



Workplace Material Safety Data Sheet



Canadian Classifications			
WHMIS	Apotex Haz. Class	Protective Clothing	TDG Air/Road/Rail
	3		
Covered by Food & Drug Act and therefore not regulated under WHMIS			

Section 1. Product Identification and Uses

Common/Trade name	Warfarin sodium	CI#	WARFARINSO5610
Synonyms	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, sodium salt; 3-(alpha-Acetylbenzyl)-4-hydroxy-coumarin sodium salt; Athrombin; Coumadin sodium; Coumafene sodium; Marevan; Panwarfin; Prothromadin; Ratsul soluble; Sodium coumadin; Sodium warfarin; Sodium, ((3-(alpha-acetylbenzyl)-2-oxo-2H-1-benzopyran-4-y Tintorane; Varfine; Waran; Warcoumin; Warfarin sodium; Warfarin, sodium deriv.; Warfarin, sodium salt; Warfilone; Zoocoumarin sodium salt	DSL#	On the DSL list.
Chemical name	Coumarin, 3-(alpha-acetylbenzyl)-4-hydroxy-, sodium salt	CAS#	129-06-6
Chemical formula	C ₁₉ H ₁₅ NaO ₄	Code	5610
Chemical family	Coumarin derivative	Molecular weight	330.33 g/mole
Supplier	Apotex Pharmachem Inc. Station Main, P.O. Box 1976, Brantford, Ontario N3T 5W5 Tel#: (519) 756-8942	Chemical structure	
Material uses	Pharmaceutical active ingredient. Therapeutic category: Anticoagulant	Manufacturer	Not available
Emergency phone	(416)-749-9300 ext. 5555 For general information call ext. 8483 (8 AM-4 PM)	DIN	Not applicable

Section 2. Hazards Identification

Potential Acute Health Effects	Very toxic if swallowed. Possible eye, skin, gastrointestinal and/or respiratory tract irritation.
Potential Chronic Health Effects	Possible hypersensitization and cumulative anticoagulant effect. Reproductive hazard.
WHMIS	WHMIS CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
Remark	Covered by Food & Drug Act and therefore not regulated under WHMIS

Section 3. First Aid Measures

Eye contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Take care not to rinse contaminated water into the non-affected eye. Always seek medical attention for accidents involving the eyes.
Skin contact	Flush the contact area with lukewarm running water for at least 15 minutes. Seek medical attention if irritation persists.
Hazardous skin contact	If contamination is extensive, remove clothing under running water. Discard or decontaminate clothing before reuse. Unless contact has been slight, seek medical attention.
Slight inhalation	Allow the victim to rest in a well ventilated area. Seek medical attention, if irritation persists
Hazardous inhalation	Take proper precautions to ensure your own safety before attempting rescue. Remove source of contamination or move victim to fresh air. If breathing has stopped, trained personnel should begin artificial respiration (use protective mask with one-way valve), or if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Seek medical attention.
Slight ingestion	Flush out mouth with water. Seek medical attention if irritation persists.
Hazardous ingestion	Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Rinse mouth thoroughly with water. If breathing has stopped, trained personnel should begin artificial respiration (use protective mask with one-way valve), or if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Seek medical attention. Treatment of overdose should be symptomatic and supportive and may include the following: 1. Ingestion of large amounts may require gastrointestinal decontamination. Administer charcoal as a slurry. 2. If a large or chronic ingestion is suspected, or PT/INR are elevated, then vitamin K1 (phytonadione) may be given. Vitamin K1 may be administered orally in the absence of vomiting. With severe toxicity, parenteral dosing may be necessary. 3. For patients presently on anticoagulants, AVOID induced vomiting and lavage due to possible trauma and subsequent bleeding. Get prothrombin time or INR immediately in patients that require anticoagulation. 4. In patients with serious bleeding and coagulopathy, treat with fresh frozen plasma, parenteral vitamin K1, and packed red blood cells, as needed. Commercial Factor IX complex may also be given. (Meditext 2006 and PDR 2006)

Section 4. Hazardous Ingredients

Name	CAS #	% (w/w)
Warfarin sodium	129-06-6	100
Toxicity values of the hazardous ingredients		
Refer to Sec. 11.		
TLV	Warfarin TWA: 0.1 (mg/m ³) from Ont. Reg. 833/00 IDLH concentration: 100 mg/m ³	

Section 5. Fire Fighting Measures

The product is:	Combustible.
Autoignition temperature	Not available.
Fire degradation products	These products are carbon oxides (CO, CO ₂). Some metallic oxides.
Flash points	Not applicable
Flammable limits	Not available.
Fire extinguishing procedures	Extinguisher media: water spray, dry chemical, carbon dioxide or foam as appropriate for surrounding fire and materials. Special fire fighting procedures: As with all fires, evacuate personnel to safe area. Firefighters should use self-contained breathing equipment and protective clothing.
Flammability	Emits toxic fumes under fire conditions.
	Remark No additional remark.
Risks of explosion	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Fine airborne dust can be ignited by static discharge.

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Remark

No additional remark.

Section 6. Accidental Release Measures

Small spill and leak

Vacuum or sweep up spillage. Avoid dust. Place spillage in appropriate labeled hazardous pharmaceutical solid waste class 261A container for disposal. Wash contaminated clothing before reuse. Ventilate area and wash spill site. Follow appropriate Safe Work Practice.

Large spill and leak

Use a shovel to put the material into appropriate labeled hazardous pharmaceutical solid waste class 261A container for disposal. Finish cleaning by spreading water on the contaminated surface. Follow appropriate Safe Work Practices.

Protective Clothing Pictograms in case of large spill and/or high exposure levels

Protective clothing in case of large spill

Full environmental suit with hood. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.



Section 7. Handling and Storage

Precautions

Use with adequate dust control. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with eyes and skin. Avoid breathing dust. Wash thoroughly after handling. Protect from light. Pregnant women shall avoid exposure to this product

Storage

Store at room temperature (15 to 30°C) in a dry, cool, and well ventilated area. Store in labelled containers. Keep tightly closed when not in use and when empty. Protect from damage. Protect from light.

Section 8. Exposure Controls/Personal Protection

Engineering Controls

Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations. Engineering methods to control hazardous conditions are preferred. Methods include mechanical (local exhaust) ventilation, process or personnel enclosure and control of process conditions. Administrative controls and personal protective equipment may also be required. Use local exhaust ventilation, and process enclosure if necessary, to control airborne dust or mist. Use a corrosion-resistant ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust system.

Personal Protection

Splash goggles. Full environmental suit with hood. Powered Air Purifying Respirator (PAPR) with combination particulate/organic vapour cartridge or Supplied Air Respirator (SAR). Rubber gloves (impervious). Approved engineering controls (i.e. containment hood, laminar flow hood).

Protective Clothing (Pictograms)



PERSONAL PROTECTIVE EQUIPMENT:

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment, including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire. If respiratory protection is required, institute a complete respiratory protection program, including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94, "Selection, Care, and Use of Respirators".

RESPIRATORY PROTECTION GUIDELINES:

Where barrier technology or a high degree of process containment exists, respiratory protection may not be required.

In the absence of barrier technology or high degree of process containment, a Powered Air Purifying Respirator (PAPR) with particulate cartridge P100 (HEPA) and helmet/hood or Supplied Air Respirator (SAR) is recommended.

The specific respirator selected must be based on contamination levels found in the work place, the specific operation and must not exceed the working limits of the respirator.

When performing cleaning activities refer to appropriate cleaning solution MSDS.

NOTE: Barrier technology utilizes physical containment facilities and methods to prevent human contact with a chemical or biological material with hazardous properties. Examples include glove boxes, flexible isolators, robotics or remote operation.

EYE/FACE PROTECTION: Safety goggles.
 SKIN PROTECTION:
 Impervious gloves (eg. natural or butyl rubber, nitrile, neoprene or PVC). Apotex standards require that all latex gloves should be medical grade hypoallergenic gloves. For those who have Type I hypersensitive reaction to latex, nitrile gloves are recommended. Hooded full impervious suit and boots (eg. Shield 2 or Tyvek brands and/or equivalent resistant protective clothing). Have a safety shower/eye-wash fountain readily available in the immediate work area.
 RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING:
 Guidelines : GOOD: Natural, butyl or styrene-butadiene rubber (SBR), neoprene, nitrile, polyvinyl chloride (PVC), polyurethane, nitrile+PVC, neoprene+SBR, neoprene+natural rubber, SBR/neoprene NOTE: Resistance of specific materials can vary from product to product. Evaluate resistance under conditions of use and maintain clothing carefully.
 EXPOSURE CONTROLS/PERSONAL PROTECTION COMMENTS:
 Remove contaminated clothing promptly. Launder before rewearing. Inform laundry personnel of contaminant's hazards. Do not eat, drink or smoke in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping.

Exposure Limits

Warfarin

TWA: 0.1 (mg/m³) from Ont. Reg. 833/00
 IDLH concentration: 100 mg/m³

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid. (Crystals.)	Odor	Odorless
pH	Not available.	Taste	Slightly bitter.
Odor threshold	Not applicable	Color	White.
Volatility	Not available.		
Melting point/Freezing point	157-167°C		
Boiling point	Not applicable		
Specific gravity	Not available.		
Vapor density	Not applicable		
Vapor pressure	Not available.		
Partition Coefficient:	Not available.		
Ionicity (surface active agent)	Not available.		
Critical temperature	Not available.		
Instability temperature	Not available.		
Conditions of instability	No additional remark.		
Dispersion properties	See solubility.		
Evaporation rate	Not available.		
Solubility	Very soluble in water; freely soluble in alcohol; very slightly soluble in chloroform, ether.		

Section 10. Stability and Reactivity

Stability	The product is stable.
Hazardous decomp. products	Toxic fumes of: carbon monoxide, carbon dioxide.
Degradability	Not available.
Corrosivity	Not available.
	Remark
	No additional remark.

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Reactivity/Incompatibility Strong oxidizers, strong acids, strong bases, acid chlorides, acid anhydrides.
Discoloured by light.

Remark

Not available.

Section 11. Toxicological Information

Routes of entry Eye contact. Ingestion. Inhalation. Skin contact.

Toxicity data RTECS#: GN4725000
TDLo: 300 µg/kg/2Days (oral-woman)
LD50: 8700 µg/kg (oral-rat)
LD50: 374 mg/kg (oral-mouse)

Remark

No additional remark.

Long-term effects Possible hypersensitization and cumulative anticoagulant effect.
Target organs: Blood, cardiovascular system.
Carcinogenicity: This product is not listed in IARC Monographs, the NTP Annual Reports or the current ACGIH TLVs as a carcinogen or potential carcinogen. It is not regulated by OSHA as a carcinogen.
Reproductive Toxicity: Reproductive hazard (California prop. 65).
Teratogenicity: Pregnancy Category: X. Birth defects, mental retardation, blindness, and other serious adverse effects on fetal development have been reported in infants born to mothers taking coumarin anticoagulants during pregnancy, especially during the first trimester. Also, fetal or neonatal hemorrhage, stillbirth, miscarriage, low birth weight, growth retardation, and increased risk of maternal hemorrhage during the second and third trimesters have been reported.
Mutagenicity: Mutagenicity studies have not been performed with warfarin sodium.

Remark

Medical conditions aggravated by exposure: Hypersensitivity to material; potential or active bleeding or hemorrhage; miscarriage (including recent or threatened); aneurysm; surgery (recent or contemplated); recent childbirth; high blood pressure; gastrointestinal disease; heart problems; ulcers of the GI tract, respiratory tract, or urinary tract; recent bodily trauma; vitamin K deficiency; severe diabetes; and kidney or liver function impairment.

Short-term effects and Signs & Symptoms of overexposure Possible eye, skin, gastrointestinal and/or respiratory tract irritation.
The usual oral adult dose of warfarin (as warfarin sodium) is 2 to 10 mg per day.
Adverse effects may include fever, chills, cough, lower back or side pain, difficult or decreased urination, gas, cold intolerance, purple discoloration of toes or feet, diarrhea, loss of appetite, nausea, vomiting, stomach pain, loss of scalp hair, and internal bleeding or hemorrhage. Possible allergic reaction to material if inhaled, ingested or in contact with skin.
Overdose may cause internal bleeding or hemorrhage. Signs of internal bleeding may include any unusual bleeding or bruising; pinpoint red spots on skin; abdominal or stomach pain; diarrhea; dizziness; fainting; headache; loss of appetite; nausea; vomiting; weakness; nervousness; joint pain, stiffness, or swelling; black, tarry stools; vomit that looks like coffee grounds; constipation; confusion; paralysis; blurred vision; chest pain; shortness of breath; and back pain.

Remark

Adverse affects based on clinical studies.

Section 12. Ecological Information

Ecological Information Environmental Fate/Exposure Summary:
Warfarin's production may result in its release to the environment through various waste streams; its use as a rodenticide for rats and mice will result in its direct release to the environment. It is also used as a blood anticoagulant. If released to air, a vapor pressure of 1.16×10^{-7} mm Hg at 21.5 deg C indicates warfarin will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 2.4 hours. Particulate-phase warfarin will be removed from the atmosphere by wet and dry deposition. If released to soil, warfarin is expected to have low soil mobility based on estimated Koc values of 701 and 918. Volatilization from moist soil surfaces is not expected to be an important fate process given an estimated Henry's Law constant of 2.8×10^{-9} atm-cu m/mole. Warfarin (sodium salt) was considered 'not readily biodegradable' with only a 13% degradation (COD reduction) over a 28-day incubation period using activated sludge. If released into water, warfarin is expected to adsorb to suspended solids and sediment based upon the Koc. Volatilization from water surfaces is not expected to be an important fate process based upon this compound's estimated Henry's Law constant. An estimated BCF of 24 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis occurs very slowly in water with a half-life (pH 7, 25°C) of 16 years. Occupational exposure to warfarin may occur through inhalation of dust and dermal contact with this compound at workplaces where warfarin is produced or used. The general population may be exposed to warfarin via medical administration of this compound for the treatment of certain blood conditions.

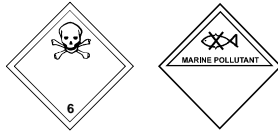
Section 13. Disposal Considerations

Waste Disposal

For internal Apotex waste disposal: Collect in sealed containers and place in appropriate labeled pharmaceutical solid waste class 261A.
 For external waste disposal: Follow all appropriate safe work procedures and federal, provincial and local regulations for disposal. Use only licensed disposal and waste hauling companies.
 NOTE: Wastewater shall not be discharged into the sewer system if concentration exceeds 0.3%.

Section 14. Transport Information TDG, IATA, IMDG

CLASS 6.1: Toxic material.



UN

Shipping name: Toxic solids, n.o.s. (Warfarin sodium)
 UN: 2811 PG: II

Special Provisions for Transport

The shipping document must indicate "Marine Pollutant", if transported by ship.

Section 15. Other Regulatory Information and Pictograms

USA Classifications

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD INDEX

NFPA-HEALTH-blue :3-Extremely hazardous to health.
 NFPA-FLAMMABILITY-red :1-Materials that must be preheated before ignition can occur.
 NFPA-REACTIVITY-yellow :0-Normally stable.

National Fire Protection Association (U.S.A.)

Health



Fire Hazard

Reactivity

Specific Hazard

Hazardous Material Information System (U.S.A.)

Health Hazard	* 3
Fire Hazard	1
Reactivity	0
Personal Protection	X

* - Chronic hazard indicator
 X - See Section 8

HCS (Hazardous Communication System) (OHSA, U.S.A.)

HCS CLASS: Highly toxic.

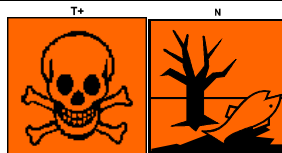
DOT (Department of Transportation) (U.S.A) (Pictograms)

DOT CLASS 6.1: Poisonous material.



European Classifications

DSCL (Dangerous Substances Classifications) (Europe) (Pictograms)



DSCL Risk (R) and Safety (S) Phrases

R28- Very toxic if swallowed.
 R61- May cause harm to the unborn child
 R62- Possible risk of impaired fertility (Apotex)
 R52/53 - Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment.
 R36/37/38- Irritating to eyes, respiratory system and skin.
 S45- In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)

ADR (European Agreement of Dangerous goods by Road) (Pictograms)

CLASS 6.1: Toxic substance.



Other Regulations

Not available.

Section 16. Other Information

References

The Merck Index, twelfth edition
HSBD & RTECS Database
PDR Electronic Library

MSDS:

United States Pharmacopeial Convention, Inc.
12601 Twinbrook Parkway
Rockville, MD 20852 USA
(301) 881-0666

Validation date:
(year.month)

January 2, 2007

Other Special Considerations

SAMPLING AND ANALYSIS :

Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method.

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