1. Substance/preparation and manufacturer/supplier identification

Lupro-Cid® NA

Use: feed additive(s)

Manufacturer/supplier:
BASF Vietnam Co. Ltd.
12 Tu do Boulevard, Vietnam-Singapore IP
Thuan An, Binh Duong, VIETNAM
Telephone: +84 2743 743-100
Telefax number: +84 2743 743-200
E-mail address: dinhnam.nguyen@basf.com

Emergency information:
International emergency number:
Telephone: +49 180 2273-112

2. Hazard identification

Classification of the substance and mixture:
Flammable liquids: Cat. 4
Acute toxicity: Cat. 4 (Inhalation - vapour)
Acute toxicity: Cat. 4 (oral)
Acute toxicity: Cat. 5 (dermal)
Skin corrosion/irritation: Cat. 2
Serious eye damage/eye irritation: Cat. 1
Specific target organ toxicity — single exposure: Cat. 3 (irritating to respiratory system)

Label elements and precautionary statement:

Pictogram:
Signal Word:
Danger

Hazard Statement:
H227 Combustible liquid.
H318 Causes serious eye damage.
H315 Causes skin irritation.
H313 May be harmful in contact with skin.
H332 Harmful if inhaled.
H302 Harmful if swallowed.
H335 May cause respiratory irritation.

Precautionary Statements (Prevention):
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves and eye/face protection.
P261 Avoid breathing vapours.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 Do not breathe mist or vapour.
P270 Do not eat, drink or smoke when using this product.
P264 Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):
P310 Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P352 IF ON SKIN (or hair): Wash with plenty of soap and water.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P370 + P378 In case of fire: Use alcohol-resistant foam, carbon dioxide, dry powder or water spray for extinction.

Precautionary Statements (Storage):
P233 Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Precautionary Statements (Disposal):
P501 Dispose of contents/container to hazardous or special waste collection point.

Other hazards which do not result in classification:
If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture. The
product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

3. Composition/information on ingredients

Chemical nature

Preparation based on: formic acid, propionic acid, sodium formate, water

Hazardous ingredients

formic acid

<table>
<thead>
<tr>
<th>Content (W/W): 25 % - &lt; 50 %</th>
<th>Flam. Liq.: Cat. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS Number: 64-18-6</td>
<td>Acute Tox.: Cat. 3 (Inhalation - vapour)</td>
</tr>
<tr>
<td></td>
<td>Acute Tox.: Cat. 4 (oral)</td>
</tr>
<tr>
<td></td>
<td>Skin Corr./Irrit.: Cat. 1A</td>
</tr>
<tr>
<td></td>
<td>Eye Dam./Irrit.: Cat. 1</td>
</tr>
</tbody>
</table>

diffic: 

propionic acid

<table>
<thead>
<tr>
<th>Content (W/W): 15 % - &lt; 20 %</th>
<th>Flam. Liq.: Cat. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS Number: 79-09-4</td>
<td>Acute Tox.: Cat. 5 (oral)</td>
</tr>
<tr>
<td></td>
<td>Acute Tox.: Cat. 5 (dermal)</td>
</tr>
<tr>
<td></td>
<td>Skin Corr./Irrit.: Cat. 1B</td>
</tr>
<tr>
<td></td>
<td>Eye Dam./Irrit.: Cat. 1</td>
</tr>
<tr>
<td></td>
<td>STOT SE: Cat. 3 (irr. to respiratory syst.)</td>
</tr>
</tbody>
</table>

4. First-Aid Measures

General advice:
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention. Immediately administer a corticosteroid from a controlled/metered dose inhaler.

On skin contact:
Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

On contact with eyes:
Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Note to physician:
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., (Further) symptoms and/or effects are not known so far
5. Fire-Fighting Measures

Suitable extinguishing media:
- water spray
- dry powder
- foam
- carbon dioxide

Unsuitable extinguishing media for safety reasons:
- water jet

Specific hazards:
- harmful vapours, carbon oxides
- The substances/groups of substances mentioned can be released in case of fire.

Special protective equipment:
- Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:
- Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.
- Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.
- Cool endangered containers with water-spray.

6. Accidental Release Measures

Personal precautions:
- Use personal protective clothing. Avoid contact with the skin, eyes and clothing. Do not breathe vapour/spray. Ensure adequate ventilation. Wear respiratory protection if ventilation is inadequate.
- Avoid all sources of ignition: heat, sparks, open flame. Information regarding personal protective measures see, section 8.

Environmental precautions:
- Do not discharge into drains/surface waters/groundwater.

Methods for cleaning up or taking up:
- For small amounts: Contain with absorbent material (e.g. sand, silica gel, acid binder, general purpose binder, sawdust).
- For large amounts: Dike spillage. Cover with blanket of foam (alcohol-resistant foam). Pump off product.
- For residues: Pick up with suitable absorbent material.
- Dispose of absorbed material in accordance with regulations. Cleaning operations should be carried out only while wearing breathing apparatus.

7. Handling and Storage

Handling
- Handle in accordance with good industrial hygiene and safety practice. Ensure thorough ventilation of stores and work areas. Use with local exhaust ventilation. Wear suitable protective clothing and eye/face protection. Avoid contact with the skin, eyes and clothing.
Protection against fire and explosion:
Avoid all sources of ignition: heat, sparks, open flame. Take precautionary measures against static discharges. If exposed to fire, keep containers cool by spraying with water.

Storage
Segregate from alkalies and alkalizing substances.

Suitable materials for containers: High density polyethylene (HDPE), Low density polyethylene (LDPE)
Further information on storage conditions: Keep container tightly closed and dry; store in a cool place. Protect containers from physical damage.

8. Exposure controls and personal protection

Components with occupational exposure limits

formic acid, 64-18-6:
- TWA value 5 ppm (ACGIHTLV)
- STEL value 10 ppm (ACGIHTLV)
- TWA value 9 mg/m3 (OEL (VN))
- STEL value 18 mg/m3 (OEL (VN))

propionic acid, 79-09-4:
- TWA value 10 ppm (ACGIHTLV)

Personal protective equipment
Respiratory protection:
Respiratory protection in case of vapour/aerosol release. Gas filter for gases/vapours of organic compounds (boiling point >65 °C, e. g. EN 14387 Type A)

Hand protection:
Wear chemical resistant protective gloves.
butyl rubber (butyl) - 0.7 mm coating thickness
chloroprene rubber (Neoprene)
Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:
Tightly fitting safety goggles (splash goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).
General safety and hygiene measures:
Avoid contact with the skin, eyes and clothing. Do not inhale gases/vapours/aerosols. Wearing of closed work clothing is required additionally to the stated personal protection equipment. No eating, drinking, smoking or tobacco use at the place of work. Hands and/or face should be washed before breaks and at the end of the shift. Store work clothing separately.

9. Physical and Chemical Properties

Form: liquid
Colour: colourless, clear
Odour: pungent odour
Odour threshold: Not determined since harmful by inhalation.

pH value: 2.6 - 3.2
(measured with the undiluted substance)

Freezing point: < -26 °C
boiling temperature: 114.5 °C
(1,013.3 hPa) (Directive 92/69/EEC, A.2)

Flash point: 78 °C (DIN EN 22719; ISO 2719)
Evaporation rate: not determined

Flammability (solid/gas): Combustible liquid. (derived from flash point)
Lower explosion limit: For liquids not relevant for classification and labelling., The lower explosion point may be 5 - 15 °C below the flash point.
Upper explosion limit: For liquids not relevant for classification and labelling.
Ignition temperature: 490 °C

Information on: formic acid
Thermal decomposition: 350 °C , > 150 kJ/kg (DSC (DIN 51007))

Information on: propionic acid
Thermal decomposition: No exothermic decomposition within the mentioned temperature range. It is not a self-decompositionable substance. (DSC (DIN 51007))

Explosion hazard: Based on the chemical structure there is no indicating of explosive properties.
Fire promoting properties: Based on its structural properties the product is not classified as oxidizing.
Vapour pressure: 14.6 hPa (20 °C) 75.4 hPa (50 °C) (measured)
Density: 1.256 g/cm³ (20 °C) (ISO 2811-3)
Relative vapour density (air): not determined
Solubility in water: fully soluble
Partitioning coefficient n-octanol/water (log Pow): not applicable for mixtures

Information on: formic acid
-1.9 (23 °C; pH value: 5.0) (Directive 92/69/EEC, A.8)
-2.3 (23 °C; pH value: 9.0) (Directive 92/69/EEC, A.8)

Information on: propionic acid
Partitioning coefficient n-octanol/water (log Pow): 0.33 (23 °C; pH value: 9) (measured)

Information on: sodium formate
Partitioning coefficient n-octanol/water (log Pow): < -2.3 (23 °C; pH value: 9)
By analogy with a product of similar composition (Directive 92/69/EEC, A.8)

Viscosity, dynamic: approx. 13.3 mPa.s (20 °C)
Viscosity, kinematic: approx. 10.6 mm²/s (20 °C) (Capillary viscometer)

10. Stability and Reactivity

Conditions to avoid:
Avoid all sources of ignition: heat, sparks, open flame. See MSDS section 7 - Handling and storage.

Information on: formic acid
Thermal decomposition: 350 °C, > 150 kJ/kg (DSC (DIN 51007))

Information on: propionic acid
Thermal decomposition: (DSC (DIN 51007))
No exothermic decomposition within the mentioned temperature range. It is not a self-decompositionable substance.

Substances to avoid:
alkalies
Corrosion to metals: The product is not to be labelled as corrosive for transport purposes.

Hazardous reactions:
Reacts with alkalies. Exothermic reaction.

Hazardous decomposition products:
No hazardous decomposition products if stored and handled as prescribed/indicated.

11. Toxicological Information

Acute toxicity

Assessment of acute toxicity:
Of moderate toxicity after short-term inhalation. Of moderate toxicity after single ingestion. Of low toxicity after short-term skin contact. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Experimental/calculated data:
LD50 rat (oral): 730 mg/kg (OECD Guideline 401)

Information on: propionic acid
Experimental/calculated data:
LD50 rat (oral): 3,455 mg/kg (BASF-Test)

----------------------------------
Information on: formic acid
Experimental/calculated data:
LC50 rat (by inhalation): 7.85 mg/l 4 h (BASF-Test)

Information on: propionic acid
Experimental/calculated data:
LC50 rat (by inhalation): > 19.7 mg/l 1 h (OECD Guideline 403)
The vapour was tested.

LC0 rat (by inhalation): 24.4 mg/l 8 h (IRT)
The vapour was tested.

----------------------------------
Information on: propionic acid
Experimental/calculated data:
LD50 rat (dermal): 3,235 mg/kg (other)

Irritation

Assessment of irritating effects:
Skin contact causes irritation. May cause severe damage to the eyes.

Experimental/calculated data:
Skin corrosion/irritation rabbit: (OECD Guideline 404)
Serious eye damage/irritation cattle: irreversible damage (BCOP)

**Respiratory/Skin sensitization**

Assessment of sensitization:
Skin sensitizing effects were not observed in animal studies. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Experimental/calculated data:
Buehler test guinea pig: Non-sensitizing. (OECD Guideline 406)

Information on: propionic acid
Experimental/calculated data:
Guinea pig maximization test guinea pig: Non-sensitizing. (OECD Guideline 406)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

**Germ cell mutagenicity**

Assessment of mutagenicity:
No mutagenic effect was found in various tests with bacteria and mammalian cell culture. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Assessment of mutagenicity:
No mutagenic effect was found in various tests with bacteria and mammalian cell culture.

Information on: propionic acid
Assessment of mutagenicity:
Results from a number of mutagenicity studies with microorganisms, mammalian cell culture and mammals are available. Taking into account all of the information, there is no indication that the substance is mutagenic. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

**Carcinogenicity**

Assessment of carcinogenicity:
In long-term animal studies in which the substance was given in high concentrations by feed, a carcinogenic effect was not observed. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Assessment of carcinogenicity:
In long-term studies in rats and mice in which the substance was given by feed, a carcinogenic effect was not observed. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: propionic acid
Assessment of carcinogenicity:
In long-term animal studies in which the substance was given in high concentrations by feed, a carcinogenic effect was not observed.

----------------------------------

**Reproductive toxicity**

Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: propionic acid
Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect.

----------------------------------

**Developmental toxicity**

Assessment of teratogenicity:
No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: formic acid
Assessment of teratogenicity:
No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: propionic acid
Assessment of teratogenicity:
No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

----------------------------------

**Specific target organ toxicity (single exposure):**

Assessment of STOT single:
Causes temporary irritation of the respiratory tract.

Remarks: The product has not been tested. The statement has been derived from the properties of the individual components.

**Repeated dose toxicity and Specific target organ toxicity (repeated exposure)**

Assessment of repeated dose toxicity:
Based on available Data, the classification criteria are not met.
Information on: formic acid
Assessment of repeated dose toxicity:
After repeated administration the prominent effect is the induction of corrosion.

Information on: propionic acid
Assessment of repeated dose toxicity:
No substance-specific organtoxicity was observed after repeated administration to animals. After repeated administration the prominent effect is the induction of corrosion.

Aspiration hazard
No aspiration hazard expected.

12. Ecological Information

Ecotoxicity

Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms. The product has not been tested. The statement has been derived from the properties of the individual components. The product gives rise to pH shifts. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Information on: formic acid
Toxicity to fish:
LC50 (96 h) 130 mg/l, Brachydanio rerio (OECD 203; ISO 7346; 92/69/EEC, C.1, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: propionic acid
Toxicity to fish:
LC50 (96 h) > 10,000 mg/l, Leuciscus idus (DIN 38412 Part 15, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: sodium formate
Toxicity to fish:
LC50 (96 h) > 1,000 mg/l, Oncorhynchus mykiss (Fish test acute, Flow through.)
The details of the toxic effect relate to the nominal concentration. No effects at the highest test concentration.

LC50 (96 h) 1,720 mg/l, Scophthalmus maximus (Fish test acute, semistatic)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. Nominal concentration.

Information on: formic acid
Aquatic invertebrates:
EC50 (48 h) 365 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The statement of the toxic effect relates to the analytically determined concentration.

Information on: propionic acid
Aquatic invertebrates:
EC50 (48 h) > 500 mg/l, Daphnia magna (Directive 84/449/EEC, C.2, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: sodium formate
Aquatic invertebrates:
EC50 (48 h) > 1,000 mg/l, Daphnia magna (Daphnia test acute, Flow through.)
The details of the toxic effect relate to the nominal concentration.

LC50 (96 h) 1,308 mg/l, Crangon crangon (semistatic)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. Nominal concentration.

----------------------------------

Information on: formic acid
Aquatic plants:
EC50 (72 h) 1,240 mg/l (growth rate), Selenastrum capricornutum (OECD Guideline 201, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: propionic acid
Aquatic plants:
EC50 (72 h) > 500 mg/l (biomass), Scenedesmus subspicatus (OECD Guideline 201, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: sodium formate
Aquatic plants:
EC50 (72 h) > 1,000 mg/l (growth rate), Pseudokirchneriella subcapitata (Algal growth inhibition test, static)
Nominal concentration.

----------------------------------

Information on: formic acid
Microorganisms/Effect on activated sludge:
EC10 (13 d) 72 mg/l, activated sludge, domestic, non-adapted (other, aerobic)

Information on: propionic acid
Microorganisms/Effect on activated sludge:
EC20 (30 min) 500 - 1,040 mg/l, activated sludge, domestic (DIN EN ISO 8192, aquatic)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: sodium formate
Microorganisms/Effect on activated sludge:
No observed effect concentration (28 d) 22.13 mg/l, aerobic microorganisms (Oxygen consumption test, aerobic)

----------------------------------
Mobility

Assessment transport between environmental compartments:
The substance will not evaporate into the atmosphere from the water surface.
The product has not been tested. The statement has been derived from the properties of the individual components.
Adsorption to solid soil phase is not expected.
The product has not been tested. The statement has been derived from the properties of the individual components.

Persistence and degradability
Information on: formic acid
Elimination information:
100 % DOC reduction (9 d) (OECD 301E/92/69/EEC, C.4-B) (aerobic, municipal sewage treatment plant effluent)

Information on: propionic acid
Elimination information:
approx. 74 % BOD of the ThOD (30 d) (other) (aerobic, activated sludge, domestic)

Information on: sodium formate
Elimination information:
74 % BOD of the ThOD (15 d) (OECD Guideline 306) (aerobic, aerobic microorganisms)

Bioaccumulation potential

Assessment bioaccumulation potential:
Significant accumulation in organisms is not to be expected.
The product has not been tested. The statement has been derived from the properties of the individual components.

13. Disposal Considerations

Observe national and local legal requirements.

14. Transport Information

Domestic transport: Not classified as a dangerous good under transport regulations

Sea transport
IMDG
Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO
15. Regulatory Information

Hazard determining component(s) for labelling: FORMIC ACID, PROPIONIC ACID

Other regulations

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

16. Other Information

Any other intended applications should be discussed with the manufacturer. Corresponding occupational protection measurements must be followed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.