

4/24/07



SIGMA-ALDRICH

Material Safety Data Sheet

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Section 1 - Product and Company Information

Product Name	Retinoic acid, minimum 98% HPLC		
Product Number	R2625		
Brand	Sigma Chemical		
Company	Sigma-Aldrich		
Street Address	3050 Spruce Street		
City, State, Zip, Country	SAINT LOUIS, MO 63103 US		
Technical Phone:	800-325-5832	Emergency Phone:	314-776-6555
Fax:	800-325-5052		

Section 2 - Composition/Information on Ingredient

<u>Substance Name</u>	<u>CAS #</u>	<u>SARA 313</u>	<u>EC no</u>	<u>Annex I Index Number</u>
ALL TRANS-RETINOIC ACID	302-79-4	No	206-129-0	

Formula	C20H28O2
Synonyms	Aberel, Airof, GN 100335, Aknoten, Cordes vas, Dermairol, 3,7-Dimethyl-9-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2,4,6,8-nonatetraenoic acid, Efederm, Epi-aberel, Eudyna, 2,4,6,8-Nonatetraenoic acid, 3,7-dimethyl-9-(2,6,6-trimethyl-1-cyclohexen-1-yl)-, NSC-122758, beta-RA, Retin-A, Retinoic acid, all-(E)-Retinoic acid, beta-Retinoic acid, trans-Retinoic acid, all-trans-Retinoic acid, all-trans-beta-Retinoic acid, beta-all-trans-Retinoic acid, Ro 1-5488, Tretin M, Tretinoin, Vitamin A acid, Vitamin A acid, all-trans-, Vitamin A1 acid, all-trans-

Section 3 - Hazards Identification

Emergency Overview
Harmful.
Harmful if swallowed.
Calif. Prop. 65 reproductive hazard.

HMIS Rating
Health: 1* Flammability: 0 Reactivity: 1

NFPA Rating
Health: 1 Flammability: 0 Reactivity: 1

*additional chronic hazards present.
For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Eye Exposure
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Autoignition Temp: N/A

Extinguishing Media
Suitable
Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting
Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)
Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Precaution(s)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure
Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage
Suitable
Keep tightly closed. Store at -20°C

Special Requirements
Light sensitive.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment
Respiratory
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.

Hand
Compatible chemical-resistant gloves.

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Eye
Chemical safety goggles.

General Hygiene Measures
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance
Physical State
Solid

Molecular Weight: 300.45 AMU

pH N/A
BP/BP Range N/A
MP/MP Range 182 °C
Freezing Point N/A
Vapor Pressure N/A
Vapor Density N/A
Saturated Vapor Conc. N/A
SG/Density N/A
Bulk Density N/A
Odor Threshold N/A
Volatile% N/A
VOC Content N/A
Water Content N/A
Solvent Content N/A
Evaporation Rate N/A
Viscosity N/A
Partition Coefficient Log Kow: 6.7
Decomposition Temp. N/A
Flash Point °F N/A
Flash Point °C N/A

Explosion Limits N/A

Flammability N/A
Autoignition Temp N/A
Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

Stability
Stable.
Stable.
Conditions to Avoid
Light.
Materials to Avoid
Oxidizing agents.

Hazardous Decomposition Products
Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure
Skin Contact
May cause skin irritation.
Skin Absorption
May be harmful if absorbed through the skin.
Eye Contact
May cause eye irritation.
Inhalation
May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion
Harmful if swallowed.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: VH6475000

Toxicity Data

Oral - Mouse: 5,500 mg/kg 30% SOL(LD50)
Skin - Rabbit: > 2,500 mg/kg 50% SOLUTION(LD50)
Skin - Rat: > 2,000 mg/kg(LD50)
Oral - Rat: 2000 mg/kg (LD50)
Intraperitoneal - Rat: 96 MG/KG (LD50)
Remarks: Spinal Cord:Other degenerative changes.
Behavioral:Ataxia.
Blood:Normocytic anemia.
Subcutaneous - Rat: 53 MG/KG (LD50)
Remarks: Behavioral:Hallucinations, distorted perceptions.
Lungs, Thorax, or Respiration:Respiratory depression.
Nutritional and Gross Metabolic:Weight loss or decreased weight gain.
Intravenous - Rat: 75 MG/KG (LD50)
Oral - Mouse: 1100 mg/kg (LD50)
Intraperitoneal - Mouse: 208 MG/KG (LD50)
Subcutaneous - Mouse: 253 MG/KG (LD50)
Remarks: Behavioral:Sleep.
Lungs, Thorax, or Respiration:Respiratory depression.
Nutritional and Gross Metabolic:Weight loss or decreased weight gain.
Intravenous - Mouse: 92 MG/KG (LD50)

Irritation Data

Eyes -
Skin - Rabbit: 50 %
Remarks: No irritation effect
Eyes - Rabbit:
Remarks: No irritation effect
Skin - Human: 525 mg 21D I
Remarks: Mild irritation effect

Chronic Exposure - Carcinogen

Mouse - Skin: 8400 MG/KG 30W I
 Result: Tumorigenic: Neoplastic by RTECS criteria. Skin and Appendages: Skin: After systemic exposure: Photosensitivity.
 Skin and Appendages: Other: Tumors.

Chronic Exposure - Teratogen

Species Dose Route of Application Exposure Time
 Result: All-trans-retinoic acid is an active derivative of Vitamin A, a vitamin essential to human nutrition. Scientific studies indicate dermal application of a 5ppm medical ointment of all-trans-retinoic acid for prolonged time periods during pregnancy may cause fetal teratogenicity. Exposures in laboratory environments should be minimized by following standard laboratory safety procedures. See your institutional health and safety professional for specific guidance.

Rat 15 MG/KG Oral (14-16D PREG)
 Result: Specific Developmental Abnormalities: Musculoskeletal system.

Rat 120 MG/KG Oral (11D PREG)
 Result: Specific Developmental Abnormalities: Eye, ear.
 Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.

Rat 18 MG/KG Oral (8-10D PREG)
 Result: Specific Developmental Abnormalities: Eye, ear.

Rat 55 MG/KG Skin (6-16D PREG)
 Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Rat 40 MG/KG Intraperitoneal (8D PREG)
 Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Mouse 15 MG/KG Oral (8D PREG)
 Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.
 Specific Developmental Abnormalities: Urogenital system.

Mouse 15 MG/KG Oral (8D PREG)
 Result: Specific Developmental Abnormalities: Central nervous system.
 Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.

Mouse 40 MG/KG Oral (8D PREG)
 Result: Specific Developmental Abnormalities: Eye, ear.
 Specific Developmental Abnormalities: Gastrointestinal system.

Mouse 100 MG/KG Oral (10D PREG)
 Result: Effects on Embryo or Fetus: Other effects to embryo.

Mouse 20 MG/KG Intraperitoneal (8D PREG)
 Result: Specific Developmental Abnormalities: Central nervous system.

Mouse 16 MG/KG Intraperitoneal (11D PREG)
 Result: Specific Developmental Abnormalities: Musculoskeletal system.

Mouse 500 MG/KG Intraperitoneal (8D PREG)
 Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Mouse 20 MG/KG Unreported (11D PREG)
 Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.

Mouse 40 MG/KG Unreported (11D PREG)
 Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Mouse 40 MG/KG Unreported (8D PREG)
 Result: Specific Developmental Abnormalities: Central nervous system.

Monkey 188 MG/KG Oral (20-44D PREG)
 Result: Specific Developmental Abnormalities: Eye, ear.
 Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Monkey 250 MG/KG Oral (20-44D PREG)
 Result: Specific Developmental Abnormalities: Eye, ear.
 Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.

Monkey 250 MG/KG Oral (20-44D PREG)
 Result: Specific Developmental Abnormalities: Urogenital system.

Hamster 40 MG/KG Oral (7D PREG)
 Result: Effects on Embryo or Fetus: Fetal death.
 Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Hamster 12500 UG/KG Oral (8D PREG)

Result: Specific Developmental Abnormalities: Eye, ear.
 Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
 Specific Developmental Abnormalities: Musculoskeletal system.

Hamster 60 MG/KG Oral (8D PREG)

Result: Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material).

Hamster 25 MG/KG Oral (8D PREG)

Result: Specific Developmental Abnormalities: Central nervous system.
 Specific Developmental Abnormalities: Urogenital system.

Hamster 80 MG/KG Oral (8D PREG)

Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Chronic Exposure - Mutagen

<u>Species</u>	<u>Dose</u>	<u>Route</u>	<u>Cell Type</u>	<u>Mutation test</u>
Mouse		Intraperitoneal		Dominant lethal test
				Result: Negative.
Human	1 UMOL/L		leukocyte	DNA inhibition
Human	1 UMOL/L		leukocyte	Other mutation test systems
Human	1000 PPM	Skin		Other mutation test systems
Human	5 MG/L		fibroblast	Sister chromatid exchange
Rat	3 UMOL/L		mammary gland	DNA inhibition
Mouse	4 UMOL/KG	Skin		Unscheduled DNA synthesis
Mouse	10 UMOL/L		Embryo	Other mutation test systems
Mouse	1 UMOL/L		lymphocyte	DNA inhibition
Cattle, Horse	8 UMOL/L		lymphocyte	DNA inhibition

Chronic Exposure - Reproductive Hazard

<u>Species</u>	<u>Dose</u>	<u>Route of Application</u>	<u>Exposure Time</u>
Rat	15 MG/KG	Oral	(11-13D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetal death.
Rat	15 MG/KG	Oral	(9D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).
Rat	27500 UG/KG	Skin	(6-16D PREG)
			Result: Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.
Rat	20 MG/KG	Intraperitoneal	(8D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system.
Rat	15 MG/KG	Unreported	(11-13D PREG)
			Result: Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).
Rat	12 MG/KG	Unreported	(14-16D PREG)
			Result: Effects on Newborn: Behavioral.
Mouse	50 MG/KG	Oral	(9D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Eye, ear.
Mouse	100 MG/KG	Oral	(8D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.
Mouse	5 MG/KG	Intraperitoneal	(8D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Mouse	75 MG/KG	Intraperitoneal	(5D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Other effects to embryo.
Mouse	80 MG/KG	Unreported	(11D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Monkey	170 MG/KG	Oral	(10-24D PREG)
			Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Rabbit 6500 UG/KG Skin (7-19D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Effects on Fertility: Abortion. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).
Mammal 12500 UG/KG Intraperitoneal (9D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Section 12 - Ecological Information

Acute Ecotoxicity Tests

Test Type
LC50 Fish
Species
Brachydanio rerio
Time: Value:
96.0 h 4.64 mg/l

Elimination
Elimination: Classification
> 60 % Substantially biodegradable.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material.
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification
Symbol of Danger: Xn
Indication of Danger
Harmful.
Risk Statements R: 22
Harmful if swallowed.

US Classification and Label Text
Indication of Danger
Harmful.
Risk Statements
Harmful if swallowed.
US Statements
Calif. Prop. 65 reproductive hazard.

United States Regulatory Information
SARA Listed: No

TSCA Inventory Item: Yes

United States - State Regulatory Information
California Prop - 65
This product is or contains chemical(s) known to the state of California to cause developmental toxicity.

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.