SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product Name **ProHacid Advance (LOC 2,0 U)**

Pure substance/mixture Mixture

1.2. Relevant identified uses of the substance or mixture and uses advised against

Application Premixture

Uses advised against Not identified.

1.3. Details of the supplier of the safety data sheet

Manufacturer

Perstorp Waspik B.V.
Industrieweg 8
NL-5165 NH Waspik
The Netherlands
Tel. +31 (0)416 31 77 00
Fax: +31 (0)416 31 66 98
www.perstorp.com

E-mail address productinfo@perstorp.com

1.4. Emergency telephone number

Europe (+)1 760 476 3961 (contract no: 334101)

United Kingdom (+)44 8 08 189 0979 (contract no: 334101)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin corrosion/irritation	Category 2 - (H315)
Serious eye damage/eye irritation	Category 1 - (H318)
Specific target organ toxicity (repeated exposure)	Category 1 - (H372) Inhalation: Lungs.

2.2. Label elements

Symbols/Pictograms

Signal word
Danger

Hazard statements
H372 - Causes damage to organs through prolonged or repeated exposure
H318 - Causes serious eye damage

H315 - Causes skin irritation

Precautionary Statements
P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P314 - Get medical advice/attention if you feel unwell
P280 - Wear eye protection/ face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water

Contains: Benzoic acid, Lactic acid 5-<10%, Formic acid.

2.3. Other hazards
None known

SECTION 3: Composition/information on ingredients

3.1 Substances
Not applicable

3.2 Mixtures

Chemical Name	EC No	CAS No	REACH registration number	Weight-%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Benzoic acid	200-618-2	65-85-0	No data available	15-25	Skin Irrit. 2 (H315) Eye Dam. 1 (H318) STOT RE 1 (H372)
Silica, amorphous	231-545-4	112926-00-8	No data available	10-20	Not classified
Lactic acid	200-018-0	50-21-5	01-2119548400-48	10-20	Skin Irrit. 2 (H315) Eye Dam. 1 (H318)
Formic acid	200-579-1	64-18-6	01-2119491174-37-0001	5-<10	Flam. Liq. 3 (H226) Skin Corr. 1A (H314) Eye Dam. 1 (H318) Acute Tox. 3 (H331) Acute Tox. 4 (H302) (EUH071)
Citric acid	201-069-1	77-92-9	01-2119457026-42	5-10	Eye Irrit. 2 (H319)
Quartz (SiO2)	238-878-4	14808-60-7	No data available	5-10	Not classified
Sodium formate	205-488-0	141-53-7	01-2119486468-21-0000	1-5	Not classified
Fumaric acid	203-743-0	110-17-8	No data available	1-5	Eye Irrit. 2 (H319)

Full text of H- and EUH-phrases: see section 16

Additional information
The component Quartz contains less than 1% respirable crystalline silica (fine fraction)

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice Immediate medical attention is required. Emergency eyewash facilities must be located in the vicinity of where the product is handled.

Inhalation Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Seek immediate medical attention/advice.

Skin contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Use lukewarm water if possible. Keep eye wide open while rinsing. Do not rub affected area.

Ingestion	Clean mouth with water and drink afterwards plenty of water. If a large quantity has been ingested or you feel unwell, get medical advice/attention.

Self-protection of the first aider
Do not breathe dust.

4.2. Most important symptoms and effects, both acute and delayed
Eye contact: Causes severe irritation with flood of tears and pain and strong redness and swelling of the eye. Risk of permanent eye damage. Dyspnea (breathing difficulty). Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
Water with full jet as this can form a dust cloud.

5.2. Special hazards arising from the substance or mixture
Thermal decomposition can lead to release of irritating and toxic gases and vapours.

Hazardous combustion products
Carbon monoxide (CO), Carbon dioxide (CO2).

5.3. Advice for firefighters
Wear self-contained breathing apparatus and protective suit.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate affected area.

6.2. Environmental precautions
Do not allow into any sewer, on the ground or into any body of water. Prevent further leakage or spillage if safe to do so. See Section 12 for additional ecological information.

6.3. Methods and material for containment and cleaning up
Methods for containment

Small spill	Vacuum or sweep material and place in a disposal container
Large spill	Cover powder spill with plastic sheet or tarp to minimise spreading. Vacuum or sweep material and place in a disposal container.

Methods for cleaning up
Clean contaminated surface thoroughly. After cleaning, flush away traces with water.

6.4. Reference to other sections
See Section 7,8,13 for more information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Ensure adequate ventilation, especially in confined areas. Use personal protection recommended in Section 8. Avoid generation of dust. Avoid exposure to vapour.

General Hygiene Considerations
Wash hands thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities
Keep tightly closed in a dry and cool place. Protect from sunlight.

7.3. Specific end use(s)
This information is supplied in the present Safety Data Sheet.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure Limits

Keep personal exposure levels below Derived No Effect Level (DNEL) and national exposure limit values (if existing).

Chemical Name	European Union	United Kingdom
Formic acid 64-18-6	TWA: 5 ppm TWA: 9 mg/m³	TWA: 5 ppm TWA: 9.6 mg/m³ STEL: 15 ppm STEL: 28.8 mg/m³
Quartz (SiO2) 14808-60-7	Not available	TWA: 0.1 mg/m³

Derived No Effect Level (DNEL) - worker

Benzoic acid (65-85-0)			
Type	Exposure route	DNEL	Remarks
Chronic effects, systemic	Inhalation	3	mg/m³
Chronic effects, local	Inhalation	0.1	mg/m³
Chronic effects, systemic	Dermal	62.5	mg/kg bw/d

Lactic acid (50-21-5)			
Type	Exposure route	DNEL	Remarks
Acute effects, local	Inhalation	592	mg/m³

Formic acid (64-18-6)			
Type	Exposure route	DNEL	Remarks
Acute effects, local	Inhalation	19	mg/m³
Chronic effects, local	Inhalation	9.5	mg/m³

Sodium formate (141-53-7)			
Type	Exposure route	DNEL	Remarks
Acute effects, local	Dermal	16.7	mg/cm 2
Acute effects, systemic	Dermal	5000	mg/kg bw/d
Chronic effects, systemic	Dermal	5000	mg/kg bw/d
Chronic effects, local	Dermal	16.7	mg/cm 2
Acute effects, systemic	Inhalation	350	mg/m³
Chronic effects, systemic	Inhalation	353	mg/m³

Fumaric acid (110-17-8)			
Type	Exposure route	DNEL	Remarks
Chronic effects, systemic	Inhalation	175	mg/m³
Acute effects, systemic	Inhalation	175	mg/m³
Chronic effects, systemic	Dermal	50	mg/kg bw/d
Acute effects, systemic	Dermal	50	mg/kg bw/d

Derived No Effect Level (DNEL) - Consumer

Benzoic acid (65-85-0)			
Type	Exposure route	DNEL	Remarks
Chronic effects, systemic	Inhalation	1.5	mg/m³
Chronic effects, local	Inhalation	0.06	mg/m³
Chronic effects, systemic	Dermal	31.25	mg/kg bw/d
Chronic effects, systemic	Oral	16.6	mg/kg bw/d

Lactic acid (50-21-5)			
Type	Exposure route	DNEL	Remarks
Acute effects, systemic	Oral	35.4	mg/kg bw/d
Acute effects, local	Inhalation	296	mg/m³

Formic acid (64-18-6)			
Type	Exposure route	DNEL	Remarks
Acute effects, local	Inhalation	9.5	mg/m³
Chronic effects, local	Inhalation	3	mg/m³

Sodium formate (141-53-7)			
Type	Exposure route	DNEL	Remarks
Chronic effects, systemic	Oral	25	mg/kg bw/d
Acute effects, systemic	Inhalation	87	mg/m³
Chronic effects, systemic	Inhalation	87	mg/m³
Acute effects, local	Dermal	8.33	mg/cm 2
Acute effects, systemic	Dermal	2500	mg/kg bw/d
Chronic effects, local	Dermal	8.3	mg/cm 2
Chronic effects, systemic	Dermal	2500	mg/kg bw/d

Fumaric acid (110-17-8)			
Type	Exposure route	DNEL	Remarks
Chronic effects, systemic	Inhalation	53	mg/m³
Acute effects, systemic	Inhalation	53	mg/m³
Chronic effects, systemic	Dermal	30	mg/kg bw/d
Acute effects, systemic	Dermal	30	mg/kg bw/d
Chronic effects, systemic	Oral	30	mg/kg bw/d
Acute effects, systemic	Oral	30	mg/kg bw/d

Predicted No Effect Concentration (PNEC)

Benzoic acid (65-85-0)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	0.34	mg/l
Marine water	0.34	mg/l
Intermittent	3.3	mg/l
Impact on Sewage Treatment	100	mg/l
Freshwater sediment	1.75	mg/kg dry weight
Marine sediment	1.75	mg/kg dry weight
Soil	0.151	mg/kg dry weight

Lactic acid (50-21-5)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	1.3	mg/l
Impact on Sewage Treatment	10	mg/l

Formic acid (64-18-6)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	2	mg/l
Intermittent	1	mg/l
Freshwater sediment	13.4	mg/kg dry weight
Marine water	0.2	mg/l
Marine sediment	1.34	mg/kg dry weight
Impact on Sewage Treatment	7.2	mg/l

Citric acid (77-92-9)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	0,44	mg/l

Freshwater sediment	34.6	mg/kg dry weight
Marine water	0.044	mg/l
Marine sediment	3.46	mg/kg dry weight
Impact on Sewage Treatment	1000	mg/l
Soil	33.1	mg/kg dry weight

Sodium formate (141-53-7)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	2	mg/l
Intermittent	10	mg/l
Freshwater sediment	13.4	mg/kg dry weight
Marine water	0.2	mg/l
Marine sediment	1.34	mg/kg dry weight
Impact on Sewage Treatment	2.21	mg/l
Soil	1.5	mg/kg dry weight

Fumaric acid (110-17-8)		
Environmental compartment	Predicted No Effect Concentration (PNEC)	Remarks
Freshwater	0.1	mg/l
Intermittent	1	mg/l
Marine water	0.01	mg/l
Impact on Sewage Treatment	3	mg/l

8.2. Exposure controls

Appropriate engineering controls

Eyewash stations. Ensure adequate ventilation, especially in confined areas. Technical measures: Use only in adequate ventilation. If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Individual protection measures, such as personal protective equipment

Eye/face protection	Tight sealing safety goggles.
Hand Protection	Wear protective gloves. Butyl rubber. Chloroprene rubber, CR. Ensure that the breakthrough time of the glove material is not exceeded. Refer to glove supplier for information on breakthrough time for specific gloves.
Skin and body protection	Body protection must be chosen depending on activity and possible exposure, e.g. apron, chemical resistant boots, chemical-protection suit.
Respiratory protection	Where there is potential for airborne exposure above the exposure limit an approved air purifying respirator equipped with Type A, organic gases and vapours filter (as specified by the manufacturer) in combination with Type P2 - Medium efficiency particle filters may be used.

Environmental exposure controls

No information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

powder

white, yellow

Odour	Pungent
Odour threshold	No information available

Property	**Value**	**Remarks • Method**
pH	3.0 - 4.0	solution (5 %)
Melting point / freezing point		Not determined
Boiling point / boiling range		Not determined
Flash point		Not applicable
Evaporation rate		No information available
Flammability (solid, gas)		Not determined
Explosive limits		

Upper explosive limits		No information available
Lower explosive limits		No information available
Vapour pressure		No information available
Vapour density		No information available
Relative density		No information available
Water solubility		partially soluble
Solubility(ies)		No information available
Partition coefficient		See Section 12 for additional ecological information
Autoignition temperature		Not determined
Decomposition temperature		Not determined
Kinematic viscosity		No information available
Dynamic viscosity		No information available
Explosive properties		Not explosive.
Oxidising properties		Not oxidising.
Density		No information available
Bulk density	700-800 kg/m³	

9.2. Other information
No information available.

SECTION 10: Stability and reactivity

10.1. Reactivity
There exists no specific test data for this product. For further information, see the subsequent subsections of this chapter.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
Reacts with: Strong bases, Oxidising substances.

10.4. Conditions to avoid
None known.

10.5. Incompatible materials
Strong bases, Oxidising substances

10.6. Hazardous decomposition products
Thermal decomposition can lead to release of irritating and toxic gases and vapours.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure
Inhalation. Dermal.

Symptoms related to the physical, chemical and toxicological characteristics
Eye contact: Causes severe irritation with flood of tears and pain and strong redness and swelling of the eye. Risk of permanent eye damage. May cause skin irritation and/or dermatitis.

Numerical measures of toxicity

Acute toxicity
May be harmful if swallowed.

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	3,184.00 mg/kg
ATEmix (dermal)	9,509.00 mg/kg
ATEmix (inhalation-dust/mist)	278.00 mg/l
ATEmix (inhalation-vapour)	58.00 mg/l

Acute oral toxicity	20 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
Acute dermal toxicity	20 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
Acute inhalation toxicity - Vapour	29 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapour)
Acute inhalation toxicity - dust/mist	38 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

Benzoic acid (65-85-0)

Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 401: Acute Oral Toxicity	Mouse	Oral	2250	LD50 (lethal dose) mg/kg
Not defined	Rat	Inhalation	>12200	LC50 4h mg/m³
Not defined	Rabbit	Dermal	>2000	LD50 (lethal dose) mg/kg

Lactic acid (50-21-5)

Method	Species	Exposure route	Effective dose	Remarks
EPA OPP 81-1	Rat	Oral	3543	LD50 (lethal dose) mg/kg read-across from supporting substance (structural analogue)
EPA OPP 81-2	Rabbit	Dermal	>2000	LD0 mg/kg read-across from supporting substance (structural analogue)
OECD Test No. 403: Acute Inhalation Toxicity	Rat	Inhalation	>7.94	LC50 mg/l read-across from supporting substance (structural analogue)

Formic acid (64-18-6)

Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 401: Acute Oral Toxicity	Rat	Oral	730	LD50 (lethal dose) mg/kg
OECD Test No. 402: Acute Dermal Toxicity	Mouse	Dermal	>2000	LD0 mg/kg
OECD Test No. 403: Acute Inhalation Toxicity	Rat	Inhalation	7.85	LC50 mg/l

Citric acid (77-92-9)

Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 401: Acute Oral Toxicity	Mouse	Oral	5400	LD50 (lethal dose) mg/kg
OECD Test No. 402: Acute Dermal Toxicity	Rat	Dermal	>2000	LD0 mg/kg

Sodium formate (141-53-7)

Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 420: Acute Oral Toxicity - Fixed Dose Procedure	Rat	Oral	3000	LD50 (lethal dose) mg/kg
OECD Test No. 402: Acute Dermal Toxicity	Rat	Dermal	>2000	LD50 (lethal dose) mg/kg
EPA OTS 798.1150	Rat	Inhalation	>0.67	LC0 mg/m³ The maximal attainable dust concentration of 0.67 mg/l produced no signs of toxicity.

Fumaric acid (110-17-8)

Method	Species	Exposure route	Effective dose	Remarks

OECD Test No. 401: Acute Oral Toxicity	Rat	Oral	9300	LD50 (lethal dose) mg/kg
OECD Test No. 402: Acute Dermal Toxicity	Rabbit	Dermal	20000	LD50 (lethal dose) mg/kg
OECD Test No. 403: Acute Inhalation Toxicity	Rat	Inhalation	>1.306	LC0 mg/l

Skin corrosion/irritation
Irritating to skin.

Benzoic acid (65-85-0)			
Method	Species	Exposure route	Results:
Not defined	Guinea pig	Dermal	Irritating to skin

Lactic acid (50-21-5)			
Method	Species	Exposure route	Results:
EPA OPP 81-5	Rabbit	Dermal	Irritating to skin read-across from supporting substance (structural analogue)

Formic acid (64-18-6)			
Method	Species	Exposure route	Results:
Unknown	human data	Dermal	Corrosive

Citric acid (77-92-9)			
Method	Species	Exposure route	Results:
OECD Test No. 404: Acute Dermal Irritation/Corrosion	Rabbit	Dermal	Causes mild skin irritation No classification according to GHS criteria.

Sodium formate (141-53-7)			
Method	Species	Exposure route	Results:
OECD Test No. 404: Acute Dermal Irritation/Corrosion	Rabbit	Dermal	Non-irritant

Fumaric acid (110-17-8)			
Method	Species	Exposure route	Results:
OECD Test No. 404: Acute Dermal Irritation/Corrosion	Rabbit	Dermal	Non-irritant No classification according to GHS criteria.

Serious eye damage/eye irritation
Risk of serious damage to eyes.

Benzoic acid (65-85-0)			
Method	Species	Exposure route	Results:
EU method B.5	Rabbit	Eye	Causes serious eye damage

Lactic acid (50-21-5)			
Method	Species	Exposure route	Results:
Unknown	Eye in vitro	Eye	strongly irritant

Formic acid (64-18-6)			
Method	Species	Exposure route	Results:
Unknown	human data	Eye	strongly corrosive

Citric acid (77-92-9)			
Method	Species	Exposure route	Results:
OECD Test No. 405: Acute Eye Irritation/Corrosion	Rabbit	Eye	Non-irritant (30%)
			Causes serious eye irritation (100%)

Sodium formate (141-53-7)			
Method	Species	Exposure route	Results:
EPA OTS 798.4500	Rabbit	Eye	Slightly irritating.

Fumaric acid (110-17-8)			
Method	Species	Exposure route	Results:
OECD Test No. 405: Acute Eye Irritation/Corrosion	Rabbit	Eye	Irritating to eyes

Respiratory or skin sensitisation
No sensitising effects known.

Benzoic acid (65-85-0)			
Method	Species	Exposure route	Results:
LLNA	Mouse	Skin	Not a skin sensitiser

Lactic acid (50-21-5)			
Method	Species	Exposure route	Results:
EPA OPP 81-6	Guinea pig	Skin	Not a skin sensitiser read-across from supporting substance (structural analogue)

Formic acid (64-18-6)			
Method	Species	Exposure route	Results:
OECD Test No. 406: Skin Sensitisation	Guinea pig	Skin	Not a skin sensitiser

Sodium formate (141-53-7)			
Method	Species	Exposure route	Results:
OECD Test No. 406: Skin Sensitisation	Guinea pig	Skin	Not a skin sensitiser read-across from supporting substance (structural analogue)

Fumaric acid (110-17-8)			
Method	Species	Exposure route	Results:
OECD Test No. 406: Skin Sensitisation	Guinea pig	Skin	Not a skin sensitiser

Germ cell mutagenicity
According to the data on the components: Not mutagenic.

Benzoic acid (65-85-0)		
Method	Species	Results:
OECD Test No. 471: Bacterial Reverse Mutation Test	Salmonella typhimurium	Negative
OECD 487	in vitro	Negative

Formic acid (64-18-6)		
Method	Species	Results:
OECD Test No. 471: Bacterial Reverse Mutation Test	in vitro	Negative
OECD Test No. 473: In vitro Mammalian Chromosome Aberration Test	in vitro	Negative
OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test	in vitro	Negative
OECD Test No. 479: Genetic Toxicology: In vitro Sister Chromatid Exchange Assay in Mammalian Cells	in vitro	Negative
OECD Test No. 477: Genetic Toxicology: Sex-Linked Recessive Lethal Test in Drosophila melanogaster	in vivo	Negative

Citric acid (77-92-9)		
Method	Species	Results:
OECD Test No. 471: Bacterial Reverse Mutation Test	in vitro	Negative
OECD 487	in vitro	Positive
OECD Test No. 473: In vitro Mammalian Chromosome Aberration Test	in vitro	Positive
OECD Test No. 475: Mammalian Bone Marrow Chromosome Aberration Test	in vivo	Negative

Sodium formate (141-53-7)		
Method	Species	Results:
OECD Test No. 471: Bacterial Reverse Mutation Test	in vitro	Negative
OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test	in vitro	Negative read-across from supporting substance (structural analogue)
OECD Test No. 473: In vitro Mammalian Chromosome Aberration Test	in vitro	Negative read-across from supporting substance (structural analogue)
OECD Test No. 477: Genetic Toxicology: Sex-Linked Recessive Lethal Test in Drosophila melanogaster	in vivo	Negative

Fumaric acid (110-17-8)		
Method	Species	Results:
OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test	in vitro	Negative
OECD Test No. 471: Bacterial Reverse Mutation Test	Salmonella typhimurium	Negative

Carcinogenicity
According to the data on the components: Not Carcinogenic. The component Quartz contains less than 1% respirable crystalline silica (fine fraction).

Benzoic acid (65-85-0)				
Method	Species	Exposure route	Effective dose	Remarks
Not defined	Rat	Oral	>1000	NOAEL mg/kg bw/d read-across from supporting substance (structural analogue)

Formic acid (64-18-6)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Oral	2000	NOAEL mg/kg bw/d No carcinogenic effects have been observed. read-across from supporting substance (structural analogue)

Citric acid (77-92-9)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 451: Carcinogenicity Studies	Rat	Oral		No carcinogenic effects have been observed.

Sodium formate (141-53-7)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Oral	2000	NOAEL mg/kg bw/d No carcinogenic effects have been observed. read-across from supporting substance (structural analogue)

Reproductive toxicity

This product does not contain any known or suspected reproductive hazards.

Benzoic acid (65-85-0)				
Method	Species	Exposure route	Effective dose	Remarks
Not defined	Rat	Oral	500	No impairment of fertility has been observed. No embryotoxic or teratogenic effects have been observed. read-across from supporting substance (structural analogue) mg/kg bw/d NOAEL 4 gen.

Formic acid (64-18-6)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 414: Pre-natal Development Toxicity Study	Rabbit	Oral	667	NOAEL mg/kg bw/d No embryotoxic or teratogenic effects have been observed. read-across from supporting substance (structural analogue)
OECD Test No. 416: Two-Generation Reproduction Toxicity	Rat	Oral	650	NOAEL mg/kg bw/d A two-generation reproduction toxicity study performed with a read-across substance did not indicate any potential for reproductive or developmental toxicity.

Citric acid (77-92-9)				
Method	Species	Exposure route	Effective dose	Remarks
Unknown	Rat	Oral	>295	NOAEL mg/kg bw/d Teratogenicity
Unknown	Mouse	Oral	>272	NOAEL mg/kg bw/d Teratogenicity

Sodium formate (141-53-7)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 414: Pre-natal Development Toxicity Study	Rat	Oral	1000	NOAEL mg/kg bw/d No embryotoxic or teratogenic effects have been observed.
OECD Test No. 416: Two-Generation Reproduction Toxicity	Rabbit	Oral	1000	NOAEL mg/kg bw/d No impairment of fertility has been observed. No embryotoxic or teratogenic effects have been observed.

Fumaric acid (110-17-8)				
Method	Species	Exposure route	Effective dose	Remarks
Unknown	Guinea pig	Oral	>400	NOAEL mg/kg bw/d No embryotoxic or teratogenic effects have been observed.

STOT - single exposure Slightly irritating to the respiratory system.

Benzoic acid (65-85-0)

Method	Species	Exposure route	Effective dose	Remarks
		Inhalation		Slightly irritating to the respiratory system.

Formic acid (64-18-6)				
Method	Species	Exposure route	Effective dose	Remarks
Unknown	human data	Inhalation		May give smarting pain in nose and throat, headache, tiredness, dizziness and coughing. High concentration can give difficulties in breathing.

STOT - repeated exposure Causes damage to organs through prolonged or repeated exposure if inhaled. Lungs. May cause damage to the following organs through prolonged or repeated exposure: Inhalation: Lungs.

Benzoic acid (65-85-0)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 412: Sub-acute Inhalation Toxicity: 28-Day Study	Rat	Inhalation	250	NOAEL mg/m³ systemic toxicity
OECD Test No. 412: Sub-acute Inhalation Toxicity: 28-Day Study	Rat	Inhalation	<25	NOAEL mg/m³ Local health effects
EPA OPP 82-2	Rabbit	Dermal	>2500	NOAEL mg/kg

Formic acid (64-18-6)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Oral	2000	LOAEL mg/kg bw/d read-across from supporting substance (structural analogue)
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Oral	400	NOAEL mg/kg bw/d read-across from supporting substance (structural analogue)
OECD Test No. 413: Sub-chronic Inhalation Toxicity: 90-day Study	Rat	Inhalation	0.244	LOAEL mg/l read-across from supporting substance (structural analogue)
OECD Test No. 413: Sub-chronic Inhalation Toxicity: 90-day Study	Rat	Inhalation	0.122	NOAEL mg/l read-across from supporting substance (structural analogue)
OECD Test No. 413: Sub-chronic Inhalation Toxicity: 90-day Study	Rat	Inhalation	0.244	NOAEL mg/l systemic toxicity read-across from supporting substance (structural analogue)

Citric acid (77-92-9)				
Method	Species	Exposure route	Effective dose	Remarks
Unknown	Rat	Oral	4000	NOAEL mg/kg bw/d

Sodium formate (141-53-7)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 408: Repeated Dose 90-Day Oral Toxicity Study in Rodents	Rat	Oral	3138	NOAEL mg/kg bw/d read-across from supporting substance (structural analogue)

Fumaric acid (110-17-8)				
Method	Species	Exposure route	Effective dose	Remarks

OECD Test No. 452: Chronic Toxicity Studies	Rat	Oral	600	NOAEL mg/kg bw/d

Aspiration hazard
No hazard from product as supplied.

SECTION 12: Ecological information

12.1. Toxicity
Harmful to aquatic life

20% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Benzoic acid (65-85-0)

Method	Species	Exposure route	Effective dose	Exposure time	Remarks
EPA-660/3-75-001	Lepomis macrochirus	Freshwater	44.6	96h	LC50 (lethal concentration) mg/l
EPA-660/3-75-009	Daphnia magna	Freshwater	>100	48h	LC50 (lethal concentration) mg/l
OECD Test No. 211: Daphnia magna Reproduction Test	Daphnia magna	Freshwater	>=25	21d	NOEC mg/l
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	>33.1	72h	EC50 (effective concentration) mg/l

Lactic acid (50-21-5)

Method	Species	Exposure route	Effective dose	Exposure time	Remarks
EPA-669/3-75-009	Oncorhynchus mykiss (rainbow trout)	Freshwater	130	96h	LC50 (lethal concentration) mg/l read-across from supporting substance (structural analogue)
OECD Test No. 202: Daphnia sp. Acute Immobilization Test	Daphnia magna	Freshwater	130	48h	EC50 (effective concentration) mg/l read-across from supporting substance (structural analogue)
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	3500	72h	EC50 (effective concentration) mg/l read-across from supporting substance (structural analogue)

Formic acid (64-18-6)

Method	Species	Exposure route	Effective dose	Exposure time	Remarks
OECD Test No. 203: Fish, Acute Toxicity Test	Brachydanio rerio	Freshwater	130	96h	LC50 (lethal concentration) mg/l read-across from supporting substance (structural analogue)
OECD Test No. 202: Daphnia sp. Acute Immobilization Test	Daphnia magna	Freshwater	365	48h	EC50 (effective concentration) mg/l read-across from supporting

					substance (structural analogue)
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	1240	72h	EC50 (effective concentration) mg/l read-across from supporting substance (structural analogue)
OECD Test No. 203: Fish, Acute Toxicity Test	Brachydanio rerio	Freshwater	90	96h	NOEC mg/l read-across from supporting substance (structural analogue)
OECD Test No. 202: Daphnia sp. Acute Immobilization Test	Daphnia magna	Freshwater	180	48h	NOEC mg/l read-across from supporting substance (structural analogue)
OECD Test No. 211: Daphnia magna Reproduction Test	Daphnia magna	Freshwater	>=100	21d	NOEC mg/l
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	<76.8	72h	NOEC mg/l read-across from supporting substance (structural analogue)
Regulation (EC) No. 440/2008, Annex, C.3	Bacteria toxicity	Freshwater	72	13d	NOEC mg/l

Citric acid (77-92-9)					
Method	Species	Exposure route	Effective dose	Exposure time	Remarks
OECD Test No. 203: Fish, Acute Toxicity Test	Leuciscus idus	Freshwater	440-760	96h	LC50 (lethal concentration) mg/l
Unknown	Daphnia magna	Freshwater	1535	24h	EC50 (effective concentration) mg/l
Unknown	Bacteria toxicity Scenedesmus quadricauda	Freshwater	640	8d	LC50 (lethal concentration) mg/l

Sodium formate (141-53-7)					
Method	Species	Exposure route	Effective dose	Exposure time	Remarks
EPA OTS 797.1400	Oncorhynchus mykiss (rainbow trout)	Freshwater	>1000	96h	LC50 (lethal concentration) mg/l
EPA-660/3-75-009	Daphnia magna	Freshwater	>1000	48h	EC50 (effective concentration) mg/l
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	>1000	72h	EC50 (effective concentration) mg/l read-across from supporting substance (structural analogue)

Fumaric acid (110-17-8)					
Method	Species	Exposure route	Effective dose	Exposure time	Remarks
OECD Test No. 203: Fish, Acute Toxicity Test	Brachydanio rerio	Freshwater	>100	96h	LC50 (lethal concentration) mg/l
OECD Test No. 202: Daphnia sp. Acute	Daphnia magna	Freshwater	>100	48h	EC50 (effective concentration) mg/l

Immobilization Test					
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	>100	72h	EC50 (effective concentration) mg/l

12.2. Persistence and degradability

Based on the degradability studies on the ingredients, the product is expected to be readily biodegradable.

Benzoic acid (65-85-0)			
Method	Value	Exposure time	Results:
OECD 311	>89%	21-35d	Readily biodegradable

Lactic acid (50-21-5)			
Method	Value	Exposure time	Results:
EU Method C.5	67%	20d	Readily biodegradable, failing 10-d window

Formic acid (64-18-6)			
Method	Value	Exposure time	Results:
OECD Test No. 301C: Ready Biodegradability: Modified MITI Test (I) (TG 301 C)	100%	28d	Readily biodegradable
EU Method C.4-B	99%	11d	Readily biodegradable
EU Method C.4-B	98%	14d	Readily biodegradable

Citric acid (77-92-9)			
Method	Value	Exposure time	Results:
OECD Test No. 301B: Ready Biodegradability: CO2 Evolution Test (TG 301 B)	97%	28d	Readily biodegradable

Sodium formate (141-53-7)			
Method	Value	Exposure time	Results:
OECD Test No. 306: Biodegradability in Seawater	86%	28d	Readily biodegradable
DIN EN 1899 BOD	3940	5d	mgO2/kg

Fumaric acid (110-17-8)			
Method	Value	Exposure time	Results:
OECD Test No. 301B: Ready Biodegradability: CO2 Evolution Test (TG 301 B)	67.5%	28d	Readily biodegradable

12.3. Bioaccumulative potential

Based on the partition coefficients of the ingredients the product is not expected to bioaccumulate in organisms.

Chemical Name	**Partition coefficient**	**Bioconcentration factor (BCF)**
Benzoic acid	1.88	
Lactic acid	-0.6	
Formic acid	-2.1	
Citric acid	-1.72	
Sodium formate	-1.8	
Fumaric acid	0.46	

12.4. Mobility in soil

No information available.

Mobility in soil

*. read-across from supporting substance (structural analogue).

12.5. Results of PBT and vPvB assessment
The components in this formulation do not meet the criteria for classification as PBT or vPvB.

12.6. Other adverse effects
No information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste from residues/unused products
This material and its container must be disposed of as hazardous waste.

Contaminated packaging
Thoroughly emptied and clean packaging may be recycled.

Waste codes / waste designations according to EWC / AVV
Waste from residues/unused products: 16 03 05*.

Other Information
Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

ADR Road transport
14.1 UN number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing Group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special precautions for user	None

RID Rail transport
14.1 UN number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing Group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special precautions for user	None

IMDG Sea transport
14.1 UN number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing Group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special precautions for user	None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available

IATA Air transport
Not regulated

14.1 UN number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing Group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special precautions for user	None

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or

mixture

International Regulations
Not applicable.

European Union
REGULATION (EC) No 1831/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on additives for use in animal nutrition.

France

Chemical Name	French RG number
Quartz (SiO2) 14808-60-7	RG 25

Germany
Water hazard class (WGK) Water endangering class = 1 (self classification)

Chemical Name	Type	Class
Formic acid - 64-18-6	5.2.5	0.10 kg/h Mass flow (Class I); 20 mg/m³ Mass concentration (Class I) I

15.2. Chemical safety assessment
Not applicable.

SECTION 16: Other information

Key or legend to abbreviations and acronyms used in the safety data sheet

Full text of H-Statements referred to under section 3
H319 - Causes serious eye irritation
H315 - Causes skin irritation
H318 - Causes serious eye damage
H226 - Flammable liquid and vapour
H314 - Causes severe skin burns and eye damage
H331 - Toxic if inhaled
H302 - Harmful if swallowed
H372 - Causes damage to organs through prolonged or repeated exposure if inhaled
EUH071 - Corrosive to the respiratory tract

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This safety data sheet complies with the requirements of: Regulation (EC) No. 1907/2006, COMMISSION REGULATION (EU) No. 830/2015 of 20 May 2015.

Disclaimer
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End of Safety Data Sheet