GPS Safety Summary

Retinol

Chemical Identity

Name: Retinol
CAS number: 68-26-8
Molecular formula: C\textsubscript{20}H\textsubscript{30}O

Structure

\[
\text{IUPAC name:} \quad (2E,4E,6E,8E)-3,7\text{-dimethyl-9-(2,6,6-trimethylcyclohexen-1-yl)nona-2,4,6,8-tetraen-1-ol}
\]
BASF brand names: Retinol

For synonyms see end of document

Product Uses

Retinol and its esters is used in nutrition products for the fortification of foods (e.g. flour, sugar, oil, milk). It is also an active ingredient in oral and topical formulations, e.g. tablets, eye drops, nasal oils, skin creams. Further applications of retinol include the use in animal nutrition and personal care products such as skin creams and nasal oils.

Benefits

Vitamin A and its esters is an essential micronutrient required by humans and animals for vision, growth differentiation and proliferation of a wide range of epithelial tissues, bone growth, reproduction, embryonic development and health maintenance.

The use as active ingredient ranges from the treatment of conjunctiva and defects of cornea, the use for regeneration of acute and chronically damaged nasal mucosa caused by abuse of decongestants, to supporting the therapy of neurodermitis, eczema and psoriasis as well as the treatment of vitamin A hypovitaminosis and its consequences like xerophthalmia, hyperkeratosis and night blindness.
Health Information

Human Health Safety Assessment

Note: The information contained in the table below may be useful to someone handling the concentrated substance such as a manufacturer or transporter. Consumers are not likely to come in contact with the concentrated substance. The data, while verifiable, are not intended to be comprehensive nor replace the data found in the (M)SDS.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>Of low toxicity after single ingestion.</td>
</tr>
<tr>
<td>Irritation</td>
<td>Skin and eye contact causes irritation.</td>
</tr>
<tr>
<td>Sensitization</td>
<td>Sensitization after skin contact possible.</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Not mutagenic in bacteria, in the majority of mammal cell culture tests and in tests with mammals. Based on available data not considered mutagenic.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Based on current knowledge not considered to be carcinogenic.</td>
</tr>
<tr>
<td>Toxicity after repeated exposure</td>
<td>Repeated exposure to large quantities may lead to hypervitaminosis A, affecting certain organs.</td>
</tr>
<tr>
<td>Toxicity for reproduction</td>
<td>May cause harm to the unborn child.</td>
</tr>
</tbody>
</table>

Environmental Information

Environmental Safety Assessment

Note: The information in this chapter is intended to provide brief and general information of this substance’s environmental impact. The results in the table below refer to testing performed with the concentrated substance. The data contained in this section explain the relative effect of the concentrated substance on the environment, as defined by certain tests.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Toxicity</td>
<td>May cause long lasting harmful effects to aquatic life.</td>
</tr>
<tr>
<td>Persistence and degradability</td>
<td>Biodegradable.</td>
</tr>
</tbody>
</table>
Bioaccumulation potential: Accumulation in organisms is possible.

Physical/Chemical Properties

Phys/Chem Safety Assessment

- Retinol is a crystalline solid which is insoluble in water. It is non flammable and possesses no explosive properties.

Note: The results in the table below refer to testing performed with the concentrated substance. It is not intended to be comprehensive or to replace information found in the (M)SDS.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Melting / freezing point</td>
<td>61 - 63°C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Substance decomposes before boiling.</td>
</tr>
<tr>
<td>Flash point</td>
<td>The substance is a solid.</td>
</tr>
<tr>
<td>Flammability</td>
<td>Non flammable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Non explosive</td>
</tr>
<tr>
<td>Self-ignition temperature</td>
<td>The substance is a solid with a melting point &lt; 160°C</td>
</tr>
</tbody>
</table>

Exposure Potential

- **Workplace exposure:** Exposure can occur either in a retinol manufacturing facility or in the various industrial facilities that use retinol. Those working with retinol in industrial operations could be exposed during maintenance, sampling, testing, or other procedures. Each industrial facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure. Safety showers and eye-wash stations should be accessible nearby. Workers should follow the recommended safety measures in the Extended Safety Data Sheet (eSDS).

- **Consumer exposure:** Vitamin A is essential for the growth and maintenance of higher organisms. The use of retinol is regulated and safety values are well established. Since consumer products contain only small amounts of retinol, consumers are exposed to
concentrations which do not pose an irritant or harmful potential. However, carefully read and follow the instructions given on product labels for proper use.

- Environmental exposure: Retinol has no adverse effects on aquatic life in the range of its water solubility. It is not considered to be present in surface waters from the use in industrial settings where releases are strictly controlled. However, retinol is used in a wide variety of consumer products like personal care articles, foods and feeds as well as in vitamin preparations and the environment is exposed to the substance in many ways. Though the classification for retinol states that it may be harmful to aquatic life with long lasting effects it is degraded by microorganisms and indirectly by light and hence released substance by consumers is not expected to remain in the environment and an accumulation in the food chain is not expected. Conclusively, all identified uses are safe for the environment based on the scientific facts summarized above and when carried out in compliance with recommended risk management measures and applicable regulations.

Recommended Handling Measures

The recommended safety measures generally apply in contact with the concentrated substance. It is NOT intended to replace the comprehensive guidance found in the (M)SDS, only supplement it. Please refer to the (M)SDS for specific safety and first aid measures.

When using concentrated chemicals always make sure that there is adequate ventilation. Always use appropriate chemical resistant gloves to protect your hands and skin and always wear eye protection such as chemical goggles. Do not eat, drink, or smoke where chemicals are handled, processed, or stored. Wash hands and skin following contact. If the substance gets into your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical attention. For specific advice please consult the corresponding (Material) Safety Data Sheet of the substance.

All effluent releases that may include the substance must be directed to a (municipal) waste water treatment plant that removes the substance from the final releases to the receiving water.

Regulatory Information / Classification and Labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (M)SDS. 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.

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 labelling. It is not intended to be comprehensive or to replace information found in the (M)SDS.

Labeling according to UN GHS
UN GHS is the basis for country specific GHS labeling

Signal word: Danger

Hazard Statements:

H303 May be harmful if swallowed
H316 Causes mild skin irritation
H317 May cause an allergic skin reaction
H319 Causes serious eye irritation
H360 May damage the unborn child
H413 May cause long lasting harmful effects to aquatic life

Additional information

1. IFA GESTIS-database on hazardous substances
   http://www.dguv.de/ifa/en/gestis/stoffdb/index.jsp

2. Information on registered substance (ECHA)

3. BASF Product Finder
   http://www.basf.com/group/corporate/de/Product-finder/index

Most commonly used synonyms
» Vitamin A

Disclaimer

This Product Safety Summary is intended to provide a general overview of the chemical substance. It contains basic information and is not intended to provide emergency response information, medical information or treatment information. The summary cannot be relied on to provide in-depth safety and health information. In-depth safety and health information must be obtained from the Material Safety Data Sheet ((M)SDS) for the chemical substance.

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Contact

For further information on this substance or GPS safety summaries in general, please contact: info.gps@basf.com