1 Identification

· Product identifier

· Trade name: Furfuryl Alcohol synthetic

· Product number: 2104

· CAS Number: 98-00-0

· EC number: 202-626-1

· Index number: 603-018-00-2

· Application of the substance / the mixture: Food flavorings

· Details of the supplier of the safety data sheet

DISCLAIMER: The information in this Safety Data Sheet (SDS) is believed to be correct as of the date issued. Advanced Biotech makes NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the Advanced Biotech product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of an Advanced Biotech product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the Advanced Biotech product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

· Manufacturer/Supplier:
Advanced Biotech
10 Taft Road
Totowa, NJ 07512 USA

· Information department:
Product Safety Department
productsafety@adv-bio.com

· Emergency telephone number:
1(800)535-5053 (Info Trac)
1(352)323-3500 (International)
During normal business hours: 1(973)339-6242

2 Hazard(s) identification

· Classification of the substance or mixture

GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.

GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure.
Trade name: Furfuryl Alcohol synthetic

GHS07

Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H312 Harmful in contact with skin.
Eye Irrit. 2A H319 Causes serious eye irritation.
STOT SE 3 H335 May cause respiratory irritation.
Flam. Liq. 4 H227 Combustible liquid.

Label elements Harmful in contact with skin or if inhaled.
GHS label elements
Pictograms on label shall be in the shape of a square set at a point and shall include a black hazard symbol on a white background with a red frame sufficiently wide to be clearly visible.
The substance is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

GHS06 GHS07 GHS08

Signal word Danger

Hazard-determining components of labeling:
furfuryl alcohol

Hazard statements
H227 Combustible liquid.
H302+H312 Harmful if swallowed or in contact with skin.
H331 Toxic if inhaled.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P280 Wear protective gloves/protective clothing/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.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
  98-00-0 furfuryl alcohol
- Identification number(s)
  - EC number: 202-626-1
  - Index number: 603-018-00-2

4 First-aid measures

- Description of first aid measures
- General information:
  - Initially remove any clothing soiled by the product.
  - Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
  - Remove breathing apparatus only after contaminated clothing have been completely removed.
  - In case of irregular breathing or respiratory arrest provide artificial respiration.
- After inhalation:
  - Supply fresh air or oxygen; call for doctor.
  - In case of unconsciousness place patient stably in side position for transportation.
- After skin contact: Immediately wash with water and soap and rinse thoroughly.
- After eye contact:
  - Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- After swallowing: Immediately call a doctor.
- Information for doctor:
  - Most important symptoms and effects, both acute and delayed
  - No further relevant information available.
5 Fire-fighting measures

- **Extinguishing media**
  - **Suitable extinguishing agents:** CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
  - **Special hazards arising from the substance or mixture**
    During heating or in case of fire poisonous gases are produced.
  - **Advice for firefighters**
    - **Protective equipment:** Mouth respiratory protective device.

- **Additional information**
  - Cool endangered receptacles with water spray.
  - Collect contaminated fire fighting water separately. It must not enter the sewage system.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Mount respiratory protective device.
  - Wear protective equipment. Keep unprotected persons away.
  - **Environmental precautions:**
    - Dilute with plenty of water.
    - Do not allow to enter sewers/ surface or ground water.
  - **Methods and material for containment and cleaning up:**
    - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
    - Dispose contaminated material as waste according to item 13.
    - Ensure adequate ventilation.

- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.

- **Protective Action Criteria for Chemicals**
  - **PAC-1:** 15 ppm
  - **PAC-2:** 42 ppm
  - **PAC-3:** 250 ppm
7 Handling and storage

- Handling:
- Precautions for safe handling
  Ensure good ventilation/exhaustion at the workplace.
  Open and handle receptacle with care.
  Prevent formation of aerosols.
- Information about protection against explosions and fires:
  Keep ignition sources away - Do not smoke.
  Keep respiratory protective device available.
- Conditions for safe storage, including any incompatibilities
- Storage:
- Requirements to be met by storerooms and receptacles: No special requirements.
- Information about storage in one common storage facility: Not required.
- Further information about storage conditions: Keep receptacle tightly sealed.
- Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
- Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>CAS: 98-00-0 furfuryl alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL Long-term value: 200 mg/m³, 50 ppm</td>
</tr>
<tr>
<td>REL Short-term value: 60 mg/m³, 15 ppm</td>
</tr>
<tr>
<td>Skin Long-term value: 40 mg/m³, 10 ppm</td>
</tr>
<tr>
<td>Skin Long-term value: 0.8 mg/m³, 0.2 ppm</td>
</tr>
</tbody>
</table>

- Additional information: The lists that were valid during the creation were used as a basis.
- Exposure controls
- Personal protective equipment:
- General protective and hygienic measures:
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Store protective clothing separately.
  Avoid contact with the eyes.
  Avoid contact with the eyes and skin.
- Breathing equipment:
  In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture. Selection of the glove material should be based on consideration of the penetration times, rates of diffusion and the degradation.

Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Penetration time of glove material

The exact breakthrough time has to be determined by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Tightly sealed goggles

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9 Physical and chemical properties

- Information on basic physical and chemical properties
  - General Information
    - Appearance:
      - Form: Liquid
      - Color: According to product specification
      - Odor: According to product specification
      - Odor threshold: Not determined.
    - pH-value: Not determined.
  - Change in condition
    - Melting point/Melting range: -31 °C (-23.8 °F)
    - Boiling point/Boiling range: 171 °C (339.8 °F)
  - Flash point: 65 °C (149 °F)
  - Flammability (solid, gaseous): Not applicable.
  - Ignition temperature: 390 °C (734 °F)
  - Decomposition temperature: Not determined.
  - Auto igniting: Not determined.
  - Danger of explosion: Not determined.
Safety Data Sheet
acc. to OSHA HCS

Trade name: Furfuryl Alcohol synthetic

10 Stability and reactivity

- Reactivity: No further relevant information available.
- Chemical stability
- Thermal decomposition / conditions to be avoided:
  No decomposition if used according to specifications.
- Possibility of hazardous reactions: No dangerous reactions known.
- Conditions to avoid: No further relevant information available.
- Incompatible materials: No further relevant information available.
- Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
  - LD/LC50 values that are relevant for classification:
    - ATE (Acute Toxicity Estimate)
      - Oral: LD50 160 mg/kg (mouse)
      - Dermal: LD50 400 mg/kg (rabbit)
      - Inhalative: LC50/4 h 3 mg/l
    - CAS: 98-00-0 furfuryl alcohol
      - Oral: LD50 160 mg/kg (mouse)
Dermal LD50 400 mg/kg (rabbit)
Inhalative LC50/4 h 3 mg/l (ATE)

· Primary irritant effect:
  · on the skin: No irritant effect.
  · on the eye: Irritating effect.
  · Sensitization: No sensitizing effects known.

· Additional toxicological information:
  · Carcinogenic categories
    · IARC (International Agency for Research on Cancer)
      Substance is not listed.
    · NTP (National Toxicology Program)
      Substance is not listed.
    · OSHA-Ca (Occupational Safety & Health Administration)
      Substance is not listed.

12 Ecological information

· Toxicity
  · Aquatic toxicity: No further relevant information available.
  · Persistence and degradability No further relevant information available.

· Behavior in environmental systems:
  · Bioaccumulative potential No further relevant information available.
  · Mobility in soil No further relevant information available.

· Additional ecological information:
  · General notes:
    Water hazard class 1 (Assessment by list): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  · Results of PBT and vPvB assessment
    · PBT: Not applicable.
    · vPvB: Not applicable.
  · Other adverse effects No further relevant information available.

13 Disposal considerations

· Waste treatment methods
  · Recommendation:
    Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· Uncleaned packagings:
  · Recommendation: Disposal must be made according to official regulations.
Trade name: Furfuryl Alcohol synthetic

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

- UN-Number
  - DOT, ADR, IMDG, IATA: UN2874

- UN proper shipping name
  - DOT: Furfuryl alcohol
  - ADR: 2874 Furfuryl alcohol
  - IMDG, IATA: FURFURYL ALCOHOL

- Transport hazard class(es)
  - DOT
    - Class: 6.1 Toxic substances
    - Label: 6.1
  - ADR
    - Class: 6.1 (T1) Toxic substances
    - Label: 6.1
  - IMDG, IATA
    - Class: 6.1 Toxic substances
    - Label: 6.1

- Packing group
  - DOT, ADR, IMDG, IATA: III

- Environmental hazards:
  - Marine pollutant: No

- Special precautions for user
  - Warning: Toxic substances

- Danger code (Kemler): 60

- EMS Number: F-A,S-A
Trade name: Furfuryl Alcohol synthetic

| Stowage Category | A |
| Segregation Code | SG17 Stow "separated from" class 5.1 SG35 Stow "separated from" acids. |

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

Transport/Additional information:

| DOT | Quantity limitations |
| On passenger aircraft/rail: 60 L |
| On cargo aircraft only: 220 L |

| ADR | Excepted quantities (EQ) |
| Code: E1 |
| Maximum net quantity per inner packaging: 30 ml |
| Maximum net quantity per outer packaging: 1000 ml |

| IMDG | Limited quantities (LQ) | 5L |
| Excepted quantities (EQ) |
| Code: E1 |
| Maximum net quantity per inner packaging: 30 ml |
| Maximum net quantity per outer packaging: 1000 ml |

UN "Model Regulation": UN 2874 FURFURYL ALCOHOL, 6.1, III

15 Regulatory information

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

| Sara |
| Section 355 (extremely hazardous substances): |
| Substance is not listed. |
| Section 313 (Specific toxic chemical listings): |
| Substance is not listed. |

TSCA (Toxic Substances Control Act):

| Substance is listed. |

Proposition 65

| Chemicals known to cause cancer: |
| Substance is listed. |
| WARNING: Consuming this product can expose you to Furfuryl Alcohol, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov/food. |

Furfuryl Alcohol CAS-no. 98-00-0 (95.0% by weight)

| Chemicals known to cause reproductive toxicity for females: |
| Substance is not listed. |

(Continued on page 11)
· Chemicals known to cause reproductive toxicity for males:
  Substance is not listed.

· Chemicals known to cause developmental toxicity:
  Substance is not listed.

· Carcinogenic categories

  · EPA (Environmental Protection Agency)
    Substance is not listed.

  · TLV (Threshold Limit Value established by ACGIH)
    Substance is not listed.

  · NIOSH-Ca (National Institute for Occupational Safety and Health)
    Substance is not listed.

· GHS label elements
  Pictograms on label shall be in the shape of a square set at a point and shall include a black hazard symbol on a white background with a red frame sufficiently wide to be clearly visible. The substance is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms
  GHS06  GHS07  GHS08

· Signal word Danger

· Hazard-determining components of labeling:
  furfuryl alcohol

· Hazard statements
  H227  Combustible liquid.
  H302+H312 Harmful if swallowed or in contact with skin.
  H331  Toxic if inhaled.
  H319  Causes serious eye irritation.
  H351  Suspected of causing cancer.
  H335  May cause respiratory irritation.
  H373  May cause damage to organs through prolonged or repeated exposure.

· Precautionary statements
  P210  Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
  P260  Do not breathe dust/fume/gas/mist/vapors/spray.
  P280  Wear protective gloves/protective clothing/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.
  P405  Store locked up.
  P501  Dispose of contents/container in accordance with local/regional/national/international regulations.
16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing SDS:** Product Safety Department
- **Contact:**
  Product Safety Department
  productsafety@adv-bio.com
- **Date of preparation / last revision** 08/24/2018 / -
- **Abbreviations and acronyms:**
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  VOC: Volatile Organic Compounds (USA, EU)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
  PBT: Persistent, Bioaccumulative and Toxic
  vPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  Flam. Liq. 4: Flammable liquids – Category 4
  Acute Tox. 4: Acute toxicity – Category 4
  Acute Tox. 3: Acute toxicity – Category 3
  Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
  Carc. 2: Carcinogenicity – Category 2
  STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
  STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2