Material Safety Data Sheet

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Version 1.2
According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

1 - Product and Company Information

Product Name	ALL TRANS-RETINOIC ACID
Product Number	R2625
Company	Sigma-Aldrich Pty, Ltd Unit 2, 14 Anella Avenue Castle Hill NSW 1765
Technical Phone #	+61 2 9841 0555
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2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
ALL TRANS-RETINOIC ACID	302-79-4	206-129-0	None

Formula	C20H28O2
Molecular Weight	300.45 AMU
Synonyms	Aberel * Airol * GN 100335 * Aknoten * Cordes vas * Dermairol * 3,7-Dimethyl-9-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2,4,6,8-nonatetraenoic acid * Effederm * 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-

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Harmful if swallowed.

4 - First Aid Measures

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

AFTER SKIN CONTACT
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.

Call a physician.

AFTER EYE CONTACT
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.

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

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

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

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES 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.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed.
Store at -20°C

SPECIAL REQUIREMENTS: Light sensitive.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance: Physical State: Solid

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	182 °C	
Flash Point	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	N/A	
SG/Density	N/A	
Partition Coefficient	Log Kow: 6.7	
Viscosity	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

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

11 - Toxicological Information

RTECS NUMBER: VH6475000

ACUTE TOXICITY
LD50
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
Remarks: Spinal Cord:Other degenerative changes.
Behavioral:Ataxia. Blood:Normocytic anemia.

LD50
Subcutaneous
Rat
53 MG/KG
Remarks: Behavioral:Hallucinations, distorted perceptions.
Lungs, Thorax, or Respiration:Respiratory depression.
Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

LD50
Intravenous
Rat
75 MG/KG

LD50
Oral
Mouse
1100 mg/kg

LD50
Intraperitoneal
Mouse
208 MG/KG

LD50
Subcutaneous
Mouse
253 MG/KG
Remarks: Behavioral:Sleep. Lungs, Thorax, or Respiration:Respiratory depression. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

LD50
Intravenous
Mouse
92 MG/KG

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

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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.

CHRONIC EXPOSURE - CARCINOGEN

Mouse
Route of Application: Skin
Exposure Time: 30W
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages:Skin: After systemic exposure: Photosensitivity. Skin and Appendages: Other: Tumors.

CHRONIC EXPOSURE - MUTAGEN
Species: Mouse
Route: Intraperitoneal
Mutation test: Dominant lethal test
Result: Negative.

Human
1 UMOL/L
Cell Type: leukocyte
DNA inhibition

Human
1 UMOL/L
Cell Type: leukocyte
Other mutation test systems

Human
1000 PPM
Skin
Other mutation test systems

Human
5 MG/L
Cell Type: fibroblast
Sister chromatid exchange

Rat
3 UMOL/L
Cell Type: mammary gland
DNA inhibition

Mouse
4 UMOL/KG
Skin

Unscheduled DNA synthesis

Mouse
10 UMOL/L
Cell Type: Embryo
Other mutation test systems

Mouse
1 UMOL/L
Cell Type: lymphocyte
DNA inhibition

Cattle, Horse
8 UMOL/L
Cell Type: lymphocyte
DNA inhibition

CHRONIC EXPOSURE - TERATOGEN
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.

Species: Rat
Dose: 15 MG/KG
Route of Application: Oral
Exposure Time: (14-16D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 120 MG/KG
Route of Application: Oral
Exposure Time: (11D PREG)
Result: Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 18 MG/KG
Route of Application: Oral
Exposure Time: (8-10D PREG)
Result: Specific Developmental Abnormalities: Eye, ear.

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

Species: Rat
Dose: 40 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse
Dose: 15 MG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Urogenital system.

Species: Mouse
Dose: 15 MG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 40 MG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Gastrointestinal system.

Species: Mouse
Dose: 100 MG/KG
Route of Application: Oral
Exposure Time: (10D PREG)
Result: Effects on Embryo or Fetus: Other effects to embryo.

Species: Mouse
Dose: 20 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Central nervous system.

Species: Mouse
Dose: 16 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (11D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 500 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Mouse
Dose: 20 MG/KG
Route of Application: Unreported
Exposure Time: (11D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse

Dose: 40 MG/KG
Route of Application: Unreported
Exposure Time: (11D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 40 MG/KG
Route of Application: Unreported
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Central nervous system.

Species: Monkey
Dose: 188 MG/KG
Route of Application: Oral
Exposure Time: (20-44D PREG)
Result: Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

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

Species: Monkey
Dose: 250 MG/KG
Route of Application: Oral
Exposure Time: (20-44D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Hamster
Dose: 40 MG/KG
Route of Application: Oral
Exposure Time: (7D PREG)
Result: Effects on Embryo or Fetus: Fetal death. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Hamster
Dose: 12500 UG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster
Dose: 60 MG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material).

Species: Hamster
Dose: 25 MG/KG
Route of Application: Oral

Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Urogenital system.

Species: Hamster
Dose: 80 MG/KG
Route of Application: Oral
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 15 MG/KG
Route of Application: Oral
Exposure Time: (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.

Species: Rat
Dose: 15 MG/KG
Route of Application: Oral
Exposure Time: (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).

Species: Rat
Dose: 27500 UG/KG
Route of Application: Skin
Exposure Time: (6-16D PREG)
Result: Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 20 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (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.

Species: Rat
Dose: 15 MG/KG
Route of Application: Unreported
Exposure Time: (11-13D PREG)
Result: Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

Species: Rat
Dose: 12 MG/KG
Route of Application: Unreported
Exposure Time: (14-16D PREG)
Result: Effects on Newborn: Behavioral.

Species: Mouse
Dose: 50 MG/KG
Route of Application: Oral

Exposure Time: (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.

Species: Mouse
Dose: 100 MG/KG
Route of Application: Oral
Exposure Time: (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.

Species: Mouse
Dose: 5 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (8D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Mouse
Dose: 75 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (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.

Species: Mouse
Dose: 80 MG/KG
Route of Application: Unreported
Exposure Time: (11D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Monkey
Dose: 170 MG/KG
Route of Application: Oral
Exposure Time: (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.

Species: Rabbit
Dose: 6500 UG/KG
Route of Application: Skin
Exposure Time: (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).

Species: Mammal
Dose: 12500 UG/KG
Route of Application: Intraperitoneal
Exposure Time: (9D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

12 - Ecological Information

ELIMINATION

Elimination: > 60 %
Classification: Substantially biodegradable.

ECOTOXICOLOGICAL EFFECTS
Test Type: LC50 Fish
Species: Brachydanio rerio
Time: 96 h
Value: 4.64 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL
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.

14 - Transport Information

RID/ADR
Non-hazardous for road transport.

IMDG
Non-hazardous for sea transport.

IATA
Non-hazardous for air transport.

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
INDICATION OF DANGER: Xn
Harmful.
R-PHRASES: 22
Harmful if swallowed.

16 - Other Information

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.

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