1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Chemical Name: Adenosine 5’-Monophosphoramidate Sodium Salt

Catalogue #: A281800

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Product Uses: To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet

Company: Toronto Research Chemicals
2 Brisbane Road
Toronto, ON M3J 2J8
CANADA

Telephone: +14166659696
FAX: +14166654439
Email: orders@trc-canada.com

1.4 Emergency Telephone Number

Emergency#: +14166659696 between 0800-1700 (GMT-5)

2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)  |  WHMIS Symbols (Canada)
None  |  Not WHMIS controlled.

2.1/2.2 Classification of the Substance or Mixture and Label Elements

GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)
Not a hazardous substance by GHS.

EU Classification (According to EU Regulation 67/548/EEC)
Not a hazardous substance by this Classification.

EU Risk and Safety Statements (According to EU Regulation 67/548/EEC)

<table>
<thead>
<tr>
<th>Hazard Statements</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Codes and Phrases</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Not a hazardous substance by this Classification.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety Precaution Codes and Phrases</th>
<th></th>
</tr>
</thead>
</table>

GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Signal Word: None

GHS Hazard Statements
None  |  Not a hazardous substance according to GHS.
2.3 Unclassified Hazards/Hazards Not Otherwise Classified

No data available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Molecular Formula:</th>
<th>C_{10}H_{14}N_{6}NaO_{6}P</th>
<th>Molecular Weight: 368.22</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS Registry #:</td>
<td>102029-68-5</td>
<td>EC#:</td>
</tr>
</tbody>
</table>

Synonyms

Adenosine 5’-(Hydrogen Phosphoramidate) Monosodium Salt;

3.2 Mixtures

Not a mixture.

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice

If medical attention is required, show this safety data sheet to the doctor.

If Inhaled

If inhaled, move person to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact

Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

In Case of Eye Contact

Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

If Swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special Hazards Arising from the Substance or Mixture

Carbon oxides, Nitrogen oxides, Phosphorous oxides, Sodium oxides

5.3 Advice for Firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further Information

No data available.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Method and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.

Storage conditions: Hygroscopic, -20°C Freezer, Under inert atmosphere

7.3 Specific End Uses
For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters
Contains no components with established occupational exposure limits.

8.2 Exposure Controls

Appropriate Engineering Controls
A laboratory fume hood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

Personal Protective Equipment
All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

Eye/Face Protection
Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

Skin Protection
Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as “chemical resistant” by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.
Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated “chemical resistant” as per EN 734 with the resistance codes corresponding to the anticipated use of the material.
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

Body Protection
Fire resistant (Nomex) lab coat or coveralls.

Respiratory Protection
Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

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This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
A) Appearance
   White Solid

B) Odour
   No data available

C) Odour Threshold
   No data available

D) pH
   No data available

E) Melting Point/Freezing Point
   >200°C (dec.)

F) Initial Boiling Point/Boiling Range
   No data available

G) Flash point
   No data available

H) Evaporation Rate
   No data available

I) Flammability (Solid/Gas)
   No data available

J) Upper/Lower Flammability/Explosive Limits
   No data available

K) Vapour Pressure
   No data available

L) Vapour Density
   No data available

M) Relative Density
   No data available

N) Solubility
   Methanol (Slightly), Water (Slightly)

O) Partition Coefficient: n-octanol/water
   No data available

P) Auto-Ignition Temperature
   No data available

Q) Decomposition Temperature
   No data available

R) Viscosity
   No data available

S) Explosive Properties
   No data available

T) Oxidizing Properties
   No data available

9.2 Other Information
   no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
   No data available.

10.2 Chemical Stability
   Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
   No data available.

10.4 Conditions to Avoid
   No data available.

10.5 Incompatible Materials
   Strong oxidizing agents.

10.6 Hazardous Decomposition Products
   In the event of fire: See section 5. Other decomposition products: No data available.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

A) Acute Toxicity
   Oral LD50: No data available.  Inhalation LC50: No data available.
   Dermal LD50: No data available.

B) Skin Corrosion/Irritation
   No data available

C) Serious Eye Damage/Irritation
   No data available

D) Respiratory or Skin Sensitization
   No data available

E) Germ Cell Mutagenicity
   No data available

F) Carcinogenicity
   No data available

G) Reproductive Toxicity/Teratogenicity
   No data available

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
H) Single Target Organ Toxicity - Single Exposure
   No data available
I) Single Target Organ Toxicity - Repeated Exposure
   No data available
J) Aspiration Hazard
   No data available
K) Potential Health Effects and Routes of Exposure
   Inhalation
      May be harmful if inhaled. May cause respiratory tract irritation.
   Ingestion
      May be harmful if swallowed.
   Skin
      May be harmful if absorbed through skin. May cause skin irritation.
   Eyes
      May cause eye irritation.
L) Signs and Symptoms of Exposure
   The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.
   To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.
M) Additional Information
   RTECS: Not available.

12. ECOLOGICAL INFORMATION
12.1 Toxicity
   No data available.
12.2 Persistence and Degradability
   No data available.
12.3 Bioaccumulative Potential
   No data available.
12.4 Mobility in Soil
   No data available.
12.5 Results of PBT and vPvB Assessment
   No data available.
12.6 Other Adverse Effects
   No data available.

13. DISPOSAL CONSIDERATIONS
13.1 Waste Treatment Methods
   A) Product
      Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.
   B) Contaminated Packaging
      Dispose of as above.
   C) Other Considerations
      Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

14. TRANSPORT INFORMATION
14.1 UN Number
   DOT (US): N/A
   IATA: N/A
   IMDG: N/A
   ADR/RID: N/A
14.2 UN Proper Shipping Name
   DOT (US)/IATA:
      Not dangerous goods
   IMDG/ADR/RID:
      Not dangerous goods
14.3 Transport Hazard Class(es)
   DOT (US): N/A
   IATA: N/A
   IMDG: N/A
   ADR/RID: N/A
14.4 Packing Group

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
14.5 Environmental Hazards

DOT (US): N/A
IATA: N/A
IMDG: N/A
ADR/RID: N/A

14.6 Special Precautions for User
None

15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

A) Canada
DSL/NDSL Status: This product is not listed on the Canadian DSL/NDSL.

B) United States
TSCA Status: This product is not listed on the US EPA TSCA.

C) European Union
ECHA Status: This product is not registered with the EU ECHA.

15.2 Chemical Safety Assessment

No data available

16. OTHER INFORMATION

16.1 Revision History
Original Publication Date: 2/1/2016

16.2 List of Abbreviations
LD50: Median lethal dose of a substance required to kill 50% of a test population.
LC50: Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo: Lowest known lethal dose
TDLo: Lowest known toxic dose
IARC: International Agency for Research on Cancer
NTP: National Toxicology Program
RTECS: Registry of Toxic Effects of Chemical Substances

16.3 Further Information
Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.