

**MATERIAL SAFETY DATA SHEET**

Date: February 19, 2007

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**MHA<sup>®</sup>**  
**METHIONINE HYDROXY ANALOGUE, CALCIUM**

**1. PRODUCT IDENTIFICATION**

**Synonyms:** 2-hydroxy-4-(methylthio) butanoic acid, calcium salt  
methionine hydroxy analogue, calcium salt

**Chemical Formula:** [CH<sub>3</sub>S(CH<sub>2</sub>)<sub>2</sub>CHOHCOO]<sub>2</sub>Ca

**CAS Reg. No.:** 4857-44-7

**Product Use:** Animal Feed Supplement

**NOVUS INTERNATIONAL, INC.**  
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St. Louis, MO 63141-5862  
Telephone: 314-576-8886  
For Emergencies: 800-568-0088  
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**NOVUS International de Mexico**  
Bosque de Ciruelos, 194 PH  
Col. Bosques de las Lomas  
Mexico, D.F. 11700  
Telephone: 01-55-5251-5433  
SETIQ (in Mexico): 01-800-002-1400

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

<u>Chemical Ingredients:</u>	<u>CAS Number</u>	<u>% by weight</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Methionine Hydroxy Analogue, calcium	4857-44-7	90-98	N.E.	N.E.
Calcium Sulfate	7778-18-9	1-4	Total 15 mg/m3 Respirable 5 mg/m3	Total 10 mg/m3
Calcium Hydroxide	1305-62-0	1-5	5 mg/m3	5 mg/m3

N.E. = Not Established

**3. HAZARDS IDENTIFICATION**

Emergency Overview

**CAUTION**  
**MAY CAUSE EYE, SKIN, AND RESPIRATORY TRACT IRRITATION**

Potential Health Effects

**EYE CONTACT:** Slightly irritating to eyes

**SKIN CONTACT:** Non toxic to skin  
Slightly irritating to skin

**INHALATION:** Non toxic via inhalation  
Slightly irritating when inhaled

**INGESTION:** Slightly irritating to mouth, throat, and digestive tract

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**4. FIRST AID PROCEDURES**

- IF IN EYES:** Wash eyes with plenty of water for 15 minutes. Get medical attention if irritation persists.
- IF ON SKIN:** Immediately flush the area with plenty of water. Remove contaminated clothing. Wash skin gently with soap as soon as it is available. Wash clothing before reuse. Call a physician if irritation persists.
- IF INHALED:** Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin and clothing.
- IF SWALLOWED:** Immediate first aid is not likely to be required. Wash heavily contaminated clothing before reuse.

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**5. FIRE FIGHTING MEASURES**

- FLASH POINT:** 238°C (460°F) (layer of dust)  
377°C (710°F) (dust cloud)
- EXPLOSION HAZARD:** Dust is combustible. In sufficient concentrations it can form explosive mixtures with air. Explosion protection systems, if appropriate for facilities handling this product, should be designed for Dust Class St-1 in accordance with NFPA 68. Combustion generates toxic fumes of sulfur oxides and carbon monoxide.
- EXTINGUISHING MEDIA:** Water spray or any Class A extinguishing agent.
- SPECIAL INSTRUCTIONS:** As in any fire, wear self-contained breathing apparatus (pressure-demand, MSHA/NIOSH approved or equivalent) and full protective gear. Equipment should be thoroughly decontaminated after use.

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**6. ACCIDENTAL RELEASE MEASURES**

- SPILLS:** Observe all protection and safety precautions when cleaning up spills. Refer to Section III, Hazards Identification and Section VIII, Exposure Controls/Personal Protection. Avoid creating dust clouds since this product can form an explosive mixture when dispersed in air. Avoid contamination of any material not spilled from original product containers. Use only equipment known to be clean and suitable for food-grade product service in handling any product for potential salvage.
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For spills on floors or other impervious surfaces, collect any contaminated product, place in a suitable clean container. After removing all possible material, wash the contaminated surface with industrial detergent solution and rinse with water. Deodorize the cleaned surface, if necessary, with a weak (5%) sodium hypochlorite solution. DO NOT mix sodium hypochlorite solutions with methionine hydroxy analogue, calcium salt. For spills on the ground, contaminated soil and product should be dug up and placed in a suitable container.

**7. HANDLING AND STORAGE**

Avoid contact with eyes, skin or clothing. Avoid breathing vapor or dust. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Follow all MSDS and label precautions after container is emptied as container may retain product residues.

Store under sanitary conditions with other feed ingredients. Do not store near combustible materials or ignition sources. Keep container closed when not in use.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EYE PROTECTION:** Wear chemical goggles. Have eye flushing equipment available.

**SKIN PROTECTION:** Wear suitable protective clothing. Consult the glove/clothing manufacturer to determine the appropriate clothing. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

**PERSONAL RESPIRATORY:** Avoid breathing dust. Use approved respiratory protection equipment when airborne exposure limits are exceeded. If used, full facepiece replaces the need for face shield and/or chemical goggles. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer.

**VENTILATION:** Provide good ventilation to minimize exposure. If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance:	Mixture of white-tan or white grayish granules	Odor:	Characteristic sulfur odor
Solubility in Water:	7.4 g/100 g @ 25°C	pH:	11 (for a 5% solution, typical)
Boiling Point:	Solid; not applicable	Vapor Pressure:	Solid/Not applicable
Vapor Density:	Solid; not applicable		
Evaporation Rate:	Solid, not applicable.	Solid Density:	700-800 kg/m <sup>3</sup> (loose), typical

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**10. STABILITY AND REACTIVITY**

<b>STABILITY:</b>	Stable under expected and reasonable conditions of storage or use.
<b>INCOMPATIBILITIES:</b>	Avoid contact with strong oxidizing agents and strong acids.
<b>HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:</b>	Product decomposition with gas evolution can occur on exposure to temperatures exceeding 180°C. No uniquely hazardous decomposition products are expected. If the product is burned, as with any sulfur-containing organic material, sulfur oxides, carbon dioxide and carbon monoxide can be produced.
<b>HAZARDOUS POLYMERIZATION:</b>	Does not occur.

**11. TOXICOLOGICAL INFORMATION**

The Toxicological properties have not been thoroughly investigated

Acute Toxicity Data:

Similar product

Oral - Practically Nontoxic (Rat LD50 - >10,000 mg/kg)  
Dermal - Practically Nontoxic (Rabbit LD50 - >7,940 mg/kg)  
Eye Irritation - Slightly Irritating (Rabbit, 10.8/110.0)  
Skin Irritation - Practically Nonirritating (Rabbit, 24-hr exposure, 0.2/8.0)  
In short-term repeat dosing studies (10-days), rats given product orally exhibited growth depression, with reversible changes in stomach, intestinal tract, spleen, thymus, and liver. Lower doses given for longer periods (90-days) produced no adverse effects in rats or dogs. Reduced liver weights were noted following repeated inhalation (90-days) of MHA by rats. No effects were seen on the ability of male and female rats to reproduce when fed product. Methionine hydroxy analogue, calcium produced no genetic changes in standard tests using bacterial cells.

**Calcium sulfate**

Excessive exposure to calcium sulfate in the form of dust can cause drying of mucous membranes of the eyes and respiratory tract (due to absorption of moisture and oils) which may result in irritation and occasional nose bleeds. Following repeated exposures (11-days) in their feed, weight gains were reported in young chickens. No birth defects were reported in mice, rats or rabbits given calcium sulfate orally during pregnancy. Calcium sulfate produced no genetic changes in standard tests using bacterial cells.

**Calcium hydroxide**

Excessive exposure to calcium hydroxide in the form of dust can cause drying of mucous membranes of the eyes and respiratory tract (due to high pH) which may result in irritation of the eyes and skin and occasional nose bleeds.

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**12. ECOLOGICAL INFORMATION****ASSESSMENT:**

(Based on similar product)

Practically nontoxic for water flea  
Nontoxic for algae and fish  
Biodegradable

**TEST RESULTS:**

(Based on similar product)

96 hr LC50 Fish (*Brachydanania rerio*): >1,000 mg/l  
72 hr EC50 Algae (*Scenedesmus subspicatus*): >1,000 mg/l  
72 hr EC50 Algae (*Selenastrum capricornutum*): >1,000 mg/l  
48 hr EC50 Water flea (*Daphnia magna*): 394 mg/l

Biodegradation (% after 28 days): 50 mg/l: 100%  
100 mg/l: 96%

Activated sludge respiration inhibition test: 3 hr EC50  $\geq$  1 g/l

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**13. DISPOSAL CONSIDERATIONS**

Dispose of all empty containers, contaminated products, debris, sorbents and other spill clean-up materials in accordance with applicable Federal, state or local procedures. Do not reuse containers.

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**14. TRANSPORTATION INFORMATION**

Not DOT regulated.

**U.S. Surface Freight Classification** : Methionine Hydroxy Analogue, Calcium (Feed Supplements)

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**15. REGULATORY INFORMATION**

SARA Hazard Notification: Physical & Health Hazard Categories, 40 CFR Part 370:

Immediate (acute):

Delayed (chronic):

Fire hazard:

Reactive hazard:

Sudden Release of Pressure

Section 313 Toxic Chemical(s):

Not applicable

Section 302 Extremely Hazardous Substances:

Not applicable

OSHA Hazard Communication Standard:

Hazardous under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200) due to the following ingredients:

Calcium Sulfate, CAS Reg No. 7778-18-9 (~1-4% by weight of product)  
Calcium Hydroxide CAS Reg No. 1305-62-0 (~1-5% by weight of product)

NFPA Hazard Identification Label:

**Health-1 (slight hazard) ; Fire Hazard-1 (flash point > 200°F ; Reactivity-0 (stable); Specific Hazard-None**

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WHMIS Classification: Class D2(B)  
 This product has been classified according to the hazard criteria of the Canadian Consumer Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

European Information: Not available

Miscellaneous Information:

FDA Approvals: 21CFR582.5477, 21CFR582.5230, 21CFR582.1205

**16. OTHER INFORMATION**

Label Text: **CAUTION**  
**MAY CAUSE EYE, SKIN, AND RESPIRATORY TRACT IRRITATION**

Avoid contact with eyes, skin or clothing.  
 Avoid breathing vapor or dust.  
 Keep container closed.  
 Use with adequate ventilation.  
 Wash thoroughly after handling

**IF IN EYES:** Wash eyes with plenty of water for 15 minutes. Get medical attention if irritation persists. **IF ON SKIN:** Immediately flush the area with plenty of water. Remove contaminated clothing. Wash skin gently with soap as soon as it is available. Wash clothing before reuse. Call a physician if irritation persists. **IF INHALED:** Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin, and clothing.

Prepared By: Samuel Beverly  
Title: Manager, Regulatory Affairs & Quality Assurance

Supersedes MSDS Number: MHA001.2

Revision Information: Address/Phone update Novus Mexico

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

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