MATERIAL SAFETY DATA SHEET

SODIUM METABISULFITE

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAMES: SODIUM METABISULFITE (FOOD GRADE, NF, TECH. GRADE)

MSDS No.: 105985

SYNONYMS: AMMONIUM SODIUM BISULFITE; SODIUM PYROSULFITE

PRODUCT USE: Drug manufacture, food additive, water treatment, textile manufacture, photographic chemicals, and other chemical processes.

SUPPLIER: NACROS CHEMICALS, INC.
5200 Speaker Road
Kansas City, KS 66106-1095

SUPPLIERS TELEPHONE NUMBER: 913-321-3131

TRANSPORTATION EMERGENCY TELEPHONE NUMBER: 1-800-424-9300

2. COMPOSITION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS NUMBER</th>
<th>WEIGHT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium metabisulfite</td>
<td>7681-57-4</td>
<td>98%</td>
</tr>
<tr>
<td>Sodium sulfite</td>
<td>7757-83-7</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Trace impurities and additional material names not listed above may appear in Section 15 of this MSDS. These materials may be listed for local Right-to-Know compliance and for other reasons.

OSHA Hazard Communication Standard: This product is considered hazardous under the OSHA Hazard Communication Standard.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Fine white granular product with a pungent odor that irritates the skin. May cause irritation and/or burns to the eyes. Harmful if swallowed or inhaled. May cause severe and possibly fatal allergic reactions. If inhaled or swallowed by some individuals and other "sulfite-sensitive" individuals. Reactions with acids to form toxic and irritating sulfur dioxide gas. Reactions with alkali to form toxic and irritating sulfur dioxide gas. If heated above 300°F.

POSSIBLE EXPOSURE HAZARDS:

SKIN: Repeated or prolonged contact with dust may cause irritation. Contact with solutions will cause skin irritation.

EYES: Dust or mist may irritate or burn the eyes. Solutions will irritate or burn.

INHALATION: Contact with acids, water and/or ice, releases sulfur dioxide gas which may be harmful or deadly if inhaled. May cause severe or deadly allergic reactions in some individuals. Inhalation of dust or mist can irritate the respiratory tract. Possible signs and symptoms of allergic reactions include bronchoconstriction, sneezing, coughing, fever, rapid heartbeat, decreased blood pressure, and anaphylaxis.
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INGESTION: May irritate the gastrointestinal tract. May cause severe or deadly allergic reactions in some anaphylactic and sulfite sensitive individuals. Very large doses may cause violent colic, diarrhea, depression, and even death.

DELAYED EFFECTS: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>NTP STATUS</th>
<th>IARC STATUS</th>
<th>OSHA LIST</th>
</tr>
</thead>
</table>

4. FIRST AID MEASURES

SKIN: Immediately wash skin with plenty of soap and water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.

EYES: Flush eyes immediately with water for at least 15 minutes. Get medical attention.

INHALATION: Promptly remove to fresh air. Get immediate medical attention if signs of suffocation, irritation or other symptoms develop.

INGESTION: If conscious, immediately give a large quantity of water or milk and induce vomiting by touching tongue to back of throat. Get immediate medical attention. Never give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN: Treat symptomatically. Note potential for anaphylactic shock with anergic individuals.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not flammable
FLASH POINT METHOD: Not applicable
AUTOIGNITION TEMPERATURE: Not applicable
UPPER FLAME LIMIT (volume % in air): Not applicable
LOWER FLAME LIMIT (volume % in air): Not applicable
FLAME PROPAGATION RATE (solids): Not applicable
OSHA FLAMMABILITY CLASS: Not applicable

EXTINGUISHING MEDIA: Material is not flammable. Use extinguishing media appropriate for material in surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Release toxic and irritating sulfur dioxide at fire temperatures.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:
Wear NIOSH-approved self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.) Promptly sweep up material with minimum dusting and shovel into an empty container with a cover. Cautiously spray residue with plenty of water. Provide ventilation to clear sulfur dioxide fumes which may be generated by contact with water.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.
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7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.)
Avoid contact with skin, eyes and clothing. Do not breathe dust. Do not eat or drink in the work area. Use normal personal hygiene and housekeeping. Keep away from water, ice, acids, heat and oxidizing agents. For food grade product, see precautions in section 16 regarding use on boat used in preserving shrimp and fish.

STORAGE RECOMMENDATIONS:
Store in a cool, dry, well-ventilated area away from water, ice, acids, and oxidizing agents. Releases sulfur dioxide gas slowly at ambient temperatures.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:
Local exhaust if dusty conditions exist or if there is a release of sulfur dioxide gas. Do not use in unventilated spaces, e.g., the hold of fishing boats, walk-in coolers or confined spaces.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: For handling dry material, wear cotton gloves and full work clothing, including long-sleeved shirt and trousers. When handling solutions and there is prolonged or repeated contact, wear impermeable gloves, clothing and boots.

EYE PROTECTION: Wear a hard hat (or other head covering) and chemical safety goggles. Do not wear contact lenses.

RESPIRATORY PROTECTION: Where required, use a NIOSH-approved respirator for dust, mist and/or sulfur dioxide gas, as conditions indicate. Some exposures may require a NIOSH-approved self-contained breathing apparatus or supplied air respirator.

ADDITIONAL RECOMMENDATIONS: Eyewash and safety shower are recommended.

EXPOSURE GUIDELINES

INGREDIENT NAME
Sodium metabisulfite

ACGIH TLV 5 mg/m³ TWA

OSHA PEL

OTHER LIMIT

OTHER EXPOSURE LIMITS FOR POTENTIAL RECOMPOSITION PRODUCTS:
Sulfur dioxide: OSHA TWA = 3 ppm
ACGIH TLV = 2 ppm
ACGIH STEL = 3 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Fine, white granular material.

PHYSICAL STATE: Solid

MOLECULAR WEIGHT: 116.11

CHEMICAL FORMULA: Na₂S₂O₅

ODOR: Pungent sulfur dioxide odor.

SPECIFIC GRAVITY (water = 1.0): 1.48

SOLUBILITY IN WATER (weight %): 39% at 1°C

pH: 1% solution - 4.3

BOILING POINT: Not applicable

MELTING POINT: Begins to rapidly decompose above 150°C

VAPOR PRESSURE: Not applicable

VAPOR DENSITY (air = 1.0): Not applicable
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EVAPORATION RATE: Not applicable.  COMPARSED TO: Not applicable.
% VOLATILE: Not applicable.
FLASH POINT: Not flammable.
(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID):
Normally stable. Avoid elevated temperatures. Temperatures above 150°C cause the rapid evolution of toxic and corrosive sulfur dioxide gas.

INCOMPATIBILITIES:
Oxidizing agents may cause strong exothermic reactions. Acids, water and ice release sulfur dioxide gas which is toxic, corrosive, and potentially deadly. Water and/or ice speeds the production of sulfur dioxide gas.

HAZARDOUS DECOMPOSITION PRODUCTS:
Sulfur dioxide and sodium sulfide residue. Sodium sulfide is flammable, a dangerous fire-risk, a strong irritant to skin and tissue, and is incompatible with acids.

HAZARDOUS POLYMERSATION:
Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:
Sodium metabisulfite: LD₅₀ (oral, rat) = 1131 mg/kg

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:
Sodium sulfite has been demonstrated to be mutagenic in microbial systems; however, it is not mutagenic in studies involving insects and is not considered to present a mutagenic threat to multi-cell organisms.

OTHER DATA:
None

12. ECOLOGICAL INFORMATION

For Sodium sulfite:
7600 ppm/lit/24, 48 & 96 hr/moqui guppy subchronic/freshwater
Biological Oxygen Demand (BOD): 0.12 lb/lb, instantaneous

12. DISPOSAL CONSIDERATIONS

RCRA
Is the unused product a RCRA hazardous waste if discarded? No
If yes, the RCRA ID number is: Not applicable.

OTHER DISPOSAL CONSIDERATIONS:
Dispose of in accordance with applicable Federal, State and Local regulations.
The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORTATION INFORMATION
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US DOT HAZARD CLASS: Not regulated.
US DOT ID NUMBER: Not applicable.
PROPER SHIPING NAME: Not applicable.

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All components are listed on TSCA Inventory of Chemical Substances.
OTHER TSCA ISSUES: None.

SARA TITLE III RCRA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME
SARA/RCRA RQ (lb) SARA EMS TPQ (lb)

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8888) and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate.

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percent are found in Section 2.

INGREDIENT NAME
No ingredients listed in this section.

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME
No ingredients listed in this section.

ADDITIONAL REGULATORY INFORMATION:

None.

WHS CLASSIFICATION (CANADA): 029

FOREIGN CHEMICAL CONTROL INVENTORY STATUS:
Listed on Canadian DSL and EU EHSCS.

16. OTHER INFORMATION

CURRENT ISSUE DATE: September, 2004
PREVIOUS ISSUE DATE: April, 2003
SODIUM METABISULFITE

OTHER INFORMATION:

Only Off grade is for use in drag formulation. Only Food Grade material is for use as a food additive.

On and off use of Food grade material to promote shrimp and fish.
NEVER apply dry material to shrimp or fish. ALWAYS prepare and use a solution in a well-ventilated area.
NEVER use below deck or in any confined space such as a hold or cooler. Injury or death may occur.
ALWAYS use on deck with plenty of ventilation. Follow mixing and use directions printed on bag.

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