MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 2268
MSDS Number: 2268
SRM Name: Carbon-13 Labeled Levoglucosan in Ethyl Acetate

Date of Issue: 07 May 2012

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: This Standard Reference Material (SRM) is a solution of carbon-13 labeled levoglucosan in ethyl acetate. This SRM is intended primarily for use as an internal standard or surrogate internal standard solution that is used to spike both the unknown sample and a calibration or external standard solution of non-labeled levoglucosan. A unit of SRM 2268 consists of five 2-mL ampoules, each containing approximately 1.2 mL of solution.

Substance: Ethyl acetate

Other Designations: Acetic acid ethyl ester; acetic ether; acetidin; acetoxyethane; ethyl ethanoate; vinegar naphtha; acetic ester; ethyl acetic ester; ethyl acetate, anhydrous; ethyl acetate ester

2. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 3 Reactivity = 0

Major Health Hazards: Respiratory tract irritation, skin irritation, eye irritation, central nervous system depression.

Physical Hazards: Flammable liquid and vapor.

Potential Health Effects (Acute and Chronic):

Inhalation: Inhalation of 400 ppm for 3–5 min has caused respiratory tract irritation. Exposure may result difficulty in breathing, headache, drowsiness, dizziness, loss of coordination, kidney damage, liver damage, and unconsciousness.

Skin Contact: Direct contact may cause irritation with redness and defatting action on the skin.

Eye Contact: Direct contact may cause irritation, with redness, pain, and lacrimation. Exposure to 400 ppm may cause a sensation of irritation. Repeated or prolonged exposure may cause conjunctivitis and cornea clouding.

Ingestion: Ingestion of small amounts may cause sore throat, abdominal pain, and diarrhea. Large amounts may cause central nervous system depression, with dizziness, headache, weakness, fatigue, drowsiness, and unconsciousness. Poisoning may cause congestion of the liver and kidneys.

Listed as a Carcinogen/Potential Carcinogen

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component[(a)]	CAS Number	EC Number (EINECS)	Nominal Concentration (%)
Ethyl acetate	141-78-6	205-500-4	100

[(a)] The concentration of deuterated levoglucosan in this solution is less than 0.01 %, which is below the reportable limit required for individual MSDS information under current OSHA regulations, see OSHA 29 CFR 1910.1200(g)(2)(i)(C)(1). For the actual concentration, see the Certificate of Analysis.

EC Classification: F, Xi

EC Risk (R No.): 11, 36, 66, 67

EC Safety (S No.): 16, 26, 33

EC Risk/Safety Phrases: See Section 15, "Regulatory Information".

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Seek medical attention if necessary.

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Seek medical assistance if necessary. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Then get immediate medical attention.

Ingestion: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

5. Fire Fighting Measures

Fire and Explosion Hazards: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point.

Extinguishing Media: Alcohol-resistant foam, carbon dioxide, regular dry chemical, water.

Fire Fighting: Avoid inhalation of combustion by-products.

Flash Point (°C): –4 (25 °F)
Method: Closed Cup

Autoignition Temp. (°C): 426 (799 °F)

Flammability Limits in Air
UPPER (Volume %): 11.5
LOWER (Volume %): 2

6. Accidental Release Measures

Occupational Release: Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. For small spills, absorb with sand or other non-combustible material. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

Disposal: Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Store safely to prevent physical damage. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Exposure Limits

ACGIH (TWA): 400 ppm
NIOSH (TWA): 400 ppm; 1400 mg/m^3
NIOSH (IDLH): 2000 ppm (10 % LEL)
OSHA (TWA): 400 ppm; 1400 mg/m^3

Ventilation: Local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29 CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Wear safety goggles. An eyewash station and drench shower should be readily available near the handling and use areas. Contact lens should not be worn.

Personal Protection: Chemically resistant gloves and clothing are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Clear, colorless liquid; varying odor.

Molecular Formula: $C_4H_8O_2$

Molar Mass (g/mol): 88.1

Vapor Density (air = 1): 3.04

Water Solubility: 8.7 %

Melting Point: –84 °C (–183.2 °F)

Boiling Point: 77 °C (171 °F)

Specific Gravity (water = 1): 0.9003

10. STABILITY AND REACTIVITY

Stability: X Stable ____ Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep of waters and sewers.

Incompatible Materials: Acids, bases, oxidizing materials, combustible materials.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon and miscellaneous decomposition products.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data:

Rat, Oral LD_{50}: 5620 mg/kg
Rat, Dermal LC_{50}: >20 mL/kg

Health Effects: See Section 2, "Hazards Identification" for potential health effects.

Target Organs: Central nervous system.

Mutagen: Ethyl acetate has been studied for mutagenic effects. The following endpoints are listed by Registry of Toxic Effects of Chemical Substances (RTECS).

Hamster: 9 g/L
Saccharomyces cerevisiae: 24 400 ppm

Medical Conditions Generally Aggravated by Exposure: Blood system disorders, respiratory disorders, skin disorders, allergies.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Fish Toxicity: Fathead minnow (*Pimephales promelas*) LC_{50} (flow-through): 220–250 mg/L (96 h)
Rainbow trout (*Oncorhynchus mykiss*) LC_{50} (flow-through): 484 mg/L (96 h)
Invertebrate: Freshwater water flea (*Daphnia magna*) EC_{50}: 560 mg/L (48 h)
Algal Toxicity: *Desmodesmus subspicatus* EC_{50}: 3300 mg/L (48 h)

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262, Hazardous Waste Number: U112. Keep out of water supplies and sewers.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Ethyl Acetate, Hazard Class 3, UN1173, Packing Group II, Excepted Quantity: Yes, E2.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): 5000 lb (2270 kg) final RQ
SARA Title III Section 302 (40 CFR 355.30): Not regulated.
SARA Title III Section 304 (40 CFR 355.40): Not regulated.
SARA Title III Section 313 (40 CFR 372.65): Not regulated.
OSHA Process Safety (29 CFR 1910.119): Not regulated.
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes
CHRONIC HEALTH:	No
FIRE:	Yes
REACTIVE:	No
PRESSURE:	No

STATE REGULATIONS

California Proposition 65: Not listed.

CANADIAN REGULATIONS

WHMIS Information: Not provided for this information.

EUROPEAN REGULATIONS

EC Classification:

F – Flammable
Xi – Irritant

EC Risk Phrases:

S11 – Highly flammable.
S36 – Irritating to eyes.
S66 – Repeated exposure may cause drowsiness and dizziness.
S67 – Vapors may cause drowsiness and dizziness.

EC Safety Phrases:

S16 – Keep away from sources of ignition – No smoking.
S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S33 – Take precautionary measures against static discharges.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Ethyl acetate is listed.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources: ChemAdvisor, Inc., MSDS *Ethyl Acetate*, 20 December 2012.

EC, European Chemical Substance Information System (ESIS), *Ethyl Acetate*, *CAS No. 141-78-6*; available at http://esis.jrc.ec.europa.eu/index.php?PGM=ein (accessed Apr 2012).