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PRODUCT SAFETY SUMMARY:
4-HYDROXYCOUMARIN

This Product Safety Summary is intended to provide a general description of certain Huntsman chemical substances and products containing the chemical substance(s). The information in this Summary is not intended to replace the information included on the Safety Data Sheet (SDS), Product Safety Label, and other safe use and handling literature for the chemical substance(s).

Chemical Identity:

Name	Other Identifiers
4-hydroxycoumarin	4-Hydroxy-1-benzopyran-2-one 4-Hydroxy-2H-chromen-2-one 4-Coumarinol

General Product Overview:

4-hydroxycoumarin is a reactive intermediate or component with widespread sector of end use of article (i.e. manufacture of fine chemicals, scavenger, laboratory agent). Manufactured or used by Huntsman for industrial downstream users or professionals.

Applications and Uses:

4-hydroxycoumarin is used at industrial site or in flexible foams or in rigid foams. Manufactured or formulated in the chemical industry in closed batch processes by mixing or blending, without or with occasional controlled exposure. Use at industrial site in “as such” form or leading to inclusion into/onto article.

Physical and Chemical Properties:

4-hydroxycoumarin is off-white to pale yellowish (beige) powder. Certain physical/chemical properties specific to 4-hydroxycoumarin are summarized below:

Physical/Chemical Property	Result
Molecular Weight	162.14 g/mol
Melting point	No melting point detected as decomposition started at approx. 208 °C
Boiling point	No boiling point detected as decomposition started at approx. 208 °C

Physical/Chemical Property	Result
Density	1.425 x 10^3 kg/m^3 at 20 °C
Partition coefficient (Log Kow)	2.31 at 21.2 °C
Vapour Pressure	2.0 x 10^{-3} Pa at 25 °C
Water Solubility	0.223 g/L at 20°C
Flammability	Not classified
Explosiveness	Non-explosive
Oxidizing property	Non-oxidizing

Additional physical and chemical property information is available on the product Safety Data Sheet (SDS), which can be requested at SDS@huntsman.com.

Human Health Information:

The probability of experiencing health effects associated with exposure to 4-hydroxycoumarin is controlled, provided the recommendations stated in the Safety Data Sheet are enforced. Adverse health effects are subject to dose level, route, and duration of exposure.

Different regulatory classification criteria apply in different geographic regions. These different criteria may result in different human health regulatory classifications for the same product in different geographic regions. Specific regulatory classification information is contained in the Safety Data Sheet for each product in use in a specific geographic region. The acute and chronic health effects information set forth below is based on GHS criteria.

All instructions found on the packaging should be followed. 4-hydroxycoumarin is safe when used appropriately. The uses identified for the substance have been assessed as safe under several regulatory programs.

Summary – Human Toxicological data:

Effect Assessment	Result
Acute Toxicity	LD_{50}> 2000 mg/kg. Cat 5
Skin Irritation	Non-corrosive to the skin
Eye Irritation	No prediction can be made
Sensitization	no adverse effect observed (not sensitising)
Genotoxicity	Non-mutagenic

4-hydroxycoumarin is classified under the UN GHS classification criteria. More information can be obtained in the Safety Data Sheet.

Acute Health Effects:

Likelihood/frequency of oral, skin and inhalation exposures are low, if used under strictly recommended conditions and closed process. The substance is considered to have low volatility due to its low vapour pressure which limits inhalation exposure. The medium water solubility (0.223 g/L) indicates that the possibility of the substance getting absorbed dermally will be moderate.

Acute oral toxicity of 4-hydroxycoumarin is low. The oral LD_{50} for rats was determined to be > 2000 mg/kg. Based on the LD_{50} and the criteria of the CLP Regulation, the test item is not classified for acute oral toxicity.

4-hydroxycoumarin does not indicate skin irritation and is considered to be non-corrosive. 4-hydroxycoumarin does cause skin sensitization. Exposure may cause allergic skin reactions in some individuals.

According to UN GHS Classification for the test item 4-Hydroxycoumarin, no prediction of eye irritation can be made.

Summary - Ecotoxicological Data:

Effect Assessment	Result
Short term toxicity to aquatic invertebrates	EC_{50} value > 100 mg/L
Toxicity to aquatic microorganisms	ErC_{50} for freshwater algae = 47 mg/L ErC_{10} for freshwater algae = 37 mg/L NOErC for freshwater algae = 32 mg/L

4-hydroxycoumarin was found to pose no hazard to aquatic species including Daphnia and the green alga *Raphidocelis subcapitata*.

Summary - Environmental fate and pathways:

Effect Assessment	Result
Ready biodegradability	Not readily biodegradable

4-hydroxycoumarin is not considered to be readily biodegradable.

The closed process in which the product is used does not lead to direct emissions to soil and air. Procedural and/or control technologies are used to minimize emissions and potential exposure during cleaning and maintenance activities.

Occupational (workers) Exposure:

At Huntsman, 4-hydroxycoumarin is manufactured in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. During normal operating conditions, occupational exposure to 4-hydroxycoumarin is not expected in the manufacturing process. Procedural and/or control technologies are used to minimize exposure during sampling, cleaning, maintenance, or in more open handling systems. Appropriate engineering controls (such as ventilation) and personal protective equipment should be used in accordance with the exposure guidelines and workplace practices identified in the Safety Data Sheet.
Workers working with 4-hydroxycoumarin in industrial operations could be exposed during maintenance, sampling, testing, or other procedures. Workplace exposure is controlled and minimized by use of proper occupational handling procedures and personal protection and safety equipment. Potential routes of worker exposure to 4-hydroxycoumarin are through dermal contact and to a minor extent, through inhalation in a 4-hydroxycoumarin manufacturing facility or in the various industrial facilities that use 4-hydroxycoumarin. Ingestion is not an anticipated route of exposure. Worker exposure can occur in industrial facilities where the substance is produced or formulated into end-use products or used as textile dyes. Within this assessment, both industrial workers and trained professionals are evaluated. The exposure has been assessed as safe if the substance is used as directed on the label, avoiding splashes onto skin and into eyes. Huntsman follows and recommends customers to follow workplace exposure guidelines through a variety of industrial hygiene and ventilation measures. The substance has been assessed as safe for professional and industrial use, when the provisions identified in the SDS are followed carefully.

Likelihood/frequency of skin and inhalation exposure is low, due to its usage under strictly controlled conditions and closed process. Also, no combined exposure of workers is expected as there are no consumer uses for 4-hydroxycoumarin, while exposure during service life is negligible.

Consumer Exposure:

Huntsman does not market 4-hydroxycoumarin directly for consumer use.

There are no consumer uses for 4-hydroxycoumarin, although some dermal exposure from the service life is expected. A very low residual release during the service life of articles. Hence, oral and inhalation exposure are considered not relevant, while dermal exposure can be considered as negligible. Further, it is recommended to keep 4-hydroxycoumarin away from the reach of children and avoid direct contact.

Environmental exposure:

4-hydroxycoumarin is not readily biodegradable and not harmful to aquatic organisms. Conclusively, all identified uses are safe for the environment based on the scientific facts and when carried out in compliance with recommended risk management measures and applicable regulations.

Regulatory Information/Classification and Labeling:

Regulations exist that govern manufacture, sales, transportation, use and disposal of 4-hydroxycoumarin. These regulations may vary by city, state, country or geographic region. Information can be found by consulting the relevant SDS.

Under the Globally Harmonized System (GHS) for Hazard Communication, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the Safety Data Sheets. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labeling. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet.

Labeling according to GHS:

Hazard statements	According to the notifications provided by companies to ECHA in REACH registrations no hazards have been classified.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labeling. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet.

References:

- Information on registered substance (ECHA): https://echa.europa.eu/registration-dossier/-/registered-dossier/32315.

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Additional Information:

Information on registered substances is available on the European Chemicals Agency (ECHA) website at https://echa.europa.eu.

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THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity, and behavior should be determined by the user and made known to handlers, processors, and end users.

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