

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 2015/830 and US OSHA HCS 2015

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

- 1.1 Product Code:** 13531
Product Name: (-)-Warfarin
Synonyms: 4-hydroxy-3-[(1S)-3-oxo-1-phenylbutyl]-2H-1-benzopyran-2-one; (S)-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:**
Acute Toxicity: Inhalation, Category 1
Acute Toxicity: Oral, Category 2
Acute Toxicity: Skin, Category 1
Toxic To Reproduction, Category 1A
Specific Target Organ Toxicity (repeated exposure), Category 1
Aquatic Toxicity (Chronic), Category 2

2.2 Label Elements:



GHS Signal Word: **Danger**

GHS Hazard Phrases:

H300: Fatal if swallowed.
H310: Fatal in contact with skin.
H330: Fatal if inhaled.
H360: May damage fertility or the unborn child.
H372: Causes damage to organs {blood} through prolonged or repeated exposure.
H411: Toxic 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.
P260: Do not breathe {dust/fume/gas/mist/vapours/spray}.
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash {hands} thoroughly after handling.
P273: Avoid release to the environment.
P280: Wear {protective gloves/protective clothing/eye protection/face protection}.
P284: Wear respiratory protection {}.

GHS Response Phrases:

P301+310: IF SWALLOWED: P310: Immediately call a POISON CENTER or doctor/physician.

P302+352: IF ON SKIN: Wash with plenty of soap and water.

P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P308+313: IF exposed or concerned: Get medical attention/advice.

P314: Get medical attention/advice if you feel unwell.

P320: Specific treatment is urgent {see ... on this label}.

P330: Rinse mouth.

P361+364: Take off immediately all contaminated clothing and wash it before reuse.

P391: Collect spillage.

GHS Storage and Disposal Phrases:

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

2.3 Adverse Human Health Causes damage to organs {blood} through prolonged or repeated exposure.

Effects and Symptoms: Fatal if inhaled, swallowed, or in contact with skin.

Material may be irritating to the mucous membranes and upper respiratory tract.

May cause eye, skin, or respiratory system irritation.

May damage fertility or the unborn child.

Toxic to aquatic life with long lasting effects

To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
5543-57-7 DJ3100235	(S)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone	100.0 %	226-907-3 607-056-00-0	Toxic Repro. 1A: H360D Acute Tox.(I) 1: H330 Acute Tox.(D) 1: H310 Acute Tox.(O) 2: H300 STOT (RE) 1: H372 Aquatic (C) 2: H411

Section 4. First Aid Measures

4.1 Description of First Aid

Measures:

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.

Section 5. Fire Fighting Measures

- 5.1 Suitable Extinguishing Media:** Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
Media: Use water spray to cool fire-exposed containers.
Unsuitable Extinguishing Media: A solid water stream may be inefficient.
- 5.2 Flammable Properties and Hazards:** No data available.
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, Protective Equipment and Emergency Procedures:** Avoid raising and breathing dust, and provide adequate ventilation.
As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
- 6.2 Environmental Precautions:** Take steps to avoid release into the environment, if safe to do so.
- 6.3 Methods and Material For Containment and Cleaning Up:** Contain spill and collect, as appropriate.
Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

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

Section 8. Exposure Controls/Personal Protection

- 8.1 Exposure Parameters:**
- 8.2 Exposure Controls:**
- 8.2.1 Engineering Controls (Ventilation etc.):** Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne 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 (Specify Type):** NIOSH approved respirator, as conditions warrant.
- 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
pH:	No data.
Melting Point:	No data.
Boiling Point:	No data.
Flash Pt:	No data.
Evaporation Rate:	No data.
Flammability (solid, gas):	No data available.
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;
Octanol/Water Partition Coefficient:	No data.
Autoignition Pt:	No data.
Decomposition Temperature:	No data.
Viscosity:	No data.

9.2 Other Information

Percent Volatile:	No data.
Molecular Formula & Weight:	C ₁₉ H ₁₆ O ₄ 308.3

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.
- Chronic Toxicological Effects:** (-)-Warfarin - Toxicity Data: Oral TDLO (mouse): 2.25 mg/kg/3D (intermittent);
- (-)-Warfarin - Investigated as a drug.
- Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here.
- See actual entry in RTECS for complete information.
- (-)-Warfarin RTECS: DJ3100235

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
5543-57-7	(S)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyrone	n.a.	n.a.	n.a.	n.a.

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 assessment:** No data available.
- 12.6 Other adverse effects:** No data available.

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: UN2811 **Packing Group:** III



14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Toxic solid, organic, n.o.s. ((-)-Warfarin)

UN Number: 2811 **Packing Group:** III

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:** III

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.



SAFETY DATA SHEET

(-)-Warfarin

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Revision: 11/11/2018

Supersedes Revision: 08/18/2014

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)
5543-57-7	(S)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyr one	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
5543-57-7	(S)-4-Hydroxy-3-(3-oxo-1-phenylbutyl)-2-benzopyr one	CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No

Regulatory Information This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC)
Statement: No.1272/2008.

Section 16. Other Information

Revision Date: 11/11/2018

Additional Information About No data available.

This Product:

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.