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

1.1 Product Identifier
Chemical Name  R-(+)-Warfarin-d5

Catalogue #  W498492

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)  
D1A  Very Toxic Material Causing Immediate and Serious Toxic Effects
  Toxic by Ingestion/Skin Absorption
D2A  Very Toxic Material Causing Other Toxic Effects
  Reproductive Toxin/Teratogen

WHMIS Symbols (Canada)  

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)
- Acute Toxicity, Dermal (Category 4)
- Acute Toxicity, Oral (Category 1)
- Reproductive Toxicity (Category 1A)
- Specific Target Organ Toxicity, Repeated Exposure (Category 1)
- Hazardous to the Aquatic Environment, Acute Hazard (Category 3)

EU Classification (According to EU Regulation 67/548/EEC)
Harmful in contact with skin. Very toxic if swallowed. May cause harm to the unborn child. May impair fertility.

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

Hazard Statements  Hazard Codes
Very Toxic  T+

Risk Codes and Phrases
- R21  Harmful in contact with skin.
- R28  Very toxic if swallowed.
  May cause harm to the unborn child.
General Advice
If medical attention is required, show this safety data sheet to the doctor.

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

In Case of Skin Contact
Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital.
Consult a physician.

In Case of Eye Contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If Swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless

<table>
<thead>
<tr>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Hydroxy-3-[(1R)-3-oxo-1-phenylbutyl]-2H-1-benzopyran-2-one-d5; R-(+)-3-(α-Acetonylbenzyl)-4-hydroxycoumarin-d5; (+)-Warfarin-d5; (R)-Warfarin-d5; Dextrowarfarin-d5;</td>
</tr>
</tbody>
</table>

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

**Signal Word** Danger

**GHS Hazard Statements**
- **H312** Harmful in contact with skin.
- **H300** Fatal if swallowed.
- **H360** May damage fertility or the unborn child.
- **H372** Causes damage to organs through prolonged or repeated exposure.
- **H402** Harmful to aquatic life.

**GHS Precautionary Statements**
- **P201** Obtain special instructions before use.
- **P280** Wear protective gloves/protective clothing/eye protection/face protection.
- **P301/P310** IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- **P308/P313** IF exposed or concerned: Get medical advice/attention.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
- **Molecular Formula:** C₁₉H₁₁D₅O₄
- **Molecular Weight:** 313.36
- **CAS Registry #:**
- **EC#:**

**Synonyms**
- 4-Hydroxy-3-[(1R)-3-oxo-1-phenylbutyl]-2H-1-benzopyran-2-one-d5; R-(+)-3-(α-Acetonylbenzyl)-4-hydroxycoumarin-d5; (+)-Warfarin-d5; (R)-Warfarin-d5; Dextrowarfarin-d5;

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 casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

**In Case of Skin Contact**
Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In Case of Eye Contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

**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
Nausea, vomiting, diarrhea, weakness, dyspnea, cyanosis, liver damage.

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media
Suitable 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

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

6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Prevent the formation of dusts and mists. Adequate ventilation must be provided to ensure dusts or mists are not inhaled.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

For protective equipment, refer to Section 8. For disposal, see Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling
Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of dusts and mists. Normal measures for preventative fire protection. No smoking, eating or drinking around this material. Wash hands after use.

7.2 Conditions for Safe Storage, Including any Incompatibilities
Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: -20°C Freezer

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 substances with established occupational exposure levels.

8.2 Exposure Controls
Appropriate Engineering Controls
A laboratory fumehood 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**
Chemical-resistant bodysuit (laminated Tychem SL or equivalent).

**Respiratory Protection**
Recommended respirators are NIOSH-approved OV/Multi-gas/P100 or CEN-approved ABEK-FFP3 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

<table>
<thead>
<tr>
<th>A) Appearance</th>
<th>B) Odour</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Solid</td>
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<table>
<thead>
<tr>
<th>C) Odour Threshold</th>
<th>D) pH</th>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>E) Melting Point/Freezing Point</th>
<th>F) Initial Boiling Point/Boiling Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>170-172°C</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>G) Flash point</th>
<th>H) Evaporation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I) Flammability (Solid/Gas)</th>
<th>J) Upper/Lower Flammability/Explosive Limits</th>
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</thead>
<tbody>
<tr>
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<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K) Vapour Pressure</th>
<th>L) Vapour Density</th>
</tr>
</thead>
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<tr>
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<td>No data available</td>
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</table>

<table>
<thead>
<tr>
<th>M) Relative Density</th>
<th>N) Solubility</th>
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<tbody>
<tr>
<td>No data available</td>
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<table>
<thead>
<tr>
<th>O) Partition Coefficient: n-octanol/water</th>
<th>P) Auto-Ignition Temperature</th>
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</thead>
<tbody>
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<td>No data available</td>
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<table>
<thead>
<tr>
<th>Q) Decomposition Temperature</th>
<th>R) Viscosity</th>
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</table>

<table>
<thead>
<tr>
<th>S) Explosive Properties</th>
<th>T) Oxidizing Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
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</tbody>
</table>

#### 9.2 Other Information
No data available

### 10. STABILITY AND REACTIVITY

#### 10.1 Reactivity
No data available
10.2 Chemical Stability
Stable under recommended 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
No data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

A) Acute Toxicity
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
Probable human reproductive toxin/teratogen. Several laboratory studies have shown strong reproductive toxicity/teratogenicity in animal models. This effect may be extrapolated to have similar effects in humans.

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 fatal if swallowed.

Skin
Harmful if absorbed through skin. May cause skin irritation.

Eyes
May cause eye irritation.

L) Signs and Symptoms of Exposure
Nausea, vomiting, diarrhea, weakness, dyspnea, cyanosis, liver damage.

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 listed

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): 2811  
IATA: 2811  
IMDG: 2811  
ADR/RID: 2811

14.2 UN Proper Shipping Name
DOT (US)/IATA: Toxic solid, organic, n.o.s. (R-(+)-Warfarin-d5)  
IMDG/ARD/RID: TOXIC SOLID, ORGANIC, N.O.S. (R-(+)-Warfarin-d5)

14.3 Transport Hazard Class(es)
DOT (US): 6.1  
IATA: 6.1  
IMDG: 6.1  
ADR/RID: 6.1

14.4 Packing Group
DOT (US): I  
IATA: I  
IMDG: I  
ADR/RID: I

14.5 Environmental Hazards
DOT (US): None  
IATA: None  
IMDG: None  
ADR/RID: None

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: 9/30/2014

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
16.3 Further Information

Copyright 2013. 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.