1 Identification

- **Product identifier**
- **Trade name**: Furfural synthetic
- **Product number**: 2011
- **CAS Number**: 98-01-1
- **EC number**: 202-627-7
- **Index number**: 605-010-00-4
- **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**

  - **GHS02 Flame**
    Flam. Liq. 3 H226 Flammable liquid and vapor.

  - **GHS06 Skull and crossbones**
    Acute Tox. 3 H301 Toxic if swallowed.
    Acute Tox. 3 H331 Toxic if inhaled.

  - **GHS08 Health hazard**
    Carc. 2 H351 Suspected of causing cancer.

(Continued on page 2)
Trade name: Furfural synthetic

Acute Tox. 4 H312 Harmful in contact with skin.
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2A H319 Causes serious eye irritation.
STOT SE 3 H335 May cause respiratory irritation.

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:

- GHS02
- GHS06
- GHS07
- GHS08

Signal word: Danger

Hazard-determining components of labeling:
2-furaldehyde

Hazard statements:
H226 Flammable liquid and vapor.
H301+H331 Toxic if swallowed or if inhaled.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H335 May cause respiratory irritation.

Precautionary statements:
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P301+P310 If swallowed: Immediately call a poison center/doctor.
P321 Specific treatment (see on this label).
P330 Rinse mouth.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P362+P364 Take off contaminated clothing and wash it before reuse.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)
- Health = 2
- Fire = 2
- Reactivity = 0

(Continued on page 3)
Trade name: Furfural synthetic

· HMIS-ratings (scale 0 - 4)
  - Health = 2
  - Fire = 2
  - Reactivity = 0

· Other hazards
  · Results of PBT and vPvB assessment
    · PBT: Not applicable.
    · vPvB: Not applicable.

3 Composition/information on ingredients

· Chemical characterization: Substances
  · CAS No. Description
    98-01-1 2-furaldehyde
  · Identification number(s)
    · EC number: 202-627-7
    · Index number: 605-010-00-4

4 First-aid measures

· Description of first aid measures
  · General information:
    Immediately 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 un consciousness 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:
    Do not induce vomiting; immediately call for medical help.
  · Information for doctor:
    · Most important symptoms and effects, both acute and delayed
      No further relevant information available.
    · Indication of any immediate medical attention and special treatment needed
      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.
  · For safety reasons unsuitable extinguishing agents: Water with full jet
  · Special hazards arising from the substance or mixture No further relevant information available.
  · Advice for firefighters
  · Protective equipment: Mouth respiratory protective device.
6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions**: 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**
  2 ppm

- **PAC-2**
  10 ppm

- **PAC-3**
  100 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.
  Protect against electrostatic charges.
  Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage**:
  - **Requirements to be met by storerooms and receptacles**:
    - No special requirements.
    - Please refer to product specification for product storage 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

<table>
<thead>
<tr>
<th>CAS: 98-01-1 2-furaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>TLV</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

· Ingredients with biological limit values:

<table>
<thead>
<tr>
<th>CAS: 98-01-1 2-furaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEI 200 mg/L</td>
</tr>
<tr>
<td>Medium: urine</td>
</tr>
<tr>
<td>Time: end of shift</td>
</tr>
<tr>
<td>Parameter: Furoic acid with hydrolysis (nonspecific)</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 break through time has to be determined by the manufacturer of the protective gloves and has to be observed.
## 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:** -36 °C (-32.8 °F)
- **Boiling point/Boiling range:** 162 °C (323.6 °F)

#### Flash point:

- 60 °C (140 °F)

#### Flammability (solid, gaseous):

- Not applicable.

#### Ignition temperature:

- 315 °C (599 °F)

#### Decomposition temperature:

- Not determined.

#### Auto igniting:

- Not determined.

#### Danger of explosion:

- Not determined.

#### Explosion limits:

- **Lower:** 2.1 Vol %
- **Upper:** 19.3 Vol %

#### Vapor pressure at 20 °C (68 °F):

- 1.5 hPa (1.1 mm Hg)

#### Density at 20 °C (68 °F):

- 1.16 g/cm³ (9.6802 lbs/gal)

#### Relative density:

- Not determined.

#### Vapor density:

- Not determined.

#### Evaporation rate:

- Not determined.

#### Solubility in / Miscibility with Water at 20 °C (68 °F):

- 83 g/l

#### Partition coefficient (n-octanol/water):

- Not determined.

#### Viscosity:

- **Dynamic:** Not determined.
- **Kinematic:** Not determined.
- **VOC content:** 0.00 %
  - 0.0 g/l / 0.00 lb/gal
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)
    |    | LD50  | LC50/4 h |
    |----|-------|----------|
    | Oral|       | 65 mg/kg (rat) |
    | Dermal|   LD50| 1,100 mg/kg |
    | Inhalative| LC50/4 h| 3 mg/l |

CAS: 98-01-1 2-furaldehyde

<table>
<thead>
<tr>
<th></th>
<th>LD50</th>
<th>LC50/4 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td></td>
<td>65 mg/kg (rat)</td>
</tr>
<tr>
<td>Dermal</td>
<td>LD50</td>
<td>1,100 mg/kg (ATE)</td>
</tr>
<tr>
<td>Inhalative</td>
<td>LC50/4 h</td>
<td>3 mg/l (ATE)</td>
</tr>
</tbody>
</table>

- 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)
    3
  - 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.
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.

14 Transport information

- **UN-Number**
  - DOT, ADR, IMDG, IATA: UN1199

- **UN proper shipping name**
  - DOT: Furaldehydes
  - ADR: 1199 FURALDEHYDES
  - IMDG, IATA: FURALDEHYDES

- **Transport hazard class(es)**
  - **DOT**
    - **Class:** 6.1 Toxic substances
    - **Label:** 6.1, 3
  - **ADR**
    - **Class:** 6.1 (TF1) Toxic substances

(Continued on page 9)
Safety Data Sheet
acc. to OSHA HCS

Trade name: Furfural synthetic

<table>
<thead>
<tr>
<th>Label</th>
<th>6.1+3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMDG</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>6.1 Toxic substances</td>
</tr>
<tr>
<td>Label</td>
<td>6.1/3</td>
</tr>
<tr>
<td>IATA</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>6.1 Toxic substances</td>
</tr>
<tr>
<td>Label</td>
<td>6.1 (3)</td>
</tr>
<tr>
<td>Packing group</td>
<td></td>
</tr>
<tr>
<td>DOT, ADR, IMDG, IATA</td>
<td>II</td>
</tr>
<tr>
<td>Marine pollutant:</td>
<td>No</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Warning: Toxic substances</td>
</tr>
<tr>
<td>Danger code (Kemler):</td>
<td>63</td>
</tr>
<tr>
<td>EMS Number:</td>
<td>F-E,S-D</td>
</tr>
<tr>
<td>Stowage Category</td>
<td>A</td>
</tr>
<tr>
<td>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Transport/Additional information:</td>
<td></td>
</tr>
<tr>
<td>DOT</td>
<td></td>
</tr>
<tr>
<td>Quantity limitations</td>
<td>On passenger aircraft/rail: 5 L</td>
</tr>
<tr>
<td>On cargo aircraft only: 60 L</td>
<td></td>
</tr>
<tr>
<td>ADR</td>
<td></td>
</tr>
<tr>
<td>Excepted quantities (EQ)</td>
<td>Code: E4</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 1 ml</td>
<td></td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
<td></td>
</tr>
<tr>
<td>IMDG</td>
<td></td>
</tr>
<tr>
<td>Limited quantities (LQ)</td>
<td>100 ml</td>
</tr>
<tr>
<td>Excepted quantities (EQ)</td>
<td>Code: E4</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 1 ml</td>
<td></td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
<td></td>
</tr>
<tr>
<td>UN &quot;Model Regulation&quot;:</td>
<td>UN 1199 FURALDEHYDES, 6.1 (3), II</td>
</tr>
</tbody>
</table>

(Continued on page 10)
Trade name: Furfural synthetic

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 not listed.
    - Chemicals known to cause reproductive toxicity for females:
      Substance is not listed.
    - 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)
    A3
  - 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
  ![GHS02](image) ![GHS06](image) ![GHS07](image) ![GHS08](image)

- Signal word
  Danger

- Hazard-determining components of labeling:
  2-furaldehyde

- Hazard statements
  - H226 Flammable liquid and vapor.
  - H301+H331 Toxic if swallowed or if inhaled.
  - H312 Harmful in contact with skin.
  - H315 Causes skin irritation.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H335 May cause respiratory irritation.

**Precautionary statements**

- **P210** Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- **P301+P310** If swallowed: Immediately call a poison center/doctor.
- **P321** Specific treatment (see on this label).
- **P330** Rinse mouth.
- **P303+P361+P353** If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- **P305+P351+P338** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P362+P364** Take off contaminated clothing and wash it before reuse.
- **P405** Store locked up.
- **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

**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** 02/11/2019 / -
- **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
  - BEI: Biological Exposure Limit
  - Flam. Liq.: Flammable liquids – Category 3
  - Acute Tox.: Acute toxicity – Category
  - Skin Irrit.: Skin corrosion/irritation – Category 2