SAFETY DATA SHEET

Recombinant Follicle Stimulating Hormone Formulation

Version: 3.0  Revision Date: 09/13/2019  SDS Number: 26810-00015  Date of last issue: 2019/04/24

Date of first issue: 2014/10/31

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Recombinant Follicle Stimulating Hormone Formulation

Manufacturer or supplier's details

Company name of supplier: MSD
Address: Kumagaya, Saitama Prefecture, Xicheng 810 MSD Co., Ltd. Menuma factory
Telephone: 048-588-8411
E-mail address: EHSDATASTEWARD@msd.com
Emergency telephone number: 1-908-423-6000

Recommended use of the chemical and restrictions on use

Recommended use: Pharmaceutical

2. HAZARDS IDENTIFICATION

GHS Classification

Reproductive toxicity: Category 1B
Specific target organ toxicity - repeated exposure: Category 1 (male reproductive organs, female reproductive organs)

GHS label elements

Signal word: Danger

Hazard pictograms: 

Hazard statements: H360FD May damage fertility. May damage the unborn child. H372 Causes damage to organs (male reproductive organs, female reproductive organs) through prolonged or repeated exposure.

Precautionary statements: Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
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Response:
P308 + P313 IF exposed or concerned: Get medical advice/attention.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents/container to an approved waste disposal plant.

Other hazards which do not result in classification
None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
<th>ENCS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol sorbitan monolaurate</td>
<td>9005-64-5</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Sucrose</td>
<td>57-50-1</td>
<td>&gt;= 1 - &lt; 10</td>
<td></td>
</tr>
<tr>
<td>Benzyl alcohol</td>
<td>100-51-6</td>
<td>&gt;= 1 - &lt; 10</td>
<td>3-1011</td>
</tr>
<tr>
<td>Recombinant Follicle Stimulating Hormone</td>
<td>146479-72-3</td>
<td>&gt;= 0.1 - &lt; 0.3</td>
<td></td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air. Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

In case of eye contact : Flush eyes with water as a precaution. Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and delayed : May damage fertility. May damage the unborn child. Causes damage to organs through prolonged or repeated exposure.

Protection of first-aiders : First Aid responders should pay attention to self-protection,
and use the recommended personal protective equipment when the potential for exposure exists (see section 8).

5. FIREFIGHTING MEASURES

Suitable extinguishing media : Water spray
 Alcohol-resistant foam
 Carbon dioxide (CO2)
 Dry chemical

Unsuitable extinguishing media : None known.

Specific hazards during firefighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides
 Metal oxides

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
 Use water spray to cool unopened containers.
 Remove undamaged containers from fire area if it is safe to do so.
 Evacuate area.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
 Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
 Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions : Discharge into the environment must be avoided.
 Prevent further leakage or spillage if safe to do so.
 Prevent spreading over a wide area (e.g. by containment or oil barriers).
 Retain and dispose of contaminated wash water.
 Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
 For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
 Clean up remaining materials from spill with suitable absorbent.
 Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
 Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.
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7. HANDLING AND STORAGE

Handling
- Technical measures: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
- Local/Total ventilation: If sufficient ventilation is unavailable, use with local exhaust ventilation.
- Advice on safe handling: Do not get on skin or clothing. Do not breathe vapours or spray mist. Do not swallow. Avoid contact with eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
- Avoidance of contact:
  - Oxidizing agents
- Hygiene measures:
  - If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

Storage
- Conditions for safe storage: Keep in properly labelled containers. Store locked up. Keep tightly closed. Store in accordance with the particular national regulations.
- Materials to avoid: Do not store with the following product types: Strong oxidizing agents
- Packaging material: Unsuitable material: None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Threshold limit value and permissible exposure limits for each component in the work environment

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sucrose</td>
<td>57-50-1</td>
<td>TWA</td>
<td>10 mg/m3</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Recombinant Follicle Stimulating Hormone</td>
<td>146479-72-3</td>
<td>TWA</td>
<td>5 µg/m3</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wipe limit</td>
<td>50 µg/100 cm²</td>
<td>Internal</td>
</tr>
</tbody>
</table>

Engineering measures: Minimize workplace exposure concentrations. If sufficient ventilation is unavailable, use with local exhaust ventilation.

Personal protective equipment
- Respiratory protection: If adequate local exhaust ventilation is not available or expo-
Filter type: Combined particulates and organic vapour type

Hand protection:

Material: Chemical-resistant gloves

Remarks:
Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection:

Skin and body protection:
Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid

Colour: No data available

Odour: No data available

Odour Threshold: No data available

pH: No data available

Melting point/freezing point: No data available

Initial boiling point and boiling range: No data available

Flash point: No data available

Evaporation rate: No data available

Flammability (solid, gas): Not applicable

Flammability (liquids): No data available

Upper explosion limit / Upper flammability limit: No data available

Lower explosion limit / Lower flammability limit: No data available
10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.
Chemical stability : Stable under normal conditions.
Possibility of hazardous reactions : Can react with strong oxidizing agents.
Conditions to avoid : None known.
Incompatible materials : Oxidizing agents
Hazardous decomposition products : No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation
SkIn contact
Ingestion
Eye contact

Acute toxicity
Not classified based on available information.

Product:
Acute oral toxicity: Acute toxicity estimate: > 2,000 mg/kg
  Method: Calculation method

Acute inhalation toxicity: Acute toxicity estimate: > 5 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: Calculation method

Components:

Polyethylene glycol sorbitan monolaurate:
  Acute inhalation toxicity: LC50 (Rat): > 5.1 mg/l
    Exposure time: 4 h
    Test atmosphere: dust/mist
    Assessment: The substance or mixture has no acute inhalation toxicity

Sucrose:
  Acute oral toxicity: LD50 (Rat): 29,700 mg/kg

Benzyl alcohol:
  Acute oral toxicity: LD50 (Rat): 1,620 mg/kg
  Acute inhalation toxicity: LC50 (Rat): > 4.178 mg/l
    Exposure time: 4 h
    Test atmosphere: dust/mist
    Method: OECD Test Guideline 403

Recombinant Follicle Stimulating Hormone:
  Acute toxicity (other routes of administration): LD50 (Rat): > 0.290 mg/kg
    Application Route: Intravenous
  LD50 (Monkey): > 0.290 mg/kg
    Application Route: Intravenous

Skin corrosion/irritation
Not classified based on available information.

Components:

Polyethylene glycol sorbitan monolaurate:
  Species: Rabbit
  Method: OECD Test Guideline 404
  Result: No skin irritation

Benzyl alcohol:
  Species: Rabbit
  Method: OECD Test Guideline 404
  Result: No skin irritation
Serious eye damage/eye irritation
Not classified based on available information.

Components:

Polyethylene glycol sorbitan monolaurate:
Species: Rabbit
Result: No eye irritation

Benzyl alcohol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Components:

Polyethylene glycol sorbitan monolaurate:
Test Type: Maximisation Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Benzyl alcohol:
Test Type: Maximisation Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Germ cell mutagenicity
Not classified based on available information.

Components:

Polyethylene glycol sorbitan monolaurate:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Sucrose:
Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test
Result: negative
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Benzyl alcohol:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: Intraperitoneal injection Result: negative

Recombinant Follicle Stimulating Hormone:
Genotoxicity in vitro: Test Type: Ames test Result: negative
Test Type: In vitro mammalian cell gene mutation test Test system: mammalian cells Result: negative
Test Type: Chromosomal aberration Test system: Human lymphocytes Result: negative
Genotoxicity in vivo: Test Type: Micronucleus test Species: Mouse Result: negative

Carcinogenicity
Not classified based on available information.

Components:
Benzyl alcohol:
Species: Mouse
Application Route: Ingestion
Exposure time: 103 weeks
Method: OECD Test Guideline 451
Result: negative

Reproductive toxicity
May damage fertility. May damage the unborn child.

Components:
Polyethylene glycol sorbitan monolaurate:
Effects on foetal development: Test Type: Embryo-foetal development Species: Rat Application Route: Ingestion Result: negative

Benzyl alcohol:
Effects on fertility: Test Type: Fertility/early embryonic development
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development:  
Species: Mouse  
Application Route: Ingestion  
Result: negative

Recombinant Follicle Stimulating Hormone:
Effects on fertility:  
Species: Rat  
Application Route: Subcutaneous  
Fertility: LOAEL: 0.11  
Symptoms: Effect on estrous cycle, Increase of early resorptions, Reduced fertility  
Result: positive

Test Type: Fertility  
Species: Rabbit  
Application Route: Subcutaneous  
Fertility: LOAEL: 0.027  
Symptoms: Reduced fertility, Reduced embryonic survival  
Result: positive

Effects on foetal development:  
Species: Rat  
Application Route: Subcutaneous  
Dose: 2.9 µg/kg  
Result: positive, No teratogenic effects

Reproductive toxicity - Assessment:  
Clear evidence of adverse effects on sexual function and fertility, based on animal experiments., Clear evidence of adverse effects on development, based on animal experiments.

STOT - single exposure  
Not classified based on available information.

STOT - repeated exposure  
Causes damage to organs (male reproductive organs, female reproductive organs) through prolonged or repeated exposure.

Components:
Recombinant Follicle Stimulating Hormone:  
Target Organs: male reproductive organs, female reproductive organs  
Assessment: Causes damage to organs through prolonged or repeated exposure.
Repeated dose toxicity

Components:

**Benzyl alcohol:**
- Species: Rat
- NOAEL: 1.072 mg/l
- Application Route: inhalation (dust/mist/fume)
- Exposure time: 28 Days
- Method: OECD Test Guideline 412

**Recombinant Follicle Stimulating Hormone:**
- Species: Monkey
- NOAEL: 0.17 mg/kg
- LOAEL: 0.86 mg/kg
- Application Route: Subcutaneous
- Exposure time: 13 Weeks
- Number of exposures: daily
- Target Organs: Reproductive organs
- Remarks: No significant adverse effects were reported

- Species: Rat
  - NOAEL: 0.14 mg/kg
  - LOAEL: 0.28 mg/kg
  - Application Route: Subcutaneous
  - Exposure time: 1 year
  - Target Organs: Testis
  - Remarks: No significant adverse effects were reported

- Species: Dog
  - NOAEL: 0.14 mg/kg
  - LOAEL: 0.28 mg/kg
  - Application Route: Subcutaneous
  - Exposure time: 1 year
  - Target Organs: Testis
  - Remarks: No significant adverse effects were reported

- Species: Rat
  - NOAEL: 0.028 mg/kg
  - LOAEL: 0.28 mg/kg
  - Application Route: Subcutaneous
  - Exposure time: 1 year
  - Target Organs: Testis

Aspiration toxicity
Not classified based on available information.

Experience with human exposure

Components:

**Recombinant Follicle Stimulating Hormone:**
12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

**Polyethylene glycol sorbitan monolaurate:**
- **Toxicity to fish**
  - LL50 (Danio rerio (zebra fish)): > 100 mg/l
  - Exposure time: 96 h
  - Method: OECD Test Guideline 203
- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)**
  - NOEC (Daphnia magna (Water flea)): 10 mg/l
  - Exposure time: 21 d
  - Method: OECD Test Guideline 211

**Benzyl alcohol:**
- **Toxicity to fish**
  - LC50 (Pimephales promelas (fathead minnow)): 460 mg/l
  - Exposure time: 96 h
- **Toxicity to daphnia and other aquatic invertebrates**
  - EC50 (Daphnia magna (Water flea)): 230 mg/l
  - Exposure time: 48 h
  - Method: OECD Test Guideline 202
- **Toxicity to algae/aquatic plants**
  - EC50 (Pseudokirchneriella subcapitata (green algae)): 770 mg/l
  - Exposure time: 72 h
  - Method: OECD Test Guideline 201
  - NOEC (Pseudokirchneriella subcapitata (green algae)): 310 mg/l
  - Exposure time: 72 h
  - Method: OECD Test Guideline 201
- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)**
  - NOEC (Daphnia magna (Water flea)): 51 mg/l
  - Exposure time: 21 d
  - Method: OECD Test Guideline 211

Persistence and degradability

Components:

**Polyethylene glycol sorbitan monolaurate:**
- **Biodegradability**
  - Result: Readily biodegradable.
  - Biodegradation: > 60 %
  - Exposure time: 28 d

**Benzyl alcohol:**
- **Biodegradability**
  - Result: Readily biodegradable.
  - Biodegradation: 92 - 96 %
13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : Dispose of in accordance with local regulations.
Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

International Regulations
UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations
Refer to section 15 for specific national regulation.
15. REGULATORY INFORMATION

Related Regulations

**Fire Service Law**
Not applicable to dangerous materials / designated flammables.

**Chemical Substance Control Law**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono(or poly)ether of (mono ester of anhydro(or dianhydro)glucitol and</td>
<td>222</td>
</tr>
<tr>
<td>dodecanoic acid) and alpha-hydro-omega-hydroxypoly(oxyethylene)</td>
<td></td>
</tr>
</tbody>
</table>

**Industrial Safety and Health Law**

- **Harmful Substances Prohibited from Manufacture**
  Not applicable

- **Harmful Substances Required Permission for Manufacture**
  Not applicable

- **Substances Prevented From Impairment of Health**
  Not applicable

- **Circular concerning Information on Chemicals having Mutagenicity - Annex 2: Information on Existing Chemicals having Mutagenicity**
  Not applicable

- **Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity**
  Not applicable

- **Substances Subject to be Notified Names**
  Not applicable

- **Substances Subject to be Indicated Names**
  Not applicable

- **Ordinance on Prevention of Hazards Due to Specified Chemical Substances**
  Not applicable

- **Ordinance on Prevention of Lead Poisoning**
  Not applicable

- **Ordinance on Prevention of Tetraalkyl Lead Poisoning**
  Not applicable

- **Ordinance on Prevention of Organic Solvent Poisoning**
  Not applicable

- **Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)**
  Not applicable

- **Poisonous and Deleterious Substances Control Law**
  Not applicable
Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
Not applicable

High Pressure Gas Safety Act
Not applicable

Explosive Control Law
Not applicable

Vessel Safety Law
Not regulated as a dangerous good

Aviation Law
Not regulated as a dangerous good

Marine Pollution and Sea Disaster Prevention etc Law
Bulk transportation : Noxious liquid substance (Category Z)
Pack transportation : Not classified as marine pollutant

Narcotics and Psychotropics Control Act
Narcotic or Psychotropic Raw Material (Export / Import Permission)
Not applicable
Specific Narcotic or Psychotropic Raw Material (Export / Import permission)
Not applicable

Waste Disposal and Public Cleansing Law
Industrial waste

The components of this product are reported in the following inventories:
AICS : not determined
DSL : not determined
IECSC : not determined

16. OTHER INFORMATION

Further information

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

Date format : yyyy/mm/dd

Full text of other abbreviations
ACGIH : USA. ACGIH Threshold Limit Values (TLV)
ACGIH / TWA : 8-hour, time-weighted average
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user’s end product, if applicable.