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 incl. Gamborg B5 Vitamins)
Product code: M0231
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]

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>H Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation, Category 2</td>
<td>H315</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation, Category 2</td>
<td>H319</td>
</tr>
<tr>
<td>Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation</td>
<td>H335</td>
</tr>
</tbody>
</table>

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 oxidising (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>43,044</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>37,38</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>7,522</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>4,09</td>
<td>Not classified</td>
</tr>
<tr>
<td>Potassium dihydrogenphosphate</td>
<td>(CAS-No.) 7778-77-0 (EC-No.) 231-913-4</td>
<td>3,851</td>
<td>Not classified</td>
</tr>
<tr>
<td>Myo-Inositol</td>
<td>(CAS-No.) 87-89-8 (EC-No.) 201-781-2</td>
<td>2,266</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>0,831</td>
<td>Not classified</td>
</tr>
</tbody>
</table>
Manganese sulfate monohydrate | (CAS-No.) 10034-96-5 | (EC-No.) 232-089-9 | (EC Index-No.) 025-003-00-4 | 0,383 | Eye Dam. 1, H318 | STOT RE 2, H373 | Aquatic Chronic 2, H411

Thiamine hydrochloride | (CAS-No.) 67-03-8 | (EC-No.) 200-641-8 | | 0,227 | | | |

Zinc sulphate | (CAS-No.) 7446-20-0 | (EC-No.) 231-793-3 | (EC Index-No.) 030-006-00-9 | 0,195 | 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 | 0,141 | Repr. 1B, H360FD |

Nicotinic acid | | (CAS-No.) 59-67-6 | (EC-No.) 200-441-0 | | 0,023 | | Eye Irrit. 2, H319 |

Pyridoxine HCl (Vitamine B6) | | (CAS-No.) 58-56-0 | (EC-No.) 200-386-2 | | 0,023 | | Eye Dam. 1, H318 |

Potassium iodide | | (CAS-No.) 7681-11-0 | (EC-No.) 231-659-4 | | 0,0188 | | 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 | | 0,0057 | | Not classified |

Cobalt(II) chloride | substance listed as REACH Candidate | (CAS-No.) 7646-79-9 | (EC-No.) 231-589-4 | (EC Index-No.) 027-004-00-5 | 0,0006 | | 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 | 0,0006 | | 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>
<tbody>
<tr>
<td>Boric acid</td>
<td>(CAS-No.) 10043-35-3</td>
<td>(C &gt;= 5,5) Repr. 1B, H360FD</td>
</tr>
<tr>
<td></td>
<td>(EC-No.) 233-139-2</td>
<td>(EC Index-No.) 005-007-00-2</td>
</tr>
<tr>
<td>Cobalt(II) chloride</td>
<td>(CAS-No.) 7646-79-9</td>
<td>(C &gt;= 0,01) Carc. 1B, H350i</td>
</tr>
<tr>
<td></td>
<td>(EC-No.) 231-589-4</td>
<td>(EC Index-No.) 027-004-00-5</td>
</tr>
</tbody>
</table>

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>PBT criteria of REACH regulation, annex XIII</th>
<th>vPvB criteria of REACH regulation, annex XIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric acid (10043-35-3)</td>
<td>This substance/mixture does not meet the PBT</td>
<td>This substance/mixture does not meet the vPvB</td>
</tr>
<tr>
<td></td>
<td>criteria</td>
<td>criteria</td>
</tr>
<tr>
<td></td>
<td></td>
<td></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>
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<tbody>
<tr>
<td>14.1</td>
<td>UN number</td>
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<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
<tr>
<td>14.2</td>
<td>UN proper shipping name</td>
<td></td>
</tr>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
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</tbody>
</table>
14.3. Transport hazard class(es)

<table>
<thead>
<tr>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>

14.4. Packing group

<table>
<thead>
<tr>
<th>Packing group</th>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
<td></td>
</tr>
</tbody>
</table>

14.5. Environmental hazards

<table>
<thead>
<tr>
<th>Environmental hazards</th>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
<td></td>
</tr>
</tbody>
</table>

No supplementary information available

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 ≥ 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: Water hazard class (WGK) 1, low hazard to water (Classification according to AwSV, Annex 1)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV: Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

**Netherlands**

SZW-lijst van kankerverwekkende stoffen: Manganese sulfate monohydrate, Cobalt(II) chloride are listed

SZW-lijst van mutagene stoffen: Manganese sulfate monohydrate is listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : None of the components are listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : Boric acid, Cobalt(II) chloride are listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : Boric acid is listed

Denmark
Recommendations Danish Regulation : Young people below the age of 18 years are not allowed to use the product
Pregnant/breastfeeding women working with the product must not be in direct contact with the product
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment
No additional information available

SECTION 16: Other information

Indication of changes:

<table>
<thead>
<tr>
<th>2.2</th>
<th>Hazard statements (CLP)</th>
<th>Added</th>
<th>H315;H319;H335</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>Signal word (CLP)</td>
<td>Added</td>
<td>Warning</td>
</tr>
<tr>
<td>2.2</td>
<td>Hazard pictograms (CLP)</td>
<td>Added</td>
<td>GHS07</td>
</tr>
<tr>
<td>2.2</td>
<td>Precautionary statements (CLP)</td>
<td>Added</td>
<td>P261;P302+P352;P305+P351</td>
</tr>
</tbody>
</table>

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-Oberved Adverse Effect Concentration |
| PBT | Persistent Bioaccumulative Toxic |
| SDS | Safety Data Sheet |

Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Tox. 4 (Oral)</td>
<td>Acute toxicity (oral), Category 4</td>
</tr>
<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>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>
<tr>
<td>STOT SE 3</td>
<td>Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation</td>
</tr>
<tr>
<td>H272</td>
<td>May intensify fire; oxidiser.</td>
</tr>
<tr>
<td>H302</td>
<td>Harmful if swallowed.</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H334</td>
<td>May cause allergy or asthma symptoms or breathing difficulties if inhaled.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>H341</td>
<td>Suspected of causing genetic defects.</td>
</tr>
<tr>
<td>H350i</td>
<td>May cause cancer by inhalation.</td>
</tr>
<tr>
<td>H360F</td>
<td>May damage fertility.</td>
</tr>
<tr>
<td>H360FD</td>
<td>May damage fertility. May damage the unborn child.</td>
</tr>
<tr>
<td>H373</td>
<td>May cause damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>H410</td>
<td>Very toxic to aquatic life with long lasting effects</td>
</tr>
<tr>
<td>H411</td>
<td>Toxic to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

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.