GPS Safety Summary

Substance Name:

Undec-10-enoic acid

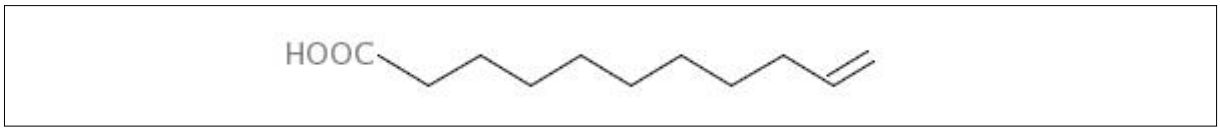
1. General Statement

Undec-10-enoic acid is produced to be used in various industries such as fragrances and flavors industry, cosmetics industry.
Under salt form (Zn/Ca), it can be used in personal cares, for its highly effective natural antimicrobial and preservative properties.
With its bifunctional nature (presence of an ester function and a terminal double bond at the end of the chains), it can also be used as a synthesis support (modified silicones, polymers…).
The substance is manufactured and handled in industrial settings.

2. Chemical Identity

Name:	Undec-10-enoic acid
Brand names:	Undecylenic acid
Chemical name (IUPAC):	Undec-10-enoic acid
CAS number(s):	112-38-9
EC number:	203-965-8
Molecular formula:	$C_{11}H_{20}O_2$

Structure:



3. Use and applications

Undec-10-enoic acid is used as an intermediate in the synthesis of chemicals such as fine chemicals in fragrances and flavours industry, cosmetics and in polymers and modified silicone.

4. Physical / Chemical properties

Undec-10-enoic acid is a colourless solid with a low melting point and the following physical/chemical properties:

Property	Value
Physical state	Solid
Form	Compact
Colour	White

Odour	Penetrating
Density	1,002 g/cm^3 at 24.4°C
Melting range	21,2°C to 26,4°C at 1013 hPa
Boiling range	286,05°C to 293,75°C at 1013 hPa
Flammability	Not flammable
Explosive / oxidizing properties	Not expected based on its structure
Self-ignition temperature	Not applicable
Vapour pressure	0,0192 Pa at 20°C
Mol weight	184,3 g/mol
Water solubility	38,46 mg/L at 20°C and pH 4,27; the solubility depends on the pH
Flash point	158°C at 1013 hPa
Octanol-water partition coefficient (LogKow)	4,0 at 20°C

5. Health Effects

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	*Oral*: Based on the available test data, not expected to cause significant toxicity after acute oral exposure. *Dermal*: Based on the available test data, not expected to cause significant toxicity after acute dermal exposure. *Inhalation*: Not relevant. No data.
Irritation / corrosion Skin / eye/ respiratory tract	Skin and eye irritant.
Sensitisation	Based on the available test data, not expected to cause allergic skin reactions.
Toxicity after repeated exposure Oral / inhalation / dermal	Based on the available test data on a similar substance, not expected to cause significant toxicity after repeated exposure.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause genetic effects.
Carcinogenicity	Based on the information from the repeated exposure studies, not expected to cause cancer under normal conditions of use.
Toxicity for reproduction	Based on the available test data, not expected to cause adverse effects on reproduction.

6. Environmental Effects

Effect Assessment	Result
Aquatic Toxicity	Toxic to algae. Harmful to fish and aquatic invertebrates.

Fate and behaviour	Result
Biodegradation	Based on the available test data: readily biodegradable.

Bioaccumulation potential	Based on the estimated bioconcentration factor: low potential for bioaccumulation.
PBT / vPvB conclusion	Not considered to be PBT or vPvB.

7. Exposure

7.1 Human health

Considering the life cycle of the substance (manufacture and use as intermediate of synthesis) consumers will not come into contact with undec-10-enoic acid.

Worker exposure can occur in facilities manufacturing or using the substance. Workers will mainly be exposed to the liquid form of undec-10-enoic acid as the substance is usually processed at temperatures higher than its melting point. Worker activities are mainly undertaken in closed systems resulting in a low exposure. However when workers are exposed, during handling, loading, mixing, sampling or maintenance operations, they should follow the recommended safety measures in the extended Safety Data Sheet (eSDS).

7.2 Environment

In industrial sites manufacturing and using undec-10-enoic releases to the environment occur mostly to water. On site waste water treatment is required for all sites manufacturing and using the substance. Undec-10-enoic acid is readily biodegradable and will not be persistent.

Due to its low vapour pressure undec-10-enoic has a low potential for volatilisation.

Risk assessment showed that the substance will pose no risk to the food chain or to humans exposed via the environment.

8. Risk Management recommendations

Human health measures		
Organizational	Implement good basic standards of occupational hygiene. Ensure operatives are well informed of the hazards and trained to minimise exposures. Refer to the latest available extended safety data sheet (eSDS).	
Engineering controls	Should be handled in well ventilated areas. Provide appropriate local exhaust ventilation at points of emission. Ensure that eye- and handwash stations and safety showers are close to workstation locations.	
Protection	**Eye/Face protection:**	Tightly fitting safety goggles
	Skin protection:	Protective suit
	Hand protection:	Acid resistant gloves (PVC, neoprene) tested to standard EN374
	Respiratory protection:	In case of insufficient ventilation, wear suitable respiratory equipment.
Environment protective measures		
On-site waste water treatment is required. Do not release into the environment. Do not let product enter drains. Dam up with inert material. Destroy absorbed product in accordance with local and national regulations. Limit industrial sewage sludge spreading.		

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has been registered under:

- EU Regulation EC 1907/2006 (REACH)

9.2 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 eSDS. 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. Substances registered for REACH are classified according CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification	
According to REGULATION (EC) no 1272/2008: – Skin Irritation; Category 2; Causes skin irritation. – Eye Irritation; Category 2; Causes serious eye irritation. – Aquatic Chronic; Category 2; Toxic to aquatic life with long lasting effects.	
Signal word	
– Warning	
Pictogram	
– GHS07: exclamation mark	
– GHS09: environment	
Hazard statement	
– H315: Causes skin irritation. – H319: Causes serious eye irritation. – H411: Toxic to aquatic life with long lasting effects.	
Additional classification according Global Harmonized System (GHS)	
– Acute Toxicity; Oral; Category 5; May be harmful if swallowed. – Aquatic Acute; Category 2; Toxic to aquatic life.	

10. Contact Information within Company

For further information on this substance or product safety summary in general, please contact:

- arkema.reach-dpt1@arkema.com
- ICCA portal where the GPS Safety Summary is posted: http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

11. Date of Issues / Revision

- Date of issue: 2013/02/10
- Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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