

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 1272/2008

### Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

- 1.1 Product Code:** 13526  
**Product Name:** (+)-Warfarin  
**Synonyms:** 4-hydroxy-3-[(1R)-3-oxo-1-phenylbutyl]-2H-1-benzopyran-2-one; (R)-Warfarin;
- 1.2 Relevant identified uses of the substance or mixture and uses advised against:**  
**Relevant identified uses:** For research use only, not for human or veterinary use.
- 1.3 Details of the Supplier of the Safety Data Sheet:**  
**Company Name:** Cayman Chemical Company  
1180 E. Ellsworth Rd.  
Ann Arbor, MI 48108  
**Web site address:** www.caymanchem.com  
**Information:** Cayman Chemical Company +1 (734)971-3335
- 1.4 Emergency telephone number:**  
**Emergency Contact:** CHEMTREC Within USA and Canada: +1 (800)424-9300  
CHEMTREC Outside USA and Canada: +1 (703)527-3887

### Section 2. Hazards Identification

- 2.1 Classification of the Substance or Mixture:**  
**2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP]:**  
Toxic To Reproduction, Category 1A  
Target Organ Systemic Toxicity (repeated exposure), Category 1  
Aquatic Toxicity (Chronic), Category 3  
**2.1.2 Classification according to Directive 1999/45/EC:**  
T: Toxic  
Reproductive Hazard: 1  
Risk Phrases: R48/25, R52/53, R61  
For full text of R- phrases: see SECTION 15.
- 2.2 Label Elements:**  
**2.2.1 Labeling according to Regulation (EC) No 1272/2008 [CLP]:**



**GHS Signal Word:** **Danger**

**GHS Hazard Phrases:**

H360: May damage fertility or the unborn child.  
H372: Causes damage to organs through prolonged or repeated exposure.  
H412: Harmful to aquatic life with long lasting effects.

**GHS Precaution Phrases:**

P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
P281: Use personal protective equipment as required.  
P260: Do not breathe {dust/fume/gas/mist/vapours/spray}.  
P264: Wash {hands} thoroughly after handling.  
P273: Avoid release to the environment.

**GHS Response Phrases:**

P308+313: IF exposed or concerned: Get medical attention/advice.  
P314: Get medical attention/advice if you feel unwell.

**GHS Storage and Disposal Phrases:**

Please refer to Section 7 for Storage and Section 13 for Disposal information.

### 2.2.2 Labeling according to Directive 1999/45/EC:



**T**

Reproductive Hazard: 1

- 2.3 Adverse Human Health Effects and Symptoms:** Causes damage to organs through prolonged or repeated exposure.  
Harmful to aquatic life with long lasting effects.  
Material may be irritating to the mucous membranes and upper respiratory tract.  
May be harmful by inhalation, ingestion, or skin absorption.  
May cause eye, skin, or respiratory system irritation.  
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

## Section 3. Composition/Information on Ingredients

| CAS # /<br>RTECS # | Hazardous Components (Chemical Name)/<br>REACH Registration No. | Concentration | EC No./<br>EC Index No.   | Risk Phrases/<br>GHS Classification   |
|--------------------|---|---------------|---------------------------|---|
| 5543-58-8<br>NA    | (R)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone             | 100.0 %       | 226-908-9<br>607-056-00-0 | T; Rp:1, R61-48/25-52/53<br>Toxic Repro. 1A: H360<br>TOST (RE) 1: H372<br>Aquatic (C) 3: H412 |

## Section 4. First Aid Measures

- 4.1 Description of First Aid Measures:** No data available.
- In Case of Inhalation:** Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
- In Case of Skin Contact:** Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
- In Case of Eye Contact:** Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.
- In Case of Ingestion:** Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
- 4.2 Important Symptoms and Effects, Both Acute and Delayed:** Inhibits blood coagulation; Causes abnormal clotting, bruising, and/or bleeding.  
May cause abnormal hematologic indices.

## Section 5. Fire Fighting Measures

- 5.1 Suitable Extinguishing Media:** Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.  
**Unsuitable Extinguishing Media:** Use water spray to cool fire-exposed containers.  
A solid water stream may be inefficient.
- 5.2 Flammable Properties and Hazards:** No data available.
- Flash Pt:** No data.
- Explosive Limits:** LEL: No data. UEL: No data.
- Autoignition Pt:** No data.
- 5.3 Fire Fighting Instructions:** As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or

equivalent), and full protective gear to prevent contact with skin and eyes.

### Section 6. Accidental Release Measures

- 6.1 Protective Precautions,** Avoid raising and breathing dust, and provide adequate ventilation.  
**Protective Equipment and** As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator,  
**Emergency Procedures:** and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
- 6.2 Environmental** Take steps to avoid release into the environment, if safe to do so.  
**Precautions:**
- 6.3 Methods and Material For** Contain spill and collect, as appropriate.  
**Containment and Cleaning** Transfer to a chemical waste container for disposal in accordance with local regulations.  
**Up:**

### Section 7. Handling and Storage

- 7.1 Precautions To Be Taken** Avoid breathing dust/fume/gas/mist/vapours/spray.  
**in Handling:** Avoid prolonged or repeated exposure.
- 7.2 Precautions To Be Taken** Keep container tightly closed.  
**in Storing:** Store in accordance with information listed on the product insert.

### Section 8. Exposure Controls/Personal Protection

#### 8.1 Exposure Parameters:

| CAS #     | Partial Chemical Name                               | Britain EH40 | France VL | Europe       |
|-----------|---|--------------|-----------|--------------|
| 5543-58-8 | (R)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone | No data.     | No data.  | No data.     |
| CAS #     | Partial Chemical Name                               | OSHA TWA     | ACGIH TWA | Other Limits |
| 5543-58-8 | (R)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone | No data.     | No data.  | No data.     |

#### 8.2 Exposure Controls:

- 8.2.1 Engineering Controls** Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne  
**(Ventilation etc.):** levels below recommended exposure limits.
- 8.2.2 Personal protection equipment:**
- Eye Protection:** Safety glasses
- Protective Gloves:** Compatible chemical-resistant gloves
- Other Protective Clothing:** Lab coat
- Respiratory Equipment** NIOSH approved respirator, as conditions warrant.  
**(Specify Type):**
- Work/Hygienic/Maintenance Practices:** Do not take internally.  
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.  
Wash thoroughly after handling.  
No data available.

### Section 9. Physical and Chemical Properties

#### 9.1 Information on Basic Physical and Chemical Properties

**Physical States:** ☐ Gas ☐ Liquid ☒ Solid  
**Appearance and Odor:** A crystalline solid  
**Melting Point:** No data.  
**Boiling Point:** No data.  
**Flash Pt:** No data.  
**Evaporation Rate:** No data.  
**Explosive Limits:** LEL: No data. UEL: No data.  
**Vapor Pressure (vs. Air or mm Hg):** No data.  
**Vapor Density (vs. Air = 1):** No data.  
**Specific Gravity (Water = 1):** No data.  
**Solubility in Water:** No data.  
**Solubility Notes:** ~5 mg/ml in EtOH; ~25 mg/ml in DMSO & DMF;  
**Autoignition Pt:** No data.

#### 9.2 Other Information

**Percent Volatile:** No data.  
**Molecular Formula & Weight:** C<sub>19</sub>H<sub>16</sub>O<sub>4</sub> 308.3

### Section 10. Stability and Reactivity

**10.1 Reactivity:** No data available.  
**10.2 Stability:** Unstable ☐ Stable ☒  
**10.3 Stability Note(s):** Stable if stored in accordance with information listed on the product insert.  
**Polymerization:** Will occur ☐ Will not occur ☒  
**10.4 Conditions To Avoid:** No data available.  
**10.5 Incompatibility - Materials To Avoid:** strong acids  
    strong bases  
    strong oxidizing agents  
**10.6 Hazardous Decomposition Or Byproducts:** carbon dioxide  
    carbon monoxide

### Section 11. Toxicological Information

**11.1 Information on Toxicological Effects:** The toxicological effects of this product have not been thoroughly studied.  
**Carcinogenicity:** NTP? No IARC Monographs? No OSHA Regulated? No

### Section 12. Ecological Information

**12.1 Toxicity:** Avoid release into the environment.  
    Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
    Runoff from fire control or dilution water may cause pollution.  
**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** No data available.

assessment:

### Section 13. Disposal Considerations

**13.1 Waste Disposal Method:** Dispose in accordance with local, state, and federal regulations.

### Section 14. Transport Information

#### 14.1 LAND TRANSPORT (US DOT):

**DOT Proper Shipping Name:** Toxic solid, organic, n.o.s. (Warfarin)  
**DOT Hazard Class:** 6.1 POISON  
**UN/NA Number:** 2811 **Packing Group:** I



#### 14.1 LAND TRANSPORT (European ADR/RID):

**ADR/RID Shipping Name:** Toxic solid, organic, n.o.s. (Warfarin)  
**UN Number:** 2811 **Packing Group:** I  
**Hazard Class:** 6.1 - POISON

#### 14.3 AIR TRANSPORT (ICAO/IATA):

**ICAO/IATA Shipping Name:** Toxic solid, organic, n.o.s. (Warfarin)  
**UN Number:** 2811 **Packing Group:** I  
**Hazard Class:** 6.1 - POISON **IATA Classification:** 6.1

**Additional Transport Information:** Transport in accordance with local, state, and federal regulations.  
When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10.  
Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.

### Section 15. Regulatory Information

#### EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

| CAS #     | Hazardous Components (Chemical Name)                | S. 302 (EHS) | S. 304 RQ | S. 313 (TRI) |
|-----------|---|--------------|-----------|--------------|
| 5543-58-8 | (R)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone | No           | No        | No           |

| CAS #     | Hazardous Components (Chemical Name)                | Other US EPA or State Lists                              |
|-----------|---|--|
| 5543-58-8 | (R)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone | CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No |

#### European Community Hazard Symbol codes:



**T**

Reproductive Hazard: 1

#### European Community Risk and Safety Phrases:

R48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed.  
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R61 May cause harm to the unborn child.  
S24/25 Avoid contact with skin and eyes.  
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever



# SAFETY DATA SHEET

## (+)-Warfarin

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Revision: 08/18/2014

Supersedes Revision: 07/06/2010

|     |   |
|-----|---|
|     | possible.)  |
| S53 | Avoid exposure - obtain special instructions before use.                              |
| S61 | Avoid release to the environment. Refer to special instructions / safety data sheets. |

**Regulatory Information Statement:** This SDS was prepared in accordance with Regulation (EC) No.1272/2008 and European Directive 67/548/EEC as amended.

### Section 16. Other Information

**Revision Date:** 08/18/2014

**Additional Information About This Product:** No data available.

**Company Policy or Disclaimer:** DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.