-Norvaline No known significant effects or critical hazards.  
 L-Glutamine No known significant effects or critical hazards.  
 L-Asparagine No known significant effects or critical hazards.  
 L-4-Hydroxyproline No known significant effects or critical hazards.

**Mutagenicity** : Sarcosine No known significant effects or critical hazards.  
 L-Tryptophan No known significant effects or critical hazards.  
 L-Norvaline No known significant effects or critical hazards.  
 L-Glutamine No known significant effects or critical hazards.  
 L-Asparagine No known significant effects or critical hazards.  
 L-4-Hydroxyproline No known significant effects or critical hazards.

**Teratogenicity** : Sarcosine No known significant effects or critical hazards.  
 L-Tryptophan No known significant effects or critical hazards.  
 L-Norvaline No known significant effects or critical hazards.  
 L-Glutamine No known significant effects or critical hazards.  
 L-Asparagine No known significant effects or critical hazards.  
 L-4-Hydroxyproline No known significant effects or critical hazards.

**Developmental effects** : Sarcosine No known significant effects or critical hazards.  
 L-Tryptophan No known significant effects or critical hazards.  
 L-Norvaline No known significant effects or critical hazards.  
 L-Glutamine No known significant effects or critical hazards.  
 L-Asparagine No known significant effects or critical hazards.  
 L-4-Hydroxyproline No known significant effects or critical hazards.

**Fertility effects** : Sarcosine No known significant effects or critical hazards.  
 L-Tryptophan No known significant effects or critical hazards.  
 L-Norvaline No known significant effects or critical hazards.  
 L-Glutamine No known significant effects or critical hazards.  
 L-Asparagine No known significant effects or critical hazards.  
 L-4-Hydroxyproline No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Not available.

## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<b>L-Tryptophan</b> L-Tryptophan	Acute EC50 >100 mg/l Fresh water Acute NOEC 100 mg/l Fresh water	Daphnia - Daphnia magna Daphnia - Daphnia magna	48 hours 48 hours

### 12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
<b>L-Tryptophan</b> L-Tryptophan	OECD 301B Ready Biodegradability - CO <sub>2</sub> Evolution Test	77 % - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
<b>L-Tryptophan</b> L-Tryptophan	-	-	Readily

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>Sarcosine</b> Sarcosine	-2.78	-	low
<b>L-Tryptophan</b> L-Tryptophan	-1.06	-	low
<b>L-Norvaline</b> Norvaline	-2.11	-	low
<b>L-Glutamine</b> Levoglutamide	-3.64	-	low
<b>L-Asparagine</b> Asparagine	-3.82	-	low
<b>L-4-Hydroxyproline</b> L-4-Hydroxyproline	-3.17	-	low

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**12.5 Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

### 13.1 Waste treatment methods

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## Section 14. Transport information

**DOT / TDG / Mexico / IMDG / IATA** : Not regulated.

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## Section 15. Regulatory information

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

**U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

**SARA 302/304**

**Composition/information on ingredients**

## Section 15. Regulatory information

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** :  Sarcosine Fire hazard  
 L-Tryptophan Fire hazard  
 L-Norvaline Fire hazard  
 L-Glutamine Fire hazard  
 L-Asparagine Fire hazard  
 L-4-Hydroxyproline Fire hazard

### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
<b>Sarcosine</b> Sarcosine	100	Yes.	No.	No.	No.	No.
<b>L-Tryptophan</b> L-Tryptophan	100	Yes.	No.	No.	No.	No.
<b>L-Norvaline</b> Norvaline	100	Yes.	No.	No.	No.	No.
<b>L-Glutamine</b> Levoglutamide	100	Yes.	No.	No.	No.	No.
<b>L-Asparagine</b> Asparagine	100	Yes.	No.	No.	No.	No.
<b>L-4-Hydroxyproline</b> L-4-Hydroxyproline	100	Yes.	No.	No.	No.	No.

### State regulations

**Massachusetts** : None of the components are listed.

**New York** : None of the components are listed.

**New Jersey** : None of the components are listed.

**Pennsylvania** : None of the components are listed.

### California Prop. 65

Not available.

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol (Annexes A, B, C, E)

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

#### UNECE Aarhus Protocol on POPs and Heavy Metals



## Section 15. Regulatory information

Not listed.

### Inventory list

<b>Australia</b>	: Not determined.
<b>Canada</b>	: Not determined.
<b>China</b>	: Not determined.
<b>Europe</b>	: All components are listed or exempted.
<b>Japan</b>	: <input checked="" type="checkbox"/> <b>Japan inventory (ENCS)</b> : All components are listed or exempted. <b>Japan inventory (ISHL)</b> : All components are listed or exempted.
<b>Malaysia</b>	: Not determined.
<b>New Zealand</b>	: Not determined.
<b>Philippines</b>	: All components are listed or exempted.
<b>Republic of Korea</b>	: Not determined.
<b>Taiwan</b>	: All components are listed or exempted.
<b>Thailand</b>	: <input checked="" type="checkbox"/> Not determined.
<b>Turkey</b>	: Not determined.
<b>United States</b>	: All components are listed or exempted.
<b>Viet Nam</b>	: <input checked="" type="checkbox"/> Not determined.

## Section 16. Other information

### History

<b>Date of issue</b>	: 05/16/2017
<b>Date of previous issue</b>	: 01/29/2016.
<b>Version</b>	: 5

Indicates information that has changed from previously issued version.

### Notice to reader

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