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PE Biosystems.
850 Lincoln Centre Drive
Foster City, CA 94404 U.S.A.
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2000 MAY 10 AM 6:59

May 4, 2000

PE Biosystems

Myrna L. Karstadt, Ph.D.
Science Support Branch
Risk Assessment Division
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
Mail Stop 7403
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001



Re: Request for Additional Information Regarding HATU and HOAt

Dear Dr. Karstadt:

In response to our telephone conversation and your follow-up e-mail message on May 3, 2000, PE Biosystems, a business unit of PE Corporation (formerly, the Perkin-Elmer Corporation), is providing information to the U.S. Environmental Protection Agency ("EPA") regarding the two chemical substances listed below.

- 1) 2-(1H-7-azabenzotriazol-1-yl)-1,1,3,3-tetramethyl uronium hexafluorophosphate ("HATU")

CAS Number: 148893-10-1

Contain NO CBI

- 2) 1-Hydroxy-7-azabenzotriazole ("HOAt")

CAS Number: 39968-33-7

You have asked us to provide four items of information: (1) current Material Safety Data Sheets (MSDSs) for HATU and HOAt, (2) the number of "laboratories" using these chemical substances, (3) whether "special contact" was made with the National Institutes of Health (NIH) as an institution, and (4) how HATU and HOAt are used and their roles in biochemistry research.

1. Number of Laboratories

Our records indicate that there are 565 end-user laboratories in the United States ("U.S.") using PE Biosystems-supplied HATU and HOAt, and 286 outside the U.S.

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Myra L. Karstadt, Ph. D.
May 4, 2000

2. Material Safety Data Sheets (MSDSs)

The final versions of the MSDSs for HATU and HOAt prepared as a result of the findings that were discussed in our TSCA 8(e) submissions of December 8, 1998 and January 8, 1999 are provided as Attachments 1 and 2, respectively. These revised MSDSs, and their cover letter (Attachment 3) were distributed to end-user laboratories/customers worldwide.

The recently completed European Union Safety Data Sheets (SDSs) and Japanese MSDSs are provided as Attachments 4,5 and 6,7, respectively.

3. Contact with the National Institutes of Health (NIH)

Revised MSDSs for HATU and HOAt and the cover letter were individually and directly provided to twenty-six (26) end-user laboratories at NIH (twenty-one (21) in Bethesda, Maryland and five (5) in Rockville, Maryland). During this process, no contact was made with health and safety staff at NIH in Bethesda.

4. Research Use of HATU and HOAt

HATU and HOAt are used by scientists in academic, governmental and industrial research and development laboratories as liquid reagents on PE Biosystems' peptide synthesizer instruments. The Pioneer™, representative of our peptide synthesizers, is depicted in Attachment 8.

Peptide synthesis involves the formation of amide bonds by coupling a carboxylic acid functional group with an amine. Carboxylic acid functionality is not active enough for this reaction to occur, and hence must be activated. HOAt and its uranium salt analog, HATU, are used as activating agents for peptide synthesis. They provide increased catalytic activity and decreased racemization during amino acid coupling, inhibit side reactions such as the formation of N-acyl urea, and increase coupling efficiencies to improve overall yield and purity of the final peptide.

Myra L. Karstadt, Ph. D.
May 4, 2000

Research utilizing synthetic peptides includes synthesis of biologically important targets, isolation and characterization of new, biologically active compounds, structure-activity relationship studies, and molecular diversity studies.

I hope that this information is responsive to your request. Please do not hesitate to contact me if I can provide additional information. I can be reached at (650) 638-5277.

Sincerely,



Debora Van der Sluis
Senior Manager
Chemical, Environmental and Safety Department

Enclosures

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

P E APPLIED BIOSYSTEMS
850 LINCOLN CENTRE DRIVE
FOSTER CITY, CA 94404
(650) 570-6667 (USA)
01925-825650 (UK)

24 HOUR EMERGENCY RESPONSE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: HATU

TRADE NAMES/SYNONYMS:

2-(1H-7-AZABENZOTRIAZOL-1-YL)-1,1,3,3-TETRAMETHYL URONIUM HEXAFLUORO-PHOSPHATE; METHANAMINIUM,N-((DIMETHYLAMINO)(3H-1,2,3-TRIAZOLO(4,5-B)PYRIDIN-3-YLOXY)METHYLENE)-N-METHYL-, HEXAFLUOROPHOSPHATE(1-); N-((DIMETHYLAMINO)(3H-1,2,3-TRIAZOLO(4,5-B)PYRIDIN-3-YLOXY)METHYLENE)-N-METHYLMETHANAMINIUM HEXAFLUOROPHOSPHATE(1-);3H-1,2,3-TRIAZOLO(4,5-B)PYRIDINE, METHANAMINIUM DERIVATIVE; GEN063080;C10H15F6N6OP; MIB33060; 00201050, GEN076521, GEN076523, GEN076525, GEN076527

CHEMICAL FAMILY: phosphates

CREATION DATE: Sep 28 1993
REVISION DATE: Dec 08 1998

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: HATU
CAS NUMBER: 148893-10-1
EC NUMBER: Not assigned.
PERCENTAGE: 100.0

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| SECTION 3 | HAZARDS IDENTIFICATION |
|-----------|------------------------|

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

EC CLASSIFICATION (CALCULATED):

Xn Harmful

R 42/43

EMERGENCY OVERVIEW:

COLOR: off-white

PHYSICAL FORM: solid (at 20 degrees C and 101.3 kPa)

MAJOR HEALTH HAZARDS: Proposition 65: N, allergic reactions

PHYSICAL HAZARDS: Dust/air mixtures may ignite or explode.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: May cause allergic reactions

LONG TERM EXPOSURE: May cause allergic reactions.

SKIN CONTACT:

SHORT TERM EXPOSURE: May cause irritation.

LONG TERM EXPOSURE: May cause allergic reactions., HATU was found to cause skin sensitization in a study in guinea pigs.

EYE CONTACT:

SHORT TERM EXPOSURE: May cause irritation.

LONG TERM EXPOSURE: May cause allergic reactions.

INGESTION:

SHORT TERM EXPOSURE: Acute oral LD50 (rats): greater than 2000 mg/kg

LONG TERM EXPOSURE: no information is available

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

SECTION 4 FIRST AID MEASURES

INHALATION: Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT: Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT: Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard. Dust/air mixtures may ignite or explode. Minimum Ignition Energy: greater than 500 mJ.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Do not scatter spilled material with high-pressure water streams. Dike for later disposal. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

HATU: No occupational exposure limits established.

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any chemical cartridge respirator with organic vapor cartridge(s) and dust and mist filter(s). Any chemical cartridge respirator with organic vapor cartridge(s) and high-efficiency particulate filter(s). Any air-purifying respirator with a full facepiece, an organic vapor canister and a dust, mist, and fume filter. Any powered, air-purifying respirator with a full facepiece and a high-efficiency particulate filter. For Unknown Concentrations or Immediately Dangerous to Life or Health - Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid

COLOR: off-white

PHYSICAL FORM: solid (at 20 degrees C and 101.3 kPa)

ODOR: Not available

MOLECULAR WEIGHT: 380.23

MOLECULAR FORMULA: C10-H15-N6-O.F6-P

BOILING POINT: Not applicable

MELTING POINT: 358-361 F (181-183 C) (decomposes at 183-189 degrees C with evolution of gas)

VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: Not available
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

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| SECTION 10 | STABILITY AND REACTIVITY |
|------------|--------------------------|

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

INCOMPATIBILITIES: metals, oxidizing materials

HAZARDOUS DECOMPOSITION: Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

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| SECTION 11 | TOXICOLOGICAL INFORMATION |
|------------|---------------------------|

HATU:

TARGET ORGANS: immune system (sensitizer)

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: asthma

ADDITIONAL DATA: Acute Oral LD50: No mortality and limited toxicity were noted in rats following a single oral administration (gavage) of 2000 mg/kg HATU. There were no abnormalities observed at necropsy. Skin Sensitization in Animals: HATU was found to cause skin sensitization in a Magnusson-Kligman Maximisation study conducted in guinea pigs. In vitro Mutagenicity: HATU was not mutagenic to Salmonella typhimurium (Ames test) or Escherichia coli. Signs and Symptoms of Exposure: Skin irritation, swelling, rash, shortness of breath, coughing. Potential Routes of Entry: Skin, eye(s), respiratory.

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| SECTION 12 | ECOLOGICAL INFORMATION |
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Not available

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| SECTION 13 | DISPOSAL CONSIDERATIONS |
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Dispose in accordance with all applicable regulations.

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| SECTION 14 | TRANSPORT INFORMATION |
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No classification assigned.

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| SECTION 15 | REGULATORY INFORMATION |
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U.S. REGULATIONS:

TSCA INVENTORY STATUS: N

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): N

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): N

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: Y

CHRONIC: Y

FIRE: N

REACTIVE: N

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: N

EUROPEAN REGULATIONS:

EC NUMBER: Not assigned.

EC RISK AND SAFETY PHRASES:

R 42/43 May cause sensitization by inhalation and skin contact.

S 7 Keep container tightly closed.

S 22 Do not breathe dust.

S 24/25 Avoid contact with skin and eyes.

S 36 Wear suitable protective clothing.

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| SECTION 16 | OTHER INFORMATION |
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MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PE BIOSYSTEMS
850 LINCOLN CENTRE DRIVE
FOSTER CITY, CA 94404
(650) 570-6667 (USA)
01925-825650 (UK)

24 HOUR EMERGENCY RESPONSE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: HOAT

TRADE NAMES/SYNONYMS:

GEN076511; GEN076513; GEN076515; GEN076517 1-HYDROXY-7-AZA-BENZOTRIAZOLE;
3H-1,2,3-TRIAZOLO(4,5-B)PYRIDINE, 3-HYDROXY-; 3-HYDROXY-3H-1,2,3-TRIZOLO(4,5-
B)PYRIDINE; C5H4N4O; MIB31647; 00201049

CHEMICAL FAMILY: triazoles, aromatic

PRODUCT USE: This material is sold for research and development (R&D) only, and must be handled by or under the direct supervision of technically qualified persons. Use in applications other than R&D may require prior approval from EPA or other regulatory authority.

CREATION DATE: Jul 06 1998
REVISION DATE: May 13 1999

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: HOAT
CAS NUMBER: 39968-33-7
EC NUMBER: Not assigned.
PERCENTAGE: 100.0

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

EC CLASSIFICATION (CALCULATED):

Xn Harmful

EMERGENCY OVERVIEW:
COLOR: white to off-white

PHYSICAL FORM: powder

PE Biosystems

ABI PART NUMBER: MIB31647
OHS PART NUMBER: 00201049
PAGE 2 OF 6 REV.C

MAJOR HEALTH HAZARDS: Possible mutagen. Potential routes of exposure: inhalation, skin and eyes. Medical Conditions Aggravated by Exposure: None known.

PHYSICAL HAZARDS: Powdered material may form explosive dust-air mixtures.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: May cause irritation.

LONG TERM EXPOSURE: May cause irritation.

SKIN CONTACT:

SHORT TERM EXPOSURE: May cause irritation. No sensitization was observed in a study (Magnusson-Kligman Maximization) in guinea pigs.

LONG TERM EXPOSURE: Same as effects reported in short term exposure.

EYE CONTACT:

SHORT TERM EXPOSURE: May cause irritation.

LONG TERM EXPOSURE: No information is available.

INGESTION:

SHORT TERM EXPOSURE: The acute oral LD50 in rats was greater than 2000 mg/kg following a single oral administration. No mortality or toxicity were noted during the study, and there were no abnormalities at necropsy. LONG TERM EXPOSURE: Ingestion is not anticipated to be a likely route of occupational exposure.

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

SECTION 4

FIRST AID MEASURES

INHALATION: Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT: Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT: Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention, if needed.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard. Powdered material may form explosive dust-air mixtures.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Do not scatter spilled material with high-pressure water streams. Dike for later disposal. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

Do not breathe dust and avoid contact with skin, eyes and respiratory tract.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

HOAT: No occupational exposure limits established by ACGIH or OSHA.

VENTILATION: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels to a minimum. Laboratory samples should be handled in a fume hood or glove box. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.

EYE PROTECTION: Wear splash resistant safety goggles or face shield, as appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: If engineering controls do not maintain airborne concentrations to a negligible level, an approved respirator must be worn. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any dust, mist, and fume respirator. Any air-purifying respirator with a high-efficiency particulate filter. Any powered, air-purifying respirator with a dust, mist, and fume filter. Any powered, air-purifying respirator with a high-efficiency particulate filter. For Unknown Concentrations or Immediately Dangerous to Life or Health - Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: white to off-white
PHYSICAL FORM: powder
ODOR: Not available
MOLECULAR WEIGHT: 136.11
MOLECULAR FORMULA: C5-H4-N4-O
BOILING POINT: Not applicable
MELTING POINT: 401 F (205 C)
DECOMPOSITION POINT: 415-419 F (213-215 C)
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: Not available
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure. Powdered material may form explosive dust-air mixtures.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition.
Avoid contact with incompatible materials.

INCOMPATIBILITIES: oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon, nitrogen

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

HOAT:

TARGET ORGANS: No data available.

MUTAGENIC DATA: Mutagenic in Salmonella typhimurium (Ames test) and Escherichia coli with and without S9 activation. Weakly mutagenic in mouse lymphoma L5178Y cells in the absence of S9 activation. The in vivo mutagenic potential is not known.

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| SECTION 12 | ECOLOGICAL INFORMATION |
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Not available

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| SECTION 13 | DISPOSAL CONSIDERATIONS |
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Dispose in accordance with all applicable regulations.

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| SECTION 14 | TRANSPORT INFORMATION |
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No classification assigned.

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| SECTION 15 | REGULATORY INFORMATION |
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U.S. REGULATIONS:

TSCA INVENTORY STATUS: N

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): N

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): N

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: N

CHRONIC: N

FIRE: N

REACTIVE: N

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: N

EUROPEAN REGULATIONS:

EC NUMBER: Not assigned.

PE Biosystems

ABI PART NUMBER: MIB31647
OHS PART NUMBER: 00201049
PAGE 6 OF 6 REV.C

EC RISK AND SAFETY PHRASES:

- S 22 Do not breathe dust.
- S 36 Wear suitable protective clothing.
- S 37 Wear suitable gloves.
- S 39 Wear eye/face protection.

SECTION 16

OTHER INFORMATION

COPYRIGHT 1984-1999 MDL INFORMATION SYSTEMS, INC. ALL RIGHTS RESERVED.

Attachment 3

PE Biosystems

PE Biosystems
500 Old Connecticut Path
Framingham, MA 01701
Telephone 508-383-7675
Fax 508-383-7820

May 15, 1999

Dear HOAt, HATU, and HBTU User:

Please find enclosed current and/or revised Material Safety Data Sheets (MSDSs) for the activator products, HOAt, HATU, and HBTU. Our Company has recently become aware of information on the potential health and environmental hazards associated with these products, and has revised the MSDSs. To protect our customers and vendors, and in accordance with international regulations, PE Biosystems is supplying these revised documents to your organization. Please review this safety documentation carefully and maintain this information for your records.

In addition, recommendations for handling these chemicals are outlined below. Some people can become sensitive to activating reagents, particularly HATU and HBTU, and the following guidelines are the minimal requirements for safe handling as they will assist you in limiting exposure:

1. Always wear proper laboratory attire, including a lab coat and safety glasses.
2. Always wear gloves - double glove.
3. Always weigh the powder in a glove box or equivalent contained area.
4. Mix solutions of these compounds in a fume hood.
5. Wipe the balance in glove box and the bench in the hood with water or after handling.
6. Any disposable items used - such as weigh boats and gloves - bag in the glove box then dispose of in solid waste.
7. Wash hands after handling - first wash with gloves on, then without gloves - with soap and water.
8. If health symptoms develop, such as those described in the MSDS, contact your local medical clinician.
9. Contact PE Biosystems Chemical Regulatory Compliance at 888-687-2902 or 650-638-5277.

We hope this information is helpful. It is our highest priority to keep our customers safe and fully informed regarding our chemistry products.

If you should have any questions, please contact Technical Support at PE Biosystems, 800/899-5858, select Option #1, or, 650/638-5800, select Option #1, then select Option #4.

Deborah Van der Sluis

Deborah Van der Sluis
Manager
Chemical Regulatory Compliance

Attachment 4

SAFETY DATA SHEET

Based on Directive 91/155/EEC at seq. of the
Commission of the European Communities

HATU

1. Identification of the substance/preparation and the company

1.1 Identification of the substance or preparation:

Synonyms :

2-(1H-7-Azabenzotriazol-1-yl)-1,1,3,3-tetramethyl uronium hexafluorophosphate
Methanaminium, N-((dimethylamino)(3H-1,2,3-triazolo-(4,5-b)pyridin-3-yloxy)-
methylene)-N-methyl-, hexafluorophosphate(1-)

CAS no. : 148893-10-1
EC index no. : N.A. NFPA code : 2-1-0(*)
EINECS no. : N.A. Molecular weight : 380.23
RTECS no. : N.A. Formula : C10H15F6N6OP

1.2 Company/undertaking identification:

PE Biosystems
7 Kingsland Grange
Woolston
Warrington
Cheshire WA1 4SR
Tel: +44 (0)1925 825 650
Fax: +44 (0)1925 282 702

1.3 Telephone number for emergency:

(+32) 14-58 45 45
Information centre of dangerous goods (B.I.G.)
Technische Schoolstraat 43A, B-2440 Geel, Belgium

2. Composition/information on ingredients

| Hazardous ingredients | CAS no. | Conc in % | Hazard class. | Risks (R-phrases) |
|-----------------------|-------------|--------------|------------------|----------------------|
| HATU | 148893-10-1 | 100 | Xn | 42/43 |

3. Hazards identification

- May cause sensitization by inhalation and skin contact

4. First aid measures

4.1 Eye contact:

- Rinse immediately with plenty of water for 15 minutes
- Do not apply neutralizing agents
- Consult a doctor/medical service if irritation persists

4.2 Skin contact:

- Wash immediately with lots of water and soap for 15 minutes
- Consult a doctor/medical service if irritation persists

4.3 After inhalation:

- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration
- Consult a doctor/medical service if breathing problems develop

4.4 After ingestion:

- Never give water to an unconscious person
- Consult a doctor/medical service if you feel unwell

5. Fire-fighting measures

- 5.1 **Suitable extinguishing media:**
- Water spray
 - Polyvalent foam
 - ABC powder
 - Carbon dioxide
- 5.2 **Unsuitable extinguishing media:**
- Solid water jet ineffective as extinguishing medium
- 5.3 **Special exposure hazards:**
- Not easily combustible
 - It's dust is explosive with air
 - On burning: release of toxic and corrosive gases/vapours e.g.: (phosphorus oxides, nitrous vapours, hydrofluoric acid, carbon monoxide, carbon dioxide)
- 5.4 **Instructions:**
- Dilute toxic gases with water spray
- 5.5 **Special protective equipment for firefighters:**
- Heat/fire exposure: compressed air/oxygen apparatus
 - Heat/fire exposure: gas-tight suit

6. Accidental release measures

- 6.1 **Personal protection:** see 8.3
- 6.2 **Environmental precautions:**
- Knock down/dilute dust cloud with water spray
 - Prevent soil and ground water pollution
- 6.3 **Clean-up:**
- Prevent dust cloud formation
 - Scoop solid spill into closing containers
 - Powdered: do not use compressed air for pumping over spills
 - Clean contaminated surfaces with an excess of water
 - Wash clothing and equipment after handling

7. Handling and storage

- 7.1 **Handling:**
- Observe very strict hygiene - avoid contact
 - Avoid raising dust
 - Remove contaminated clothing immediately
- 7.2 **Storage:**
- Keep container tightly closed
 - Meet the legal requirements
 - Keep away from: heat sources, ignition sources, oxidizing agents, metals

Storage temperature: N.D.

- 7.3 **Materials for packaging:**
- to avoid : no data available

8. Exposure controls/Personal protection

- 8.1 Recommended engineering controls:
 - Measure the concentration in the air regularly
 - Work under local exhaust/ventilation

Sampling methods:
 - No data available

8.2 Exposure limits:

| | | |
|-----------------|---|------------|
| TLV-TWA | : | not listed |
| TLV-STEL | : | not listed |
| TLV-Ceiling | : | not listed |
| OES-LTEL | : | not listed |
| OES-STEL | : | not listed |
| MEL-LTEL | : | not listed |
| MEL-STEL | : | not listed |
| MAK | : | not listed |
| TRK | : | not listed |
| MAC-TGG 8 h | : | not listed |
| MAC-TGG 15 min. | : | not listed |
| MAC-Ceiling | : | not listed |
| VME-8h | : | not listed |
| VLE-15 min. | : | not listed |
| GWBB-8h | : | not listed |
| GWK-15 min. | : | not listed |
| Momentary value | : | not listed |

8.3 Personal protection:

eye protection:
 - Face shield
 - In case of dust production: protective goggles

hand protection:
 - Gloves

skin protection:
 - Protective clothing
 - In case of dust production: head/neck protection

materials for protective clothing:
 - No data available

respiratory protection:
 - Dust formation: dust mask

9. Physical and chemical properties

| | | | |
|---------------------------------|---|-------------------|------------|
| 9.1 Appearance (at 20°C) | : | Solid | |
| 9.2 Odour | : | No data available | |
| 9.3 Colour | : | Off-white | |
| 9.4 pH value | : | N.D. | |
| 9.5 Boiling point/boiling range | : | N.A. | °C |
| 9.6 Melting point/melting range | : | 181 | °C |
| 9.7 Flashpoint | : | N.D. | °C |
| 9.8 Auto-ignition point | : | N.D. | °C |
| 9.9 Explosion limits | : | N.D. | vol% (°C) |
| 9.10 Vapour pressure (at 20°C) | : | N.D. | hPa |
| 9.11 Relative density (at 20°C) | : | N.D. | |

HATU

| | | | |
|-------------------------------|---|------|------------------|
| 9.12 Water solubility | : | N.D. | g/100 ml |
| 9.13 Soluble in | : | N.D. | |
| 9.14 Relative vapour density | : | N.D. | |
| 9.15 Saturation concentration | : | N.D. | g/m ³ |
| 9.16 Viscosity | : | N.D. | Pa.s |

10. Stability and reactivity

10.1 Stability:

- Stable under normal conditions

10.2 Reactivity/Hazardous decomposition products:

- On burning: release of toxic and corrosive gases/vapours e.g.: (phosphorus oxides, nitrous vapours, hydrofluoric acid, carbon monoxide, carbon dioxide)

10.3 Conditions/materials to avoid:

- Heat sources, ignition sources, oxidizing agents, metals

11. Toxicological information

11.1 Acute toxicity:

| | | | |
|---------------------|---|--------|----------|
| LD50 oral rat | : | > 2000 | mg/kg |
| LD50 dermal rat | : | N.D. | mg/kg |
| LD50 dermal rabbit | : | N.D. | mg/kg |
| LC50 inhalation rat | : | N.D. | mg/l/4 h |

11.2 Chronic toxicity:

EC carc. cat.: not listed
EC muta. cat.: not listed
EC repr. cat.: not listed

Carcinogenicity (TLV): not listed

IARC classification: not listed

11.3 Routes of exposure: ingestion, inhalation, eyes and skin

11.4 Acute effects/symptoms:

AFTER INHALATION

- Slightly irritant to respiratory organs
- Coughing

AFTER INGESTION

- Practically non-toxic if swallowed

AFTER SKIN CONTACT

- Slightly irritant to skin

AFTER EYE CONTACT

- Slightly irritant to eyes

11.5 Chronic effects:

- May cause sensitization by skin contact
- May cause sensitization by inhalation

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:

- Swelling of the skin
- Skin rash/inflammation
- Respiratory difficulties

12. Ecological information

12.1 Mobility:

- No data available

12.2 Biodegradation:

| | | | |
|---------|------------------|--------|-------------------------------|
| - soil: | T ½ | : N.D. | days |
| | BOD ₅ | : N.D. | g O ₂ /g substance |
| | COD | : N.D. | g O ₂ /g substance |

- water: - No data available

12.3 Bioaccumulation:

- log P_{ow} : N.D.
 - BCF : N.D.

12.4 Aquatic toxicity:

- No data available

12.5 Other information:

- WGK: N.D.
 - Effect on the ozone layer : N.D.
 - Waste water purification : N.D.

13. Waste disposal considerations

13.1 Provisions relating to waste:

- Waste code (EC): 07 01 99 or 07 07 99

13.2 Disposal methods:

- Landfill or incinerate at an approved site in accordance with national and local regulations

14. Transport information

- 14.1 Proper shipping name: N.A.
- 14.2 Transport by road/rail (ADR/RID): N.A.
 Danger code: -
 Danger labels on tanks: -
 on packages: -
- 14.3 Substance identification number (UN number): N.A.
 Packing: -
- 14.4 Maritime transport (IMDG code): N.A.
 EMS : -
 MFAG : -
 Marine pollutant: -
- 14.5 Inland navigation (ADNR): N.A.
- 14.6 Air freight (ICAO): N.A.
 Instruction "passenger": -
 Instruction "cargo": -
- 14.7 Other information: not restricted for any mode of international transport

15. Regulatory information

Labelling in accordance with EC directives 67/548/EEC and 1999/45/EEC



Harmful

R42/43 : May cause sensitization by inhalation and skin contact

- S(02) : (Keep out of reach of children)
- S22 : Do not breathe dust
- S36/37 : Wear suitable protective clothing and gloves
- S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
- S(63) : In case of accident by inhalation: remove casualty to fresh air and keep at rest

16 Other information

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N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
* = INTERNAL CLASSIFICATION

Exposure limits:

TLV : Threshold Limit Value - ACGIH USA 1999
OES : Occupational Exposure Standards - EH40-98 United Kingdom 1998
MEL : Maximum Exposure Limits - EH40-98 United Kingdom 1998
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 1999
TRK : Technische Richtkonzentrationen - Germany 1999
MAC : Maximale aanvaarde concentratie - The Netherlands 2000
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB: Grenswaarde beroepsmatige blootstelling - Belgium KB 12.09.1998
GWK : Grenswaarde kortstondige blootstelling - Belgium KB 12.09.1998

WCK:

001 Internal classification
002 Classification in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 99
003 Classification based on the R phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 99
004 Classification based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 99

MSDS established : 31-03-2000
Reference number : BIG\32647GB
Reason for revision : GEN063080, GEN076521, GEN076523, GEN076525, GEN076527

Attachment 5

SAFETY DATA SHEET (DRAFT)

Based on Directive 91/155/EEC at req. of the
Commission of the European Communities

1-HYDROXY-7-AZA-BENZOTRIAZOLE

1. Identification of the substance/preparation and the company

1.1 Identification of the substance or preparation:

Synonyms : HOAT, 3-HYDROXY-3H-1,2,3-TRIAZOLO(4,5-B)PYRIDINE,
GEN076511, GEN076513, GEN076515, GEN076517

CAS no. : 039968-33-7
EC index no. : N.A. **NFPA code :** 2-1-0(*)
EINECS no. : N.A. **Molecular weight :** 136.11
RTECS no. : N.A. **Formula :** C5H4N4O

1.2 Company/undertaking identification:

PE Biosystems
7 Kingsland Grange
Woolston
Warrington
Cheshire WA1 4SR
Tel: +44 (0)1925 282 715
Fax: +44 (0)1925 282 703

1.3 Telephone number for emergency:

(+32) 14-58 45 45
Information centre of dangerous goods (B.I.G.)
Technische Schoolstraat 43A, B-2440 Geel, Belgium

2. Composition/information on ingredients

| Hazardous ingredients | CAS no. | Conc in % | Hazard class. | Risks (R-phrases) |
|------------------------------|-------------|--------------|------------------|----------------------|
| 1-Hydroxy-7-azabenzotriazole | 039968-33-7 | 100 | Xn | 40 |

3. Hazards identification

- Possible risks of irreversible effects

4. First aid measures

4.1 Eye contact:

- Rinse immediately with plenty of water for 15 minutes
- Do not apply neutralizing agents
- Consult a doctor/medical service if irritation persists

4.2 Skin contact:

- Wash immediately with lots of water and soap for 15 minutes
- Consult a doctor/medical service if irritation persists

4.3 After inhalation:

- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration
- Consult a doctor/medical service if breathing problems develop

4.4 After ingestion:

- Never give water to an unconscious person
- Consult a doctor/medical service if you feel unwell

1-HYDROXY-7-AZA-BENZOTRIAZOLE

5. Fire-fighting measures

5.1 Suitable extinguishing media:

- Water spray
- Polyvalent foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:

- No data available

5.3 Special exposure hazards:

- May burn
- It's dust is explosive with air
- On burning: release of toxic and corrosive gases/vapours: nitrous vapours, carbon monoxide, carbon dioxide

5.4 Instructions:

- Dilute toxic gases with water spray

5.5 Special protective equipment for firefighters:

- Heat/fire exposure: compressed air/oxygen apparatus
- Heat/fire exposure: gas-tight suit

6. Accidental release measures

6.1 Personal protection: see 8.3

6.2 Environmental precautions:

- Knock down/dilute dust cloud with water spray
- Contain leaking substance, pump over in suitable containers
- Plug the leak, cut off the supply

6.3 Clean-up:

- Stop dust cloud by humidifying
- Scoop solid spill into closing containers
- Powdered: do not use compressed air for pumping over spills
- Clean contaminated surfaces with an excess of water
- Take collected spill to manufacturer/competent authority
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

- Observe normal hygiene standards
- Avoid raising dust
- Clean contaminated clothing

7.2 Storage:

- Keep container tightly closed
- Meet the legal requirements
- Keep away from: heat sources, ignition sources, oxidizing agents

Storage temperature: N.D.

7.3 Materials for packaging:

- to avoid : no data available

1-HYDROXY-7-AZA-BENZOTRIAZOLE

8. Exposure controls/Personal protection

- 8.1 Recommended engineering controls:
- Work under local exhaust/ventilation

Sampling methods:
- No data available

8.2 Exposure limits:

TLV-TWA : not listed
TLV-STEL : not listed
TLV-Ceiling : not listed

OES-LTEL : not listed
OES-STEL : not listed
MEL-LTEL : not listed
MEL-STEL : not listed

MAK : not listed
TRK : not listed

MAC-TGG 8 h : not listed
MAC-TGG 15 min. : not listed
MAC-Ceiling : not listed

VME-8h : not listed
VLE-15 min. : not listed

GWBB-8h : not listed
GWK-15 min. : not listed
Momentary value : not listed

8.3 Personal protection:

eye protection:
- Safety glasses
- In case of dust production: protective goggles

hand protection:
- Gloves

skin protection:
- Protective clothing

materials for protective clothing:
- No data available

respiratory protection:
- Dust formation: dust mask

9. Physical and chemical properties

| | | | |
|---------------------------------|---|--------------------|------------|
| 9.1 Appearance (at 20°C) | : | Powder | |
| 9.2 Odour | : | N.D. | |
| 9.3 Colour | : | White to off-white | |
| 9.4 pH value | : | N.D. | |
| 9.5 Boiling point/boiling range | : | N.A. | °C |
| 9.6 Melting point/melting range | : | 205 | °C |
| 9.7 Flashpoint | : | N.D. | °C |
| 9.8 Auto-ignition point | : | N.D. | °C |
| 9.9 Explosion limits | : | N.D. | vol% (°C) |
| 9.10 Vapour pressure (at 20°C) | : | N.D. | hPa |
| 9.11 Relative density (at 20°C) | : | N.D. | |

1-HYDROXY-7-AZA-BENZOTRIAZOLE

| | | | |
|-------------------------------|---|------|------------------|
| 9.12 Water solubility | : | N.D. | g/100 ml |
| 9.13 Soluble in | : | N.D. | |
| 9.14 Relative vapour density | : | N.D. | |
| 9.15 Saturation concentration | : | N.D. | g/m ³ |
| 9.16 Viscosity | : | N.D. | Pa.s |

10. Stability and reactivity

10.1 Stability:

- Stable under normal conditions

10.2 Reactivity/Hazardous decomposition products:

- On burning: release of toxic and corrosive gases/vapours: nitrous vapours, carbon monoxide, carbon dioxide

10.3 Conditions/materials to avoid:

- Heat sources, ignition sources, oxidizing agents

11. Toxicological information

11.1 Acute toxicity:

| | | | |
|---------------------|---|--------|----------|
| LD50 oral rat | : | > 2000 | mg/kg |
| LD50 dermal rat | : | N.D. | mg/kg |
| LD50 dermal rabbit | : | N.D. | mg/kg |
| LC50 inhalation rat | : | N.D. | mg/l/4 h |

11.2 Chronic toxicity:

| | |
|------------------------|--------------|
| EC carc. cat.: | not listed |
| EC muta. cat.: | 3 (*) |
| EC repr. cat.: | not listed |
| Carcinogenicity (TLV): | not listed |
| IARC classification | : not listed |

11.3 Routes of exposure: ingestion, inhalation, eyes and skin

11.4 Acute effects/symptoms:

AFTER INHALATION

- Slightly irritant to respiratory organs

AFTER INGESTION

- Practically non-toxic if swallowed

AFTER SKIN CONTACT

- Slightly irritant to skin

AFTER EYE CONTACT

- Slightly irritant to eyes

11.5 Chronic effects:

- Possible risks of irreversible effects

1-HYDROXY-7-AZA-BENZOTRIAZOLE

12. Ecological information

12.1 Mobility:

- No data available

12.2 Biodegradation:

- | | | | |
|---------|------------------|--------|-------------------------------|
| - soil: | T ½ | : N.D. | days |
| | BOD ₅ | : N.D. | g O ₂ /g substance |
| | COD | : N.D. | g O ₂ /g substance |

- water: - No data available

- ### 12.3 Bioaccumulation:
- log P_{ow} : N.D.
 - BCF : N.D.

12.4 Aquatic toxicity:

- No data available

12.5 Other information:

- WGK: N.D.
- Effect on the ozone layer : N.D.
- Waste water purification : N.D.

13. Waste disposal considerations

13.1 Provisions relating to waste:

- Waste code (EC): N.A.

13.2 Disposal methods:

- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber

1-HYDROXY-7-AZA-BENZOTRIAZOLE

14. Transport information

- 14.1 Proper shipping name: N.A.
- 14.2 Transport by road/rail (ADR/RID): N.A.
Danger code: -
Danger labels on tanks: -
on packages: -
- 14.3 Substance identification number (UN number): N.A.
Packing: -
- 14.4 Maritime transport (IMDG code): N.A.
EMS : -
MFAG : -
Marine pollutant: -
- 14.5 Inland navigation (ADNR): N.A.
- 14.6 Air freight (ICAO): N.A.
Instruction "passenger": -
Instruction "cargo": -
- 14.7 Other information: not restricted for any mode of international transport

15. Regulatory information

Labelling in accordance with EC directives 67/548/EEC and 1999/45/EEC



Harmful

R40 : Possible risks of irreversible effects

S(02) : (Keep out of reach of children)
S22 : Do not breathe dust
S36/37/39 : Wear suitable protective clothing gloves, and eye/face protection

1-HYDROXY-7-AZA-BENZOTRIAZOLE

16. Other information

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MAC : Maximale aanvaarde concentratie - The Netherlands 2000
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium KB 12.09.1998
GWK : Grenswaarde kortstondige blootstelling - Belgium KB 12.09.1998

WGK:

001 Internal classification
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003 Classification based on the R phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 99
004 Classification based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 99

MSDS established : 30-03-2000
Reference number : BIG\27148GB
Reason for revision :

Attachment 6

HATU 2000年2月25日作成 1頁(全4頁)

化学物質等安全データシート (MSDS)

1. 化学物質等及び会社情報

化学物質等の名称 HATU
供給者 ピーイー バイオシステム ジャパン(株)
住所 東京都中央区八丁堀4-5-4 秀和桜橋ビル
担当部門 CDM 成田製造
電話番号 0476-37-0671 FAX番号 0476-37-0675
緊急連絡先 同上

2. 組成、成分情報

単一化学物質

化学名 N-((Dimethylamino)-1H-1, 2, 3-triazole (4, 5, 6) pyridin-1-ylmethylene)-N-methylmethanaminium hexafluorophosphate N-oxide
別名 2-(1H-7-アザベンゾトリアゾール-1-イル)-1, 1, 3, 3-テトラメチル ウロニウム ヘキサフルオロホスフェート (HATU)
メタナニウム, N-((ジメチルアミノ) (3H-1, 2, 3-トリアゾロ (4, 5-B) ピリジン-3-イルオキシ) メチレン)-N-メチルー, ヘキサフルオロホスフェート (1-)
N-((ジメチルアミノ) (3H-1, 2, 3-トリアゾロ (4, 5-B) ピリジン-3-イルオキシ) メチレン)-N-メチルメタナニウム ヘキサフルオロホスフェート (1-)
3H-1, 2, 3-トリアゾロ (4, 5-B) ピリジン, メタナニウム誘導体
CAS番号 148893-10-1
官報公示整理番号 なし

3. 危険有害性の要約

危険有害性 NFPA (米国防火協会) の0~4の5段階表示
人体 2 (危険)
火災 1 (要注意)
反応 0 (危険なし)

微粉/空気の混合体で発火、爆発の危険あり

最も重要な有害性 (人の健康に対する有害な影響) アレルギー反応

吸入した場合…短期暴露でアレルギー反応、長期暴露でアレルギー反応。

皮膚に付着した場合…短期暴露で刺激性あり、長期暴露でアレルギー反応。

目に入った場合…短期暴露で刺激性あり、長期暴露はアレルギー反応。

特定の危険有害性…アレルギー反応

4. 応急措置

- 吸入した場合：空気の新鮮な場所に移動させる。呼吸困難な場合は酸素吸入する。
呼吸停止の場合は人工呼吸を行う。医師の診断を受ける。
- 皮膚に付着した場合：直ちに汚染された衣服、装身具および靴は取り外し、石鹼と多量の水で最低15～20分間、製品が残らないようになるまで洗う。
必要なら医師の診断を受ける。
- 目に入った場合：直ちに多量の水または食塩水で、場合によっては臉を広げながら洗浄して製品を取り除く、直ちに医師の診断を受ける。
- 飲み込んだ場合：吐いた場合は呼吸を助けるため頭部を腰部より低くする。直ちに医師の診断を受ける。

5. 火災時の措置

- 消火剤：ドライケミカル、二酸化炭素、水、泡消火剤、大規模火災時は泡または水噴霧。
- 特定の危険性：火災危険は軽微、粉塵／空気の混合気体は発火・爆発の危険。
- 特定の消火方法：危険がなければ容器を火から遠ざける。高圧水流で漏洩物を撒き散らしてはならない。廃棄物を堤で囲う。周辺火災には適応した消火剤を使用する。製品の吸入、生成ガスの爆発を避ける。風上を保ち低地を避ける。

6. 漏出時の措置

人体に対する注意事項

アレルギー性、刺激性があるので、吸入、皮膚付着、目に入ることを避けるように、呼吸器系の保護具、手の保護具、目の保護具を用いる。

環境に対する注意事項

上下水道は避ける

除去方法

廃棄物容器に漏洩物を収集する。

不用な人の立ち入りを禁止、貯蔵地域を遊離する。

7. 取扱い及び保管上の注意

取扱い

技術的対策

取扱者の暴露防止：吸入、皮膚付着、目に入ることを避ける。

注意事項 強制排気を準備すること

安全な取扱い注意事項 強酸化剤との混触を避ける。加熱、炎、火花の原因を避ける。

保 管

適切な技術的対策

混合接触をさせてはならない化学物質等 強酸化剤

適切な条件 容器は閉じておく、適切に換気された場所に貯蔵する

保管条件 高温、直射日光、スパーク、炎を避ける

容器包装材料 試薬容器に保管する

8. 暴露防止及び保護措置

設備対策 強制排気を準備、作業場に洗眼、シャワー設備。製品の使用頻度が多いか、過度の暴露がある場合には、人工呼吸装置を準備する。人工呼吸装置は最高から最低のランクがあり、使用前に訓練を受け注意して扱う。

保護具 呼吸器系の保護具…通常の作業では不用で強制換気で十分
手の保護具 …耐薬品手袋
目の保護具 …シールド付安全眼鏡またはゴーグル
皮膚及び身体の保護具…耐薬品保護具

9. 物理的及び化学的性質

物理的状態

形状：粉体 色：僅かに灰色がかった白色 臭い：なし pH：データなし

分子量：380.23 分子式：C₁₀H₁₅F₆N₆OP

物理的状態が変化する特定の温度/温度範囲

融点：181～183℃（183から189℃で分解）

最低発火エネルギー：500ミリジュール以上

密度：データなし 溶媒に対する溶解性：データなし

10. 安全性及び反応性

安定性：常温常圧で安定

特定条件下で生じる危険な反応：強酸化剤との混触による酸化反応

避けるべき条件：強酸化剤との混触。加熱、炎、火花や発火の原因を避ける

危険有害な分解生成物：情報なし

11. 有害性情報

急性毒性：ラットに HATU を2,000mg/kgを強制胃内投与1回で死亡率、限界毒性なしの報告がある。剖検でも異常は認められない。

局所効果及び感作性

吸入した場合…急性暴露で刺激を起こし、同じ人に感作反応を起こすことがある。
慢性暴露で感作を引き起こすことがある。

皮膚に触れた場合…急性暴露で刺激を起こし、同じ人に感作皮膚炎を起こすことがある。慢性、長期の反復暴露で感作皮膚炎を起こすことがある。
HATUはモルモットの Magnusson-Kligman の最大値検査で皮膚感作が認められた。

目に入った場合…急性暴露で刺激性

症状：皮膚刺激、腫れ、発疹、呼吸促進、咳。悪化症状は喘息。

変異原性（試験管内）…サルモネラ菌（エームス・テスト）または大腸菌のテストは陰性。

12. 環境影響情報

データなし

13. 廃棄上の注意

残余廃棄物、当該化学物質等が付着している容器・包装については、国、自治体の規制に従って廃棄する。

14. 輸送上の注意

国連分類、国連番号は該当しない。また、とくに陸、空、海の規制はない。

15. 適用法令

化学物質管理促進法、労働安全衛生法、毒物及び劇物取締法に基づく MSDS の義務化の対象ではない。

なお、湖沼、海域の全りんの水質環境基準は定められている。

16. その他の情報

特になし

この情報は2000年2月現在で作成されたものである。

この文書に含まれる情報及び推奨は、信頼すべきデータにより作成されたものであるが、この情報に関連するいかなる保証もいたしません。

Attachment 7

HOAT 2000年2月25日作成 1頁(全4頁)

化学物質等安全データシート (MSDS)

1. 化学物質等及び会社情報

化学物質等の名称 HOAT
供給者 ピーイー バイオシステム ジャパン(株)
住所 東京都中央区八丁堀 4-5-4 秀和桜橋ビル
担当部門 CDM 成田製造
電話番号 0476-37-0671 FAX番号 0476-37-0675
緊急連絡先 同上

2. 組成、成分情報

単一化学物質

化学名 1-ヒドロキシ-7-アザ-ベンゾトリアゾール
別名 3H-1,2,3-トリアゾロ(4,5-B)ピリジン
3-ヒドロキシ-1,2,3-トリアゾロ(4,5-B)ピリジン
CAS番号 39968-33-7
官報公示整理番号 なし

3. 危険有害性の要約

危険有害性 NFPA (米国防火協会) の 0 ~ 4 の 5 段階表示

人体 2 (危険)

火災 1 (要注意)

反応 0 (危険なし)

微粉/空気の混合体で発火、爆発の危険

最も重要な有害性 (人の健康に対する有害な影響) 刺激性 アレルギー反応

吸入した場合…短期暴露 刺激性あり、感作を起こす

長期暴露 刺激性あり、感作を起こす

皮膚に付着した場合…短期暴露 刺激性あり、皮膚感作を起こす

長期暴露 刺激性あり、皮膚感作を起こす

目に入った場合…短期暴露 刺激性あり

長期暴露 データなし

特定の危険有害性…刺激性、アレルギー反応

4. 応急措置

吸入した場合：空気の新鮮な場所へ移動させる。呼吸困難な場合は酸素吸入する。

呼吸停止の場合は人工呼吸を行う。医師の診断を受ける。

皮膚に付着した場合：直ちに汚染された衣服、装身具および靴は取り外し、石鹼と多量の水で最低15～20分間、製品が残らないようになるまで洗う。

必要なら医師の診断を受ける。

目に入った場合：直ちに多量の水または食塩水で、場合によっては顔を上げながら洗浄して製品を取り除く。医師の診断を受ける。

飲み込んだ場合：吐いたら呼吸を助けるため、頭部を腰部より低くする。必要なら直ちに医師の診断を受ける。

5. 火災時の措置

消火剤：ドライケミカル、二酸化炭素、水、泡消火剤、大規模火災時は泡または水噴霧。

特定の危険性：火災危険は軽微、粉塵／空気の混合気体は発火・爆発の危険あり。

特定の消火方法：危険がなければ容器を火から遠ざける。高圧水流で漏洩物を撒き散らしてはならない。廃棄物を堤で囲う。周辺火災には適応した消火剤を使用する。製品の吸入、生成ガスの爆発を避ける。風上を保ち低地を避ける。

6. 漏出時の措置

人体に対する注意事項：

アレルギー性、刺激性があるので、吸入、皮膚付着、目に入ることを避けるように、呼吸器系の保護具、手の保護具、目の保護具を用いる。

環境に対する注意事項：

上下水道は避ける

除去方法：

廃棄物容器に漏洩物を収集する。

不用な人の立ち入りを禁止、貯蔵地域を遊離する。

7. 取扱い及び保管上の注意

取扱い

技術的対策

取扱者の暴露防止：吸入、皮膚付着、目に入ることを避ける。

注意事項 強制排気を準備すること

安全な取扱い注意事項 強酸化剤との混触を避ける。加熱、炎、火花の原因を避ける。

保 管

適切な技術的対策

混合接触をさせてはならない化学物質等：強酸化剤

適切な条件 容器は閉じておく、適切に換気された場所に貯蔵する

保管条件 高温、直射日光、スパーク、炎を避ける

容器包装材料 試薬容器に保管する

8. 暴露防止及び保護措置

設備対策 強制排気を準備、作業場に洗眼、シャワー設備。製品の使用頻度が多
いか、過度の暴露がある場合には、人工呼吸装置を準備する。人工呼
吸装置は最高から最低のランクがあり、使用前に警告に注意する。

保護具 呼吸器系の保護具…通常の作業では不用で強制換気で十分

手の保護具 …耐薬品手袋

目の保護具 …シールド付安全眼鏡またはゴーグル

皮膚及び身体の保護具…耐薬品保護具

9. 物理的及び化学的注意

物理的状态

形状：粉体 色：僅かに灰色がかった白色 臭い：なし pH：データなし

分子量：136.11 分子式：C₅H₄N₄O

物理的状态が変化する特定の温度/温度範囲

分解温度 213~215℃

密度：データなし 溶媒に対する溶解性：データなし

10. 安全性及び反応性

安定性：常温常圧で安定

特定条件下で生じる危険な反応：強酸化剤との混触による酸化反応

避けるべき条件：強酸化剤との混触。加熱、炎、火花や発火の原因を避ける

危険有害な分解生成物：情報なし

11. 有害性情報

急性毒性：データなし

局所効果及び感作性

吸入した場合…急性暴露で刺激を起こし、同じ人に感作反応を起こすことがある。

慢性暴露で感作を引き起こすことがある。

皮膚に触れた場合…急性暴露で刺激を起こし、同じ人に感作皮膚炎を起こすことがある。慢性、長期の反復暴露で感作皮膚炎を起こすことがある。

目に入った場合…急性暴露で刺激性、慢性暴露でデータはない

標的器官…免疫系に感作性あり

12. 環境影響情報

データなし

13. 廃棄上の注意

残余廃棄物、当該化学物質等が付着している容器・包装については、国、自治体の規制に従って廃棄する。

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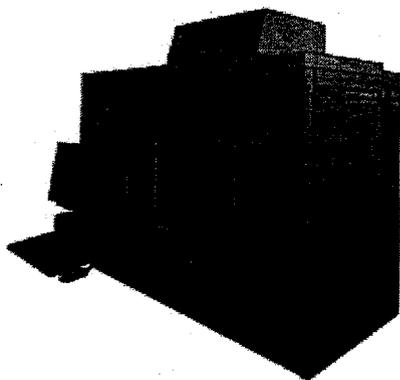
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Attachment 8

Depiction of Pioneer™

Peptide Synthesis: Pioneer™ Peptide Synthesizer

The Pioneer™ Peptide Synthesizer is an Fmoc-continuous-flow instrument that synthesizes standard and complex peptides. Monitoring with full feedback control allows you to optimize each synthesis - automatically.



Highest Integrity Peptides Made Quickly, Efficiently and at Low Cost

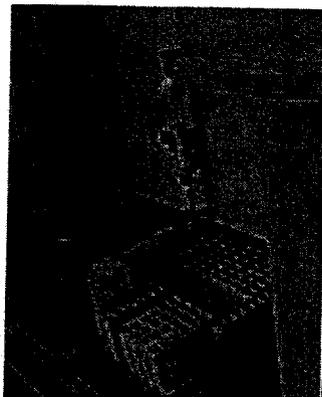
Peptides, by their very nature, differ widely in composition, structure, and function. For efficient synthesis of biologically active peptides, you need a system with the flexibility to handle each synthesis individually and the throughput to produce a large number of peptides in a short time frame. The Pioneer™ Peptide Synthesizer gives

you both.

Each synthesis can be customized in terms of scale and activation chemistry (including the new allyl chemistry and the use of multiple activation chemistries within a single synthesis). And, if two column synthesis is not enough, you can add one or two Multiple Peptide Synthesis (MPS) options for increased production.

Proven Continuous Flow Technology

The Pioneer™ Peptide Synthesizer automates the Fmoc method of synthesis using continuous-flow technology. Two column systems operate simultaneously and independently, so you can assemble two completely different peptides at the same time.



HPLC illustrates the benefits of the high coupling efficiencies (>98%) obtained with the Expedite Systems and reagents. The high average coupling efficiency allows very long oligomers to be produced consistently and reliably.