MATERIAL SAFETY DATA SHEET

1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME  ALPHA-D-GLUCOSE-1-PHOSPHATE, DIPOTASSIUM SALT, DIHYDRATE

CAS NUMBER  5996-14-5

ROI NUMBER  5012G

SYNONYMS  ND

MANUFACTURER/ SUPPLIER  Research Organics
  4353 E 49th Street
  Cleveland, Ohio
  44125  USA

TELEPHONE NUMBERS - 24 HOUR EMERGENCY ASSISTANCE:
  INFOTRAC  800-535-5053

TELEPHONE NUMBERS - GENERAL ASSISTANCE:
  Product Information  800-321-0570

2 COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>Percentage*</th>
<th>Exposure Limits/Health Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPHA-D-GLUCOSE-1-PHOSPHATE, DIPOTASSIUM SALT, DIHYDRATE</td>
<td>5996-14-5</td>
<td>100 %</td>
<td>No Exposure limits established by OSHA or ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MAY BE IRRITATING, MAY BE HARMFUL.</td>
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*Values do not reflect absolute minimums and maximums; those values may vary from time to time.

3 HAZARDS IDENTIFICATION

Emergency Overview

CAUTION! May be harmful, may be irritating. To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Potential Health Effects Skin

This material May cause skin irritation. Reddening, itching and inflammation may result.
May be absorbed through the skin.

Potential Health Effect Eyes

Direct contact may cause irritation, redness, tearing and blurred vision.

Potential Health Effects Inhalation

May cause irritation to the respiratory tract.
This material may cause injury or illness if inhaled.

Potential Health Effect Ingestion

If ingested, this material may cause irritation to the mouth, throat and gastrointestinal tract.
May be harmful if swallowed.

Special Toxic Effects

CAUTION! THE TOXICOLOGICAL PROPERTIES OF THIS MATERIAL HAVE NOT BEEN FULLY INVESTIGATED.

Target Organs

ND

4 FIRST AID MEASURES

Skin
Immediately flush skin with plenty of water, for at least 15 minutes, while removing contaminated clothing and shoes. Contaminated clothing must be laundered before reuse. Get medical attention if irritation develops or persists.

Eyes
Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists.

Inhalation
If respiratory irritation or any signs or symptoms of exposure occur, safely move the person to fresh air. Get medical attention.

Ingestion
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention.

5 FIRE FIGHTING MEASURES

Hazardous Combustion Products
MAY EMIT TOXIC FUMES UNDER FIRE CONDITIONS.

Extinguishing Media
Use extinguisher media appropriate for surrounding fire.

Basic Fire Fighting Procedure
As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective gear. Evacuate the area and fight fire from a safe distance.

Unusual Fire and Explosion Hazards
None known to manufacturer.

<table>
<thead>
<tr>
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<th>ND (Solid)</th>
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<tbody>
<tr>
<td>Flash Point Temperature</td>
<td></td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>ND</td>
</tr>
<tr>
<td>Flammability Limits in Air Lower</td>
<td>ND</td>
</tr>
<tr>
<td>Flammability Limits in Air Upper</td>
<td>ND</td>
</tr>
</tbody>
</table>

6 ACCIDENTAL RELEASE MEASURES

Emergency Action
Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. (See Personal Protection Information Section.)

Environmental Precautions
Isolate hazard area and deny entry. Keep unnecessary people away. Take immediate steps to stop and contain the spill. Caution should be exercised regarding personnel safety and exposure to the spilled material.
Spill or Leak Procedure
Vacuum or sweep up material and place in a disposal container. Clean up spills immediately under qualified supervision observing precautions in Protective Equipment section. Avoid clean up procedures that generate dust or result in water pollution.
After removal, scrub the contaminated area with detergent and flush thoroughly with water. Absorb wash liquid and place in the disposable container. Do not flush to sewer. Avoid runoff into storm sewers and ditches which lead to waterways.

7 HANDLING AND STORAGE
Handling
DO NOT GET IN EYES, ON SKIN OR CLOTHING.
Minimize dust generation during handling and contact.
Wash hands thoroughly before eating, drinking or smoking.
Storage
Store in freezer.
Use desiccant.
Keep containers tightly closed and upright when not in use.
Storage Hazards
Store away from oxidizers.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION
Engineering Controls
Facilities using or storing this material must be equipped with an eyewash station and safety shower.
Eye Protection PPE
Do not wear contact lenses when working with this substance.
Avoid eye contact with this material. Wear chemical safety goggles.
Skin Protection PPE
Avoid skin contact with this material. Use appropriate chemical protective gloves when handling.
Showering and changing into street clothing after work is recommended.
Respiratory Protection PPE
A NIOSH/MSHA approved air purifying respirator is recommended where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.
Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstance where air purifying respirators may not provide adequate protection.

9 PHYSICAL AND CHEMICAL PROPERTIES
Appearance
SOLID
Boiling Point ND
Melting Point ND
Freezing Point ND
Vapor Density ND
Vapor Pressure ND
Specific Gravity ND
Molecular Formula C6H11O9PK2*2H2O
Molecular Weight 372.4
pH ND

Effective Date: 7/11/2005
Catalog Number 5012G
ND = No Data NA = Not Applicable Replaces Sheet Dated 4/10/2001
Trade Name ALPHA-D-GLUCOSE-1-PHOSPHATE, DIPOTASSIUM SALT, DIHY
10 STABILITY / REACTIVITY

Stability/Incompatibility
Stable under normal conditions of use.
Incompatible with strong oxidizing agents.

Decomposition Products
Combustion may produce CO, CO2 and/or phosphorous compounds.

Hazardous Polymerization
Will not occur.

11 TOXICOLOGICAL INFORMATION

CAUTION! THE TOXICOLOGICAL PROPERTIES OF THIS MATERIAL HAVE NOT BEEN FULLY INVESTIGATED. FOLLOW GOOD LABORATORY PRACTICES WHEN HANDLING.

Routes of Exposure
Inhalation, ingestion, skin and eye contact.

LD50

REGISTRY OF THE TOXIC EFFECTS OF CHEMICAL SUBSTANCES(RTECS)
RTECS # Not listed.
NO ORAL LD50 IN RATS INFORMATION IS AVAILABLE.
Carcinogenicity
NOT LISTED BY IARC, NTP OR OSHA AS A CARCINOGEN

12 ECOLOGICAL INFORMATION

EcoToxicological Information
DATA NOT YET AVAILABLE.
Chemical Fate Information
DATA NOT YET AVAILABLE.

13 DISPOSAL CONSIDERATIONS

Waste Disposal
Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.
If the material is determined to be a hazardous waste, the transportation, storage, treatment and disposal of this waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270. Disposal can occur only in property permitted facilities.

14 TRANSPORTATION INFORMATION

Department of Transportation (DOT) Requirements

Proper Shipping Name
CHEMICALS, N.O.S

Hazard Class
NA (SOLID)

Packaging Group
NA

Reportable Quantity
None

Labels Required
NA

Marine Pollutant (49 CFR 172.101 Appendix B)
No

15 REGULATORY INFORMATION

Federal Regulations
This product is NOT on the EPA Toxic Substances Control Act (TSCA) inventory. The following notices are required by 40 CFR 720.36 (C) for those products NOT on the inventory list: (i) This product is supplied solely for use in Research and Development by
or under the supervision of a technically qualified individual as defined by 40 CFR 720.0 et.sec.
(ii) The health risks of this product have not fully been determined. Any information that is or
becomes available will be supplied on a Material Safety
Data Sheet. Uses other than for Research and Development may constitute a violation of TSCA.

State Regulations
Based on available information this material does not contain any components or
chemicals currently known to the State of California to cause cancer, birth defects or
reproductive harm at levels which would be subject to Proposition 65.
Reformulation, use or processing of this product may affect its composition and would
require re-evaluation

International Regulations

International Phrases
R - ND Not Determined

S - ND Not Determined

EINECS - ND

SARA TITLE III RATINGS

<table>
<thead>
<tr>
<th>Immediate Hazard</th>
<th>Delayed Hazard</th>
<th>Fire Hazard</th>
<th>Pressure Hazard</th>
<th>Reactivity Hazard</th>
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Section 313 Supplier Notification:
If this box is checked, this product contains EPCRA 313 chemical(s) subject to the reporting
requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986
(40 CFR 372). If you are unsure whether you are subject to reporting requirements or need more
information, call EPA's ECPRA Call Center at (800) 424-9346 or (703) 412-9810.

NFPA(R) Ratings

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Reactivity</th>
<th>Special Hazards</th>
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HMIS(R) RATINGS

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical Hazard</th>
<th>Personal Protection Equipment</th>
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<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
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NFPA is a registered trademark of National Fire Protection Association. HMIS is a registered trademark of National Paint and Coating Association.

16 OTHER INFORMATION

Disclaimer

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Trade Name ALPHA-D-Glucose-1-Phosphate, Dipotassium Salt, DiHY
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Completed By: Environmental and Safety Department