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

1.1. Product identifier

Product form: Mixture
Trade name: Murashige & Skoog Medium (Micro and Macro elements)
Product code: M0221
Product group: Raw material

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

1.2.1. Relevant identified uses

Main use category: Professional use
Industrial/Professional use spec: For professional use only. Duchefa Biochemie B.V. products are intended only for "in vitro laboratory" research purposes.

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Manufacturer
Duchefa Biochemie B.V.
A. Hofmanweg 71
2031 BH Haarlem - The Netherlands
T +31(0)23-5319093 - F +31(0)23-5318027
info@duchefa.nl

1.4. Emergency telephone number

Emergency number: Supplier contact information:
+31(0)23-5319093 (M-F 09:00-17:00)
+31(0)6-30109355 (outside office hours)

<table>
<thead>
<tr>
<th>Organisation/Company</th>
<th>Address</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization world directory of poison centres</td>
<td><a href="http://apps.who.int/poisoncentres/">http://apps.who.int/poisoncentres/</a></td>
<td>Consult website for a local poison centre</td>
</tr>
</tbody>
</table>

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 2: H319
Specific target organ toxicity — Single exposure, Category 3: H335
Respiratory tract irritation

Full text of H statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available
2.2. Label elements

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

Hazard pictograms (CLP):

- GHS07

Signal word (CLP): Warning

Hazard statements (CLP):
- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H335 - May cause respiratory irritation.

Precautionary statements (CLP):
- P261 - Avoid breathing dust.
- P302+P352 - IF ON SKIN: Wash with plenty of water.
- P305+P351 - IF IN EYES: Rinse cautiously with water for several minutes.

Extra phrases:
Based on research by TNO in Rijswijk (The Netherlands), commissioned by Duchefa Biochemie B.V. in Haarlem, the medium has no oxidising or explosive properties. As such the substance is not classified as oxidizing (H272, GHS03).

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium nitrate</td>
<td>(CAS-No.) 7757-79-1 (EC-No.) 231-818-8</td>
<td>44,165</td>
<td>Ox. Sol. 2, H272</td>
</tr>
<tr>
<td>Ammonium nitrate</td>
<td>(CAS-No.) 6484-52-2 (EC-No.) 229-347-8</td>
<td>38,353</td>
<td>Ox. Sol. 3, H272</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>(CAS-No.) 10043-52-4 (EC-No.) 233-140-8 (EC Index-No.) 017-013-00-2</td>
<td>7,718</td>
<td>Eye Irrit. 2, H319</td>
</tr>
<tr>
<td>Magnesium sulfate anhydrous</td>
<td>(CAS-No.) 7487-88-9 (EC-No.) 231-298-2</td>
<td>4,197</td>
<td>Not classified</td>
</tr>
<tr>
<td>Potassium dihydrogenphosphate</td>
<td>(CAS-No.) 7778-77-0 (EC-No.) 231-913-4</td>
<td>3,952</td>
<td>Not classified</td>
</tr>
<tr>
<td>Ethylenediaminetetraacetate ferric sodium</td>
<td>(CAS-No.) 15708-41-5 (EC-No.) 239-802-2</td>
<td>0,853</td>
<td>Not classified</td>
</tr>
<tr>
<td>Manganese sulfate monohydrate</td>
<td>(CAS-No.) 10034-96-5 (EC-No.) 232-089-9 (EC Index-No.) 025-003-00-4</td>
<td>0,393</td>
<td>Eye Dam. 1, H318 STOT RE 2, H373 Aquatic Chronic 2, H411</td>
</tr>
</tbody>
</table>
Zinc sulphate  | (CAS-No.) 7446-20-0  
               | (EC-No.) 231-793-3  
               | (EC Index-No.) 030-006-00-9  
               | 0,2  
               | Acute Tox. 4 (Oral), H302  
               | Eye Dam. 1, H318  
               | Aquatic Acute 1, H400  
               | Aquatic Chronic 1, H410  
Boric acid substance listed as REACH Candidate  | (CAS-No.) 10043-35-3  
                                            | (EC-No.) 233-139-2  
                                            | (EC Index-No.) 005-007-00-2  
                                            | 0,144  
                                            | Repr. 1B, H360FD  
Potassium iodide  | (CAS-No.) 7681-11-0  
                 | (EC-No.) 231-659-4  
                 | 0,0193  
                 | Acute Tox. 4 (Oral), H302  
                 | Skin Irrit. 2, H315  
                 | Eye Irrit. 2, H319  
Sodium molybdate dihydrate  | (CAS-No.) 10102-40-6  
                               | (EC-No.) 231-551-7  
                               | 0,0058  
                               | Not classified  
Cobalt(II) chloride substance listed as REACH Candidate (Cobalt dichloride)  | (CAS-No.) 7646-79-9  
                                                      | (EC-No.) 231-589-4  
                                                      | (EC Index-No.) 027-004-00-5  
                                                      | 0,00058  
                                                      | Acute Tox. 4 (Oral), H302  
                                                      | Resp. Sens. 1, H334  
                                                      | Skin Sens. 1, H317  
                                                      | Muta. 2, H341  
                                                      | Carc. 1B, H350I  
                                                      | Repr. 1B, H360F  
                                                      | Aquatic Acute 1, H400  
                                                      | Aquatic Chronic 1, H410  
Copper sulphate  | (CAS-No.) 7758-99-8  
                   | (EC-No.) 231-847-6  
                   | (EC Index-No.) 029-004-00-0  
                   | 0,00058  
                   | Acute Tox. 4 (Oral), H302  
                   | Skin Irrit. 2, H315  
                   | Eye Irrit. 2, H319  
                   | Aquatic Acute 1, H400  
                   | Aquatic Chronic 1, H410  

Specific concentration limits:

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>Specific concentration limits</th>
</tr>
</thead>
</table>
| Boric acid                | (CAS-No.) 10043-35-3  
                           | (EC-No.) 233-139-2  
                           | (EC Index-No.) 005-007-00-2  
                           | (C >= 5,5) Repr. 1B, H360FD  |
| Cobalt(II) chloride       | (CAS-No.) 7646-79-9  
                           | (EC-No.) 231-589-4  
                           | (EC Index-No.) 027-004-00-5  
                           | (C >= 0,01) Carc. 1B, H350i  |

Full text of H-statements: see section 16

**SECTION 4: First aid measures**

4.1. Description of first aid measures

First-aid measures general : Seek medical attention if ill effect develops.
First-aid measures after inhalation : Remove victim to fresh air.
First-aid measures after skin contact : Wash skin with mild soap and water.
First-aid measures after eye contact : Rinse with water.
First-aid measures after ingestion : Rinse mouth.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after skin contact : Causes skin irritation.
Symptoms/effects after eye contact : Redness, pain.
4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Alcohol resistant foam.
Dry chemical powder.
Carbon dioxide (CO2).
Water spray.

5.2. Special hazards arising from the substance or mixture
Hazardous decomposition products in case of fire: Under fire conditions, hazardous fumes will be present:
- COx
- NOx
- SOx.

5.3. Advice for firefighters
Firefighting instructions: Prevent fire fighting water from entering the environment.
Protection during firefighting: Wear proper protective equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
General measures: Avoid raising powdered materials into airborne dust.

6.1.1. For non-emergency personnel
Emergency procedures: Wear suitable protective clothing.

6.1.2. For emergency responders
No additional information available

6.2. Environmental precautions
Prevent entry to sewers and public waters.

6.3. Methods and material for containment and cleaning up
Methods for cleaning up: Sweep up dry powder and dispose properly.

6.4. Reference to other sections
No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling: Avoid dust formation. Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Store at room temperature
Store in dry, well-ventilated area
Hygroscopic
Keep container tightly closed and dry.
7.3. **Specific end use(s)**
For professional use only. Duchefa Biochemie B.V. products are intended only for "in vitro laboratory" research purposes.

**SECTION 8: Exposure controls/personal protection**

8.1. **Control parameters**
No additional information available

8.2. **Exposure controls**

**Hand protection:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Permeation</th>
<th>Thickness (mm)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Nitrile rubber (NBR)</td>
<td>6 (&gt; 480 minutes)</td>
<td>0,11</td>
<td>EN 374</td>
</tr>
</tbody>
</table>

**Eye protection:**
Safety glasses (to European standard EN 166 or equivalent)

**Skin and body protection:**
In case of possible repeated skin contact wear protective clothing

**Respiratory protection:**
Where excessive dust may result, wear approved mask. Type P2 (EN 143)

**SECTION 9: Physical and chemical properties**

9.1. **Information on basic physical and chemical properties**

- **Physical state:** Solid
- **Appearance:** Powder.
- **Colour:** White to slightly yellow.
- **Odour:** Characteristic. Weak.
- **Odour threshold:** No data available
- **pH:** No data available
- **Relative evaporation rate (butylacetate=1):** No data available
- **Melting point:** No data available
- **Freezing point:** No data available
- **Boiling point:** No data available
- **Flash point:** No data available
- **Auto-ignition temperature:** No data available
- **Decomposition temperature:** No data available
- **Flammability (solid, gas):** No data available
- **Vapour pressure:** No data available
- **Relative vapour density at 20 °C:** No data available
- **Relative density:** No data available
- **Solubility:** Readily soluble in water.
- **Log Pow:** No data available
- **Viscosity, kinematic:** No data available
- **Viscosity, dynamic:** No data available
Explosive properties : No data available
Oxidising properties : No data available
Explosive limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
Stable under normal conditions of storage, handling and use.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
No additional information available

10.4. Conditions to avoid
Moisture.

10.5. Incompatible materials
Strong oxidizers.

10.6. Hazardous decomposition products
Thermal decomposition generates:
- COx
- NOx
- SOx
- Phosphorus oxides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified
Skin corrosion/irritation : Causes skin irritation.
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : May cause respiratory irritation.
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity
No additional information available
12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Murashige &amp; Skoog Medium (Micro and Macro elements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric acid (10043-35-3)</td>
<td>This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII</td>
</tr>
<tr>
<td></td>
<td>This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII</td>
</tr>
</tbody>
</table>

12.6. Other adverse effects
Additional information: Prevent entry to sewers and public waters. Avoid release to the environment

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste treatment methods: Dispose in a safe manner in accordance with local/national regulations. Avoid release to the environment.

SECTION 14: Transport information
In accordance with ADR / IATA / IMDG

<table>
<thead>
<tr>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1. UN number</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
<tr>
<td>14.2. UN proper shipping name</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
<tr>
<td>14.3. Transport hazard class(es)</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
<tr>
<td>14.4. Packing group</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
<tr>
<td>14.5. Environmental hazards</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>

14.6. Special precautions for user
- Overland transport
  Not regulated
- Transport by sea
Not regulated

- Air transport
Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations
Contains no REACH substances with Annex XVII restrictions
Contains a substance on the REACH candidate list in concentration $\geq 0.1\%$ or with a lower specific limit: Boric acid (EC 233-139-2, CAS 10043-35-3)
Contains no REACH Annex XIV substances

15.1.2. National regulations
Ensure all national/local regulations are observed.

Germany
Reference to AwSV

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV

Netherlands
SZW-lijst van kankerverwekkende stoffen

SZW-lijst van mutagene stoffen

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling

Denmark
Recommendations Danish Regulation

15.2. Chemical safety assessment
No additional information available
SECTION 16: Other information

Indication of changes:

2.2 Hazard statements (CLP) Added H315;H319;H335
2.2 Signal word (CLP) Added Warning
2.2 Hazard pictograms (CLP) Added GHS07
2.2 Precautionary statements (CLP) Added P261;P302+P352;P305+P351

Abbreviations and acronyms:

ATE  Acute Toxicity Estimate
ADR  European Agreement concerning the International Carriage of Dangerous Goods by Road
BCF  Bioconcentration factor
CLP  Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DPD  Dangerous Preparations Directive 1999/45/EC
DSD  Dangerous Substances Directive 67/548/EEC
IATA  International Air Transport Association
IMDG  International Maritime Dangerous Goods
LC50  Median lethal concentration
LD50  Median lethal dose
LOAEL  Lowest Observed Adverse Effect Level
NOAEC  No-Observed Adverse Effect Concentration
PBT  Persistent Bioaccumulative Toxic
SDS  Safety Data Sheet

Data sources


Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Acute Tox. 4 (Oral)</th>
<th>Acute toxicity (oral), Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Acute 1</td>
<td>Hazardous to the aquatic environment — Acute Hazard, Category 1</td>
</tr>
<tr>
<td>Aquatic Chronic 1</td>
<td>Hazardous to the aquatic environment — Chronic Hazard, Category 1</td>
</tr>
<tr>
<td>Aquatic Chronic 2</td>
<td>Hazardous to the aquatic environment — Chronic Hazard, Category 2</td>
</tr>
<tr>
<td>Carc. 1B</td>
<td>Carcinogenicity (inhalation) Category 1B</td>
</tr>
<tr>
<td>Eye Dam. 1</td>
<td>Serious eye damage/eye irritation, Category 1</td>
</tr>
<tr>
<td>Eye Irrit. 2</td>
<td>Serious eye damage/eye irritation, Category 2</td>
</tr>
<tr>
<td>Muta. 2</td>
<td>Germ cell mutagenicity, Category 2</td>
</tr>
<tr>
<td>Ox. Sol. 2</td>
<td>Oxidising Solids, Category 2</td>
</tr>
<tr>
<td>Ox. Sol. 3</td>
<td>Oxidising Solids, Category 3</td>
</tr>
<tr>
<td>Repr. 1B</td>
<td>Reproductive toxicity, Category 1B</td>
</tr>
<tr>
<td>Resp. Sens. 1</td>
<td>Respiratory sensitisation, Category 1</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
<td>Skin corrosion/irritation, Category 2</td>
</tr>
<tr>
<td>Skin Sens. 1</td>
<td>Skin sensitisation, Category 1</td>
</tr>
<tr>
<td>STOT RE 2</td>
<td>Specific target organ toxicity — Repeated exposure, Category 2</td>
</tr>
</tbody>
</table>
STOT SE 3 | Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
---|---
H272 | May intensify fire; oxidiser.
H302 | Harmful if swallowed.
H315 | Causes skin irritation.
H317 | May cause an allergic skin reaction.
H318 | Causes serious eye damage.
H319 | Causes serious eye irritation.
H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 | May cause respiratory irritation.
H341 | Suspected of causing genetic defects.
H350i | May cause cancer by inhalation.
H360F | May damage fertility.
H360FD | May damage fertility. May damage the unborn child.
H373 | May cause damage to organs through prolonged or repeated exposure.
H400 | Very toxic to aquatic life.
H410 | Very toxic to aquatic life with long lasting effects
H411 | Toxic to aquatic life with long lasting effects

SDS Biochemicals version 2018

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.