

Murashige and Skoog modified basal medium (with2iP)

Apollo Scientific

Part Number: PMM701

Version No: 1.1

Safety Data Sheet (Conforms to Annex II of REACH (1907/2006) - Regulation 2020/878)

Chemwatch Hazard Alert Code: 4

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S.REACH.GB-NIR.EN

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

1.1. Product Identifier

Product name	Murashige and Skoog modified basal medium (with2iP)
Synonyms	Not Available
Proper shipping name	OXIDIZING SOLID, N.O.S. (contains Ammonium nitrate and potassium nitrate)
Other means of identification	Not Available

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

Relevant identified uses	Use according to manufacturer's directions.
Uses advised against	No specific uses advised against are identified.

1.3. Details of the manufacturer or supplier of the safety data sheet

Registered company name	Apollo Scientific
Address	Whitefield Road, Bredbury SK62QR United Kingdom
Telephone	01614060505
Fax	0161 406 0506
Website	http://www.apolloscientific.co.uk/
Email	sales@apolloscientific.co.uk

1.4. Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	Not Available
Other emergency telephone numbers	Not Available

SECTION 2 Hazards identification

2.1. Classification of the substance or mixture

Classification according to regulation (EC) No 1272/2008 [CLP] and amendments [1]	H302 - Acute Toxicity (Oral) Category 4, H319 - Serious Eye Damage/Eye Irritation Category 2, H272 - Oxidizing Solids Category 2
Legend:	1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

2.2. Label elements

Hazard pictogram(s)	
Signal word	Danger
Hazard statement(s)	
H302	Harmful if swallowed.

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H319	Causes serious eye irritation.
H272	May intensify fire; oxidiser.

Supplementary Phrases

EUH208	Contains EDTA iron sodium salt. May produce an allergic reaction.
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Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep away from clothing and other combustible materials.
P264	Wash all exposed external body areas thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves, protective clothing, eye protection and face protection.

Precautionary statement(s) Response

P370+P378	In case of fire: Use water jets to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P330	Rinse mouth.

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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2.3. Other hazards

Cumulative effects may result following exposure*.

May produce discomfort of the respiratory system and skin*.

Limited evidence of a carcinogenic effect*.

Possible skin sensitizer*.

Ammonium nitrate	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
boric acid	Listed in the European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation
boric acid	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)

SECTION 3 Composition / information on ingredients

3.1.Substances

See 'Composition on ingredients' in Section 3.2

3.2.Mixtures

1. CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classification according to regulation (EC) No 1272/2008 [CLP] and amendments	SCL / M-Factor	Nanoform Particle Characteristics
1. 6484-52-2 2.229-347-8 3.Not Available 4.Not Available	37.12	Ammonium nitrate	Serious Eye Damage/Eye Irritation Category 2, Oxidizing Solids Category 3; H319, H272 [1]	Not Available	Not Available
1. 7757-79-1 2.231-818-8 3.Not Available 4.Not Available	45.75	potassium nitrate	Oxidizing Solids Category 3, Acute Toxicity (Oral) Category 4, Serious Eye Damage/Eye Irritation Category 2; H272, H302, H319 [1]	Not Available	Not Available
1. 15708-41-5 2.239-802-2 3.Not Available 4.Not Available	0.83	EDTA iron sodium salt	Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2, Sensitisation (Skin) Category 1, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3; H315, H319, H317, H335 [1]	Not Available	Not Available
1. 7758-99-8 2.Not Available 3.029-004-00-0 029-023-00-4 4.Not Available	0.0006	copper sulfate pentahydrate	Acute Toxicity (Oral) Category 4, Serious Eye Damage/Eye Irritation Category 1, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1; H302, H318, H400, H410 [2]	oral: ATE = 481 mg/kg bw M = 10 M = 1	Not Available
1. 10102-40-6 2.231-551-7 3.Not Available 4.Not Available	0.006	sodium molybdate	Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 1, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3 , Specific Target Organ Toxicity - Repeated Exposure Category 2; H302, H315, H318, H335, H373 [1]	Not Available	Not Available

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1. CAS No 2. EC No 3. Index No 4. REACH No	%[weight]	Name	Classification according to regulation (EC) No 1272/2008 [CLP] and amendments	SCL / M-Factor	Nanoform Particle Characteristics
1. 10034-96-5 2. Not Available 3. Not Available 4. Not Available	0.38	<u>Manganese(II) sulphate monohydrate</u> *	Hazardous to the Aquatic Environment Long-Term Hazard Category 2, Specific Target Organ Toxicity - Repeated Exposure Category 2; H411, H373 [1]	Not Available	Not Available
1. 7681-11-0 2. 231-659-4 3. Not Available 4. Not Available	0.019	<u>potassium iodide</u>	Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2, Sensitisation (Skin) Category 1, Sensitisation (Respiratory) Category 1, Reproductive Toxicity Category 2; H315, H319, H317, H334, H361d [1]	Not Available	Not Available
1. 10043-35-3 2. 233-139-2/234-343-4 3. 005-007-00-2 4. Not Available	0.14	<u>boric acid</u>	Reproductive Toxicity Category 1B; H360FD [2]	Not Available	Not Available
1. 321-30-2 2. 206-286-5 3. Not Available 4. Not Available	0.67	<u>Adenine hemisulphate</u>	Acute Toxicity (Oral) Category 4; H302 [1]	Not Available	Not Available
Legend: 1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties					

SECTION 4 First aid measures

4.1. Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: <ul style="list-style-type: none"> Wash out immediately with fresh running water. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. Seek medical attention without delay; if pain persists or recurs seek medical attention. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: <ul style="list-style-type: none"> Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> If fumes, aerosols or combustion products are inhaled remove from contaminated area. Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none"> Immediately give a glass of water. First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methaemoglobin.

- Most produce a peak effect within 30 minutes.
- Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methaemoglobin.
- Initial attention should be directed towards improving oxygen delivery, with assisted ventilation, if necessary. Hyperbaric oxygen has not demonstrated conclusive benefits.
- Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Naloxone, glucose and thiamine should be given if a multiple ingestion is suspected.
- Decontaminate using Ipecac Syrup for alert patients or lavage for obtunded patients who present within 2-4 hours of ingestion.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 5 minutes; repeat, using the same dose if symptoms of hypoxia fail to subside within 1 hour.

[Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Methaemoglobin in blood	1.5% of haemoglobin	During or end of shift	B,NS,SQ

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant; also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

SECTION 5 Firefighting measures

5.1. Extinguishing media

FOR SMALL FIRE:

Continued...

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- USE FLOODING QUANTITIES OF WATER.
- **DO NOT** use dry chemical, CO₂, foam or halogenated-type extinguishers.

FOR LARGE FIRE

- Flood fire area with water from a protected position

5.2. Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> ‣ Avoid storage with reducing agents. ‣ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
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5.3. Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ May be violently or explosively reactive. ‣ Wear breathing apparatus plus protective gloves. ‣ Prevent, by any means available, spillage from entering drains or water course. ‣ Fight fire from a safe distance, with adequate cover. ‣ Extinguishers should be used only by trained personnel. ‣ Use water delivered as a fine spray to control fire and cool adjacent area. ‣ Avoid spraying water onto liquid pools. ‣ DO NOT approach containers suspected to be hot. ‣ Cool fire exposed containers with water spray from a protected location. ‣ If safe to do so, remove containers from path of fire. ‣ If fire gets out of control withdraw personnel and warn against entry. ‣ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ‣ Will not burn but increases intensity of fire. ‣ Heating may cause expansion or decomposition leading to violent rupture of containers. ‣ Heat affected containers remain hazardous. ‣ Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition. ‣ May emit irritating, poisonous or corrosive fumes. <p>Decomposition may produce toxic fumes of:</p> <p>hydrogen iodide nitrogen oxides (NO_x) metal oxides</p>

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See section 8

6.2. Environmental precautions

See section 12

6.3. Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ‣ Clean up all spills immediately. ‣ No smoking, naked lights, ignition sources. ‣ Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result. ‣ Avoid breathing dust or vapours and all contact with skin and eyes. ‣ Control personal contact with the substance, by using protective equipment. ‣ Contain and absorb spill with dry sand, earth, inert material or vermiculite. ‣ DO NOT use sawdust as fire may result. ‣ Scoop up solid residues and seal in labelled drums for disposal. ‣ Neutralise/decontaminate area.
Major Spills	<ul style="list-style-type: none"> ‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ May be violently or explosively reactive. ‣ Wear full body protective clothing with breathing apparatus. ‣ Prevent, by any means available, spillage from entering drains or water course. ‣ Consider evacuation (or protect in place). ‣ No smoking, flames or ignition sources. ‣ Increase ventilation. ‣ Contain spill with sand, earth or other clean, inert materials. ‣ NEVER use organic absorbents such as sawdust, paper, cloth; as fire may result. ‣ Avoid any contamination by organic matter. ‣ Use spark-free and explosion-proof equipment. ‣ Collect any recoverable product into labelled containers for possible recycling. ‣ DO NOT mix fresh with recovered material. ‣ Collect residues and seal in labelled drums for disposal. ‣ Wash area and prevent runoff into drains. ‣ Decontaminate equipment and launder all protective clothing before storage and re-use. ‣ If contamination of drains or waterways occurs advise emergency services.

6.4. Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

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7.1. Precautions for safe handling

Safe handling	<p>For oxidisers, including peroxides.</p> <ul style="list-style-type: none"> · Avoid personal contact and inhalation of dust, mist or vapours. · Provide adequate ventilation. · Always wear protective equipment and wash off any spillage from clothing. · Keep material away from light, heat, flammables or combustibles. · Keep cool, dry and away from incompatible materials. · Avoid physical damage to containers. · DO NOT repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use. · Use only minimum quantity required. · Avoid using solutions of peroxides in volatile solvents. Solvent evaporation should be controlled to avoid dangerous concentration of the peroxide. · Do NOT allow oxidisers to contact iron or compounds of iron, cobalt, or copper, metal oxide salts, acids or bases. · Do NOT use metal spatulas to handle oxidisers · Do NOT use glass containers with screw cap lids or glass stoppers. · Store peroxides at the lowest possible temperature, consistent with their solubility and freezing point. · CAUTION: Do NOT store liquids or solutions of peroxides at a temperature below that at which the oxidiser freezes or precipitates. Peroxides, in particular, in this form are extremely shock and heat-sensitive. Refrigerated storage of peroxides must ONLY be in explosion-proof units. · The hazards and consequences of fires and explosions during synthesis and use of oxidisers is widely recognised; spontaneous or induced decomposition may culminate in a variety of ways, ranging from moderate gassing to spontaneous ignition or explosion. The heat released from spontaneous decomposition of an energy-rich compound causes a rise in the surrounding temperature; the temperature will rise until thermal balance is established or until the material heats to decomposition, · The most effective means for minimising the consequences of an accident is to limit quantities to a practical minimum. Even gram-scale explosions can be serious. Once ignited the burning of peroxides cannot be controlled and the area should be evacuated. · Unless there is compelling reason to do otherwise, peroxide concentration should be limited to 10% (or less with vigorous reactants). Peroxide concentration is rarely as high as 1% in the reaction mixture of polymerisation or other free-radical reactions, · Oxidisers should be added slowly and cautiously to the reaction medium. This should be completed prior to heating and with good agitation. · Addition oxidisers to the hot monomer is extremely dangerous. A violent reaction (e.g., fire or explosion) can result from inadvertent mixing of promoters (frequently used with peroxides in polymerisation systems) with full-strength oxidisers · Organic peroxides are very sensitive to contamination (especially heavy-metal compounds, metal oxide salts, alkaline materials including amines, strong acids, and many varieties of dust and dirt). This can initiate rapid, uncontrolled decomposition of peroxides and possible generation of intense heat, fire or explosion The consequences of accidental contamination from returning withdrawn material to the storage container can be disastrous. · When handling NEVER smoke, eat or drink. · Always wash hands with soap and water after handling. · Use only good occupational work practice. · Observe manufacturer's storage and handling recommendations contained within this MSDS.
Fire and explosion protection	See section 5
Other information	<ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed as supplied. ▸ Store in a cool, well ventilated area. ▸ Keep dry. ▸ Store under cover and away from sunlight. ▸ Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction. ▸ Store away from incompatible materials and foodstuff containers. ▸ DO NOT stack on wooden floors or pallets. ▸ Protect containers from physical damage. ▸ Check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. <p>In addition, Goods of Class 5.1, packing group III should be stored in packages and be separated from buildings, tanks, and compounds containing other dangerous goods in tanks, and from property boundaries by a distance of at least 5 metres.</p>

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▸ DO NOT repack. Use containers supplied by manufacturer only. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids:</p> <ul style="list-style-type: none"> ▸ Removable head packaging and ▸ cans with friction closures may be used. <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.</p> <p>-</p> <p>In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *.</p> <p>-</p> <p>* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p>
Storage incompatibility	<p>The substance may be or contains a "metalloid"</p> <p>The following elements are considered to be metalloids; boron, silicon, germanium, arsenic, antimony, tellurium and (possibly) polonium</p> <p>The electronegativities and ionisation energies of the metalloids are between those of the metals and nonmetals, so the metalloids exhibit characteristics of both classes. The reactivity of the metalloids depends on the element with which they are reacting. For example, boron acts as a nonmetal when reacting with sodium yet as a metal when reacting with fluorine.</p> <p>Unlike most metals, most metalloids are amphoteric- that is they can act as both an acid and a base. For instance, arsenic forms not only salts such as arsenic halides, by the reaction with certain strong acid, but it also forms arsenites by reactions with strong bases.</p> <p>Most metalloids have a multiplicity of oxidation states or valences. For instance, tellurium has the oxidation states +2, -2, +4, and +6. Metalloids react like non-metals when they react with metals and act like metals when they react with non-metals.</p> <p>Metal nitrites:</p> <ul style="list-style-type: none"> ▸ are incompatible with chlorates, hypophosphites, iodides, mercury salts, permanganates, sulfites, primary amines and amides, secondary amines and amides, ammonium salts, activated carbon, cyanogen compounds, thiocyanates, thiosulfates, cyanides, sodium amide, boron, acetanilide, antipyrine, tannic acid and cellulose ▸ react explosively with hydrazine and liquid ammonia .

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- react explosively following fusion with metal cyanides
- react (often) with salts of nitrogenous bases to produce an unstable corresponding nitrite salt.

for metal nitrates:

- Segregate from heavy metals, phosphides, sodium acetate, lead nitrate, tartrates, trichloroethylene,
- Avoid shock and heat.
- Mixtures of metal nitrates with alkyl esters may explode due to the formation of unstable alkyl nitrates.
- Mixtures of a nitrate with phosphorous, tin(II) chloride and other reducing agents may react explosively.
- Mixtures containing nitrates and organic materials are potentially dangerous, especially if acidic materials or heavy metals are present.
- Fibrous organic material, jute, wood and similar cellulosic material can become highly combustible by nitrate impregnation
- Metal nitrates are incompatible with cyanides, thiocyanates, isothiocyanates and hypophosphites. Avoid reaction with the following which can cause an explosion: barium thiocyanate, boron phosphide, cyanides, sodium hypophosphite, sulfur and charcoal, powdered aluminium or aluminium oxide, sodium thiosulfate.
- Mixtures of metal nitrates and phosphinates may explode on heating
- A mixture of aluminium powder, water and metal nitrate may explode due to a self accelerating reaction.
- Mixtures containing nitrates, nitrites and organic materials are potentially dangerous, especially in the presence of acidic materials and heavy metals

Ammonium nitrate:

- is a strong oxidiser
- reacts violently and/ or forms explosive mixtures with hot water, reducing agents, combustible materials, flammable liquids, organic materials, ammonium dichromate, barium chloride, barium nitrate, charcoal, cyanoguanidine, oils, phosphorus, potassium chromate, potassium dichromate, potassium nitrate, potassium permanganate, sodium chloride, finely divided metals
- forms explosive and/ or heat- and shock- sensitive compounds with acetic acid, alkali metals (potassium, sodium etc.), ammonia, nitric acid, sodium hypochlorite, sulfur, urea
- may explode violently when heated and contained or confined

NOTE:- Explosive detonations can occur when material is mixed with organic material, oils or charcoals and when heated or subjected to shock.

- Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials.
- Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents.
- Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
- Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
- Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
- Peroxides, in contact with inorganic cobalt and copper compounds, iron and iron compounds, acetone, metal oxide salts and acids and bases can react with rapid, uncontrolled decomposition, leading to fires and explosions.
- Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.
- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- Avoid storage with reducing agents.

Hazard categories in accordance with Regulation (EC) No 1272/2008	Not Available
Qualifying quantity (tonnes) of dangerous substances as referred to in Article 3(10) for the application of	Not Available

7.3. Specific end use(s)

See section 1.2

SECTION 8 Exposure controls / personal protection

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
Ammonium nitrate	Dermal 5.12 mg/kg bw/day (Systemic, Chronic) Inhalation 36 mg/m ³ (Systemic, Chronic) <i>Dermal 2.56 mg/kg bw/day (Systemic, Chronic) *</i> <i>Inhalation 8.9 mg/m³ (Systemic, Chronic) *</i> <i>Oral 2.56 mg/kg bw/day (Systemic, Chronic) *</i>	18 mg/L (STP)
potassium nitrate	Not Available	18 mg/L (STP)
EDTA iron sodium salt	Dermal 4 200 mg/kg bw/day (Systemic, Chronic) Inhalation 2 mg/m ³ (Systemic, Chronic) Inhalation 74 mg/m ³ (Systemic, Acute) Inhalation 74 mg/m ³ (Local, Acute) <i>Dermal 2 100 mg/kg bw/day (Systemic, Chronic) *</i> <i>Inhalation 0.5 mg/m³ (Systemic, Chronic) *</i> <i>Oral 0.42 mg/kg bw/day (Systemic, Chronic) *</i>	3.1 mg/L (Water (Fresh)) 0.31 mg/L (Water - Intermittent release) 1.09 mg/L (Water (Marine)) 64 mg/L (STP)
copper sulfate, pentahydrate	Dermal 137 mg/kg bw/day (Systemic, Chronic) Inhalation 1 mg/m ³ (Systemic, Chronic) Inhalation 1 mg/m ³ (Local, Chronic) <i>Oral 0.041 mg/kg bw/day (Systemic, Chronic) *</i> <i>Oral 0.082 mg/kg bw/day (Systemic, Acute) *</i>	7.8 µg/L (Water (Fresh)) 5.2 µg/L (Water - Intermittent release) 87 mg/kg sediment dw (Sediment (Fresh Water)) 676 mg/kg sediment dw (Sediment (Marine)) 65 mg/kg soil dw (Soil)

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Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
		230 µg/L (STP)
sodium molybdate	Inhalation 23.97 mg/m³ (Systemic, Chronic) Inhalation 7.15 mg/m³ (Systemic, Chronic) * Oral 7.3 mg/kg bw/day (Systemic, Chronic) *	25.5 mg/L (Water (Fresh)) 4.89 mg/L (Water - Intermittent release) 45300 mg/kg sediment dw (Sediment (Fresh Water)) 5080 mg/kg sediment dw (Sediment (Marine)) 20.39 mg/kg soil dw (Soil) 46.57 mg/L (STP)
potassium iodide	Dermal 0.14 mg/kg bw/day (Systemic, Chronic) Inhalation 0.07 mg/m³ (Systemic, Chronic) Dermal 1 mg/kg bw/day (Systemic, Chronic) * Inhalation 0.035 mg/m³ (Systemic, Chronic) * Oral 0.01 mg/kg bw/day (Systemic, Chronic) * Oral 0.01 mg/kg bw/day (Systemic, Acute) *	0.007 mg/L (Water (Fresh)) 59.7 µg/L (Water - Intermittent release) 0.075 mg/L (Water (Marine)) 0.007 mg/kg sediment dw (Sediment (Fresh Water)) 0.294 mg/kg sediment dw (Sediment (Marine)) 0.237 mg/kg soil dw (Soil) 21.94 mg/L (STP) 0.3 mg/kg food (Oral)
boric acid	Dermal 1.556 mg/kg bw/day (Systemic, Chronic) Inhalation 0.544 mg/m³ (Systemic, Chronic) Inhalation 13.6 mg/m³ (Local, Chronic) Inhalation 13.6 mg/m³ (Local, Acute) Dermal 0.555 mg/kg bw/day (Systemic, Chronic) * Inhalation 0.083 mg/m³ (Systemic, Chronic) * Oral 0.056 mg/kg bw/day (Systemic, Chronic) * Inhalation 13.6 mg/m³ (Local, Chronic) * Oral 0.92 mg/kg bw/day (Systemic, Acute) * Inhalation 13.6 mg/m³ (Local, Acute) *	2.9 mg/L (Water (Fresh)) 2.9 mg/L (Water - Intermittent release) 13.7 mg/L (Water (Marine)) 5.7 mg/kg soil dw (Soil) 10 mg/L (STP)

* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs)	copper sulfate, pentahydrate	Copper and compounds: dust and mists (as Cu)	1 mg/m3	2 mg/m3	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	sodium molybdate	Molybdenum compounds (as Mo): soluble compounds	5 mg/m3	10 mg/m3	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	Manganese(II) sulphate monohydrate	Manganese and inorganic manganese compounds (as manganese)	0,2; 0,05 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	Manganese(II) sulphate monohydrate	Manganese and its inorganic compounds (as Mn) - Inhalable fraction	0.2 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	Manganese(II) sulphate monohydrate	Manganese and its inorganic compounds (as Mn) - Respirable fraction	0.05 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
Ammonium nitrate	6.7 mg/m3	73 mg/m3	440 mg/m3
potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
copper sulfate, pentahydrate	7.5 mg/m3	9.9 mg/m3	59 mg/m3
copper sulfate, pentahydrate	12 mg/m3	32 mg/m3	190 mg/m3
sodium molybdate	3.8 mg/m3	34 mg/m3	210 mg/m3
sodium molybdate	3.2 mg/m3	17 mg/m3	100 mg/m3
Manganese(II) sulphate monohydrate	9.2 mg/m3	15 mg/m3	90 mg/m3
potassium iodide	1.3 mg/m3	15 mg/m3	87 mg/m3
boric acid	6 mg/m3	23 mg/m3	830 mg/m3

Ingredient	Original IDLH	Revised IDLH
Ammonium nitrate	Not Available	Not Available
potassium nitrate	Not Available	Not Available
EDTA iron sodium salt	Not Available	Not Available
copper sulfate, pentahydrate	Not Available	Not Available
sodium molybdate	1,000 mg/m3	Not Available
Manganese(II) sulphate monohydrate	500 mg/m3	Not Available
potassium iodide	Not Available	Not Available
boric acid	Not Available	Not Available
Adenine hemisulphate	Not Available	Not Available

Occupational Exposure Banding


Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
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Continued...

Murashige and Skoog modified basal medium (with2iP)

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
Ammonium nitrate	E	≤ 0.01 mg/m ³
potassium nitrate	E	≤ 0.01 mg/m ³
EDTA iron sodium salt	E	≤ 0.01 mg/m ³
potassium iodide	E	≤ 0.01 mg/m ³
boric acid	D	> 0.01 to ≤ 0.1 mg/m ³
Adenine hemisulphate	E	≤ 0.01 mg/m ³
Notes:	Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.	

8.2. Exposure controls

<p>8.2.1. Appropriate engineering controls</p>	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.</p> <p>An approved self contained breathing apparatus (SCBA) may be required in some situations.</p> <p>Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p> <table border="1"> <thead> <tr> <th>Type of Contaminant:</th><th>Air Speed:</th></tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td><td>0.25-0.5 m/s (50-100 f/min.)</td></tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td><td>0.5-1 m/s (100-200 f/min.)</td></tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td><td>1-2.5 m/s (200-500 f/min.)</td></tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td><td>2.5-10 m/s (500-2000 f/min.)</td></tr> </tbody> </table> <p>Within each range the appropriate value depends on:</p> <table border="1"> <thead> <tr> <th>Lower end of the range</th><th>Upper end of the range</th></tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td><td>1: Disturbing room air currents</td></tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only.</td><td>2: Contaminants of high toxicity</td></tr> <tr> <td>3: Intermittent, low production.</td><td>3: High production, heavy use</td></tr> <tr> <td>4: Large hood or large air mass in motion</td><td>4: Small hood-local control only</td></tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	Lower end of the range	Upper end of the range	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents	2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity	3: Intermittent, low production.	3: High production, heavy use	4: Large hood or large air mass in motion	4: Small hood-local control only
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<p>8.2.2. Individual protection measures, such as personal protective equipment</p>																					
<p>Eye and face protection</p>	<ul style="list-style-type: none"> ▶ Chemical goggles. ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent] 																				
<p>Skin protection</p>	<p>See Hand protection below</p>																				
<p>Hands/feet protection</p>	<ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. ▶ DO NOT wear cotton or cotton-backed gloves. ▶ DO NOT wear leather gloves. ▶ Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes. 																				

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Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> Overalls. PVC Apron. PVC protective suit may be required if exposure severe. Eyewash unit. Ensure there is ready access to a safety shower. Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Murashige and Skoog modified basal medium (with2iP)

Material	CPI
NITRILE	A
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
VITON	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type -P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	-	PAPR-P1
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

· Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.

· The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).

· Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.

· Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.

· Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)

· Use approved positive flow mask if significant quantities of dust becomes airborne.

· Try to avoid creating dust conditions.

Where significant concentrations of the material are likely to enter the breathing zone, a Class P3 respirator may be required.

Class P3 particulate filters are used for protection against highly toxic or highly irritant particulates.

Filtration rate: Filters at least 99.95% of airborne particles

Suitable for:

· Relatively small particles generated by mechanical processes eg. grinding, cutting, sanding, drilling, sawing.

· Sub-micron thermally generated particles e.g. welding fumes, fertilizer and bushfire smoke.

· Biologically active airborne particles under specified infection control applications e.g. viruses, bacteria, COVID-19, SARS

· Highly toxic particles e.g. Organophosphate Insecticides, Radionuclides, Asbestos

Note: P3 Rating can only be achieved when used with a Full Face Respirator or Powered Air-Purifying Respirator (PAPR). If used with any other respirator, it will only provide filtration protection up to a P2 rating.

8.2.3. Environmental exposure controls

See section 12

SECTION 9 Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Light sensitive.
Physical state	Solid
Relative density (Water = 1)	Not Available

Continued...

Murashige and Skoog modified basal medium (with2iP)

Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available
Nanoform Solubility	Not Available	Nanoform Particle Characteristics	Not Available
Particle Size	Not Available		

9.2. Other information

Not Available

SECTION 10 Stability and reactivity

10.1.Reactivity	See section 7.2
10.2. Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable under normal handling conditions. ▶ Prolonged exposure to heat. ▶ Hazardous polymerisation will not occur.
10.3. Possibility of hazardous reactions	See section 7.2
10.4. Conditions to avoid	See section 7.2
10.5. Incompatible materials	See section 7.2
10.6. Hazardous decomposition products	See section 5.3

SECTION 11 Toxicological information

11.1. Information on toxicological effects

Inhaled	<p>There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>Borates may act as simple airway irritants. Dryness of the mouth, nose or throat, dry cough, nose bleeds, sore throat, productive cough, shortness of breath, chest tightness and difficulty breathing were related to higher dose long term exposures.</p>
Ingestion	<p>The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).</p> <p>Symptoms include cyanosis (a bluish discolouration skin and mucous membranes) and breathing difficulties. Symptoms may not be evident until several hours after exposure.</p> <p>At about 15% concentration of blood methaemoglobin there is observable cyanosis of the lips, nose and earlobes. Symptoms may be absent although euphoria, flushed face and headache are commonly experienced. At 25-40%, cyanosis is marked but little disability occurs other than that produced on physical exertion. At 40-60%, symptoms include weakness, dizziness, lightheadedness, increasingly severe headache, ataxia, rapid shallow respiration, drowsiness, nausea, vomiting, confusion, lethargy and stupor. Above 60% symptoms include dyspnea, respiratory depression, tachycardia or bradycardia, and convulsions. Levels exceeding 70% may be fatal.</p> <p>Swallowing large doses of ammonium nitrate may cause dilation of blood vessels by relaxing smooth muscle directly, and cause the appearance of methaemoglobin in the blood. Symptoms include dizziness, abdominal pain, nausea and vomiting, bloody diarrhea, weakness, convulsions and collapse. Other effects of exposure include headache, warm flushed skin, excessive urine output and fatigue. A number of heartbeat rhythm disturbances have been reported, along with ischaemia of the heart and a change in the heart rate (up or down). Severe poisoning has caused low blood pressure, decreased peripheral vascular resistance, cardiovascular collapse, and coma.</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.</p>

Continued...

Murashige and Skoog modified basal medium (with2iP)

	<p>The lethal oral dose of nitrite has been variously reported as between 0.7 and 6 grams (approximately 10-100 milligrams/kilogram body weight). This may be lower for children (especially newborns), the elderly, and people with certain enzyme deficiencies. Symptoms develop within 15-45 minutes.</p> <p>Inorganic nitrites produce smooth muscle relaxation, methaemoglobin in the blood, and cyanosis (a bluing of the extremities). Other toxic effects of nitrites include abdominal pain, diarrhea, withering of the villi of the gut and cell death (apoptosis) in the crypts of the gut. Nitrite may also cause a sudden fall in blood pressure, due to its ability to dilate blood vessels. This is probably because it can transform into nitric oxide (NO), or a NO-containing molecule.</p> <p>Fatal poisonings in infants, resulting from oral intake of nitrites in water or spinach, have been reported.</p> <p>Animal testing shows that sodium nitrite can cause liver damage and blood abnormalities.</p> <p>Ingestion or skin absorption of boric acid causes nausea, abdominal pain, diarrhoea and profuse vomiting which may be blood stained, headache, weakness, reddened lesions on the skin. In severe cases, it may cause shock, with fall in blood pressure, increase in heart rate, blue skin colour, brain and nervous irritation, reduced urine volume or even absence of urine.</p> <p>Borate poisoning causes nausea, vomiting, diarrhoea and pain in the upper abdomen. Often persistent vomiting occurs, and there may be blood in the faeces.</p> <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p>								
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.</p> <p>Boric acid is not absorbed via intact skin but absorbed on broken or inflamed skin.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>								
Eye	<p>This material can cause eye irritation and damage in some persons.</p>								
Chronic	<p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.</p> <p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material.</p> <p>Chronic exposure to ammonium nitrate may produce low blood pressure and fatigue. Swallowing 6-12 grams per day in the long term has produced inflammation of the stomach, acidity of the blood, excessive urine output and nitrite toxicity, manifested by methaemoglobin in the blood or dilation of blood vessels.</p> <p>Animal testing to see whether nitrites caused cancer proved inconclusive.</p> <p>There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.</p> <p>Chronic boric acid poisoning is characterized by mild gastrointestinal irritation, loss of appetite, disturbed digestion, nausea, possibly vomiting and a hard irregular and discoloured rash. Dryness of skin, reddening of tongue, loss of hair, inflammation of conjunctiva, and kidney injury have also been reported.</p> <p>Borate can accumulate in the testes and deplete germ cells and cause withering of the testicles, according to animal testing. Hair loss, skin inflammation, stomach ulcer and anaemia can all occur.</p>								
Murashige and Skoog modified basal medium (with2iP)	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Not Available</td><td>Not Available</td></tr> </table>	TOXICITY	IRRITATION	Not Available	Not Available				
TOXICITY	IRRITATION								
Not Available	Not Available								
Ammonium nitrate	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>dermal (rat) LD50: >5000 mg/kg^[1]</td><td>Not Available</td></tr> <tr> <td>Inhalation(Rat) LC50: >88.8 mg/l4h^[2]</td><td></td></tr> <tr> <td>Oral (Rat) LD50: 2217 mg/kg^[2]</td><td></td></tr> </table>	TOXICITY	IRRITATION	dermal (rat) LD50: >5000 mg/kg ^[1]	Not Available	Inhalation(Rat) LC50: >88.8 mg/l4h ^[2]		Oral (Rat) LD50: 2217 mg/kg ^[2]	
TOXICITY	IRRITATION								
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Inhalation(Rat) LC50: >88.8 mg/l4h ^[2]									
Oral (Rat) LD50: 2217 mg/kg ^[2]									
potassium nitrate	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>dermal (rat) LD50: >5000 mg/kg^[1]</td><td>Not Available</td></tr> <tr> <td>Inhalation(Rat) LC50: >0.527 mg/l4h^[1]</td><td></td></tr> <tr> <td>Oral (Rabbit) LD50: 1901 mg/kg^[2]</td><td></td></tr> </table>	TOXICITY	IRRITATION	dermal (rat) LD50: >5000 mg/kg ^[1]	Not Available	Inhalation(Rat) LC50: >0.527 mg/l4h ^[1]		Oral (Rabbit) LD50: 1901 mg/kg ^[2]	
TOXICITY	IRRITATION								
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Oral (Rabbit) LD50: 1901 mg/kg ^[2]									
EDTA iron sodium salt	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>dermal (rat) LD50: >2000 mg/kg^[1]</td><td>Not Available</td></tr> <tr> <td>Inhalation(Rat) LC50: >2.75 mg/l4h^[1]</td><td></td></tr> <tr> <td>Oral (Rat) LD50: >2000 mg/kg^[1]</td><td></td></tr> </table>	TOXICITY	IRRITATION	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available	Inhalation(Rat) LC50: >2.75 mg/l4h ^[1]		Oral (Rat) LD50: >2000 mg/kg ^[1]	
TOXICITY	IRRITATION								
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Oral (Rat) LD50: >2000 mg/kg ^[1]									
copper sulfate, pentahydrate	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>dermal (rat) LD50: >2000 mg/kg^[2]</td><td>Not Available</td></tr> <tr> <td>Oral (Mouse) LD50: 43 mg/kg^[2]</td><td></td></tr> </table>	TOXICITY	IRRITATION	dermal (rat) LD50: >2000 mg/kg ^[2]	Not Available	Oral (Mouse) LD50: 43 mg/kg ^[2]			
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sodium molybdate	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>dermal (rat) LD50: >2000 mg/kg^[1]</td><td>Not Available</td></tr> <tr> <td>Inhalation(Rat) LC50: >1.93 mg/l4h^[1]</td><td></td></tr> <tr> <td>Oral (Dog) LD50: 250 mg/kg^[2]</td><td></td></tr> </table>	TOXICITY	IRRITATION	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available	Inhalation(Rat) LC50: >1.93 mg/l4h ^[1]		Oral (Dog) LD50: 250 mg/kg ^[2]	
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Manganese(II) sulphate monohydrate	TOXICITY	IRRITATION
	Not Available	Not Available
potassium iodide	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1] Oral (Rat) LD50: 2500 mg/kg ^[1]	Eye: no adverse effect observed (not irritating) ^[1] Skin: no adverse effect observed (not irritating) ^[1]
boric acid	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg ^[1] Inhalation(Rat) LC50: >2.12 mg/4h ^[1] Oral (Rat) LD50: >2600 mg/kg ^[1]	Eye: no adverse effect observed (not irritating) ^[1] Skin (human): 15 mg/3d -I- mild Skin: no adverse effect observed (not irritating) ^[1]
	TOXICITY	IRRITATION
Adenine hemisulphate	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

EDTA IRON SODIUM SALT	<p>For ethylenediaminetetraacetic acid (EDTA) and its salts:</p> <p>EDTA is a strong organic acid, with a high affinity for alkaline-earth ions (for example, calcium and magnesium) and heavy-metal ions (such as lead and mercury), resulting in highly stable chelate complexes. The ability of EDTA to complex is used commercially to either promote or inhibit chemical reactions, depending on application.</p> <p>EDTA and its salts are expected to be absorbed by the lungs and the gastrointestinal tract; absorption through skin is unlikely. They cause mild skin irritation, and severe eye irritation. The greatest risk in the human body will occur when the EDTA attempts to scavenge the trace metals used and required by the body. The binding of divalent and trivalent cations by EDTA can cause mineral deficiencies, such as zinc deficiency. These appear to be responsible for all of the known pharmacological effects.</p> <p>EDTA and its salts are mostly eliminated through the urine, with 5% eliminated via the bile, along with the metal ions which are bound to it. Trisodium EDTA has not been found to cause cancer. EDTA and its salts are not likely to cause harm to children and infants at levels likely to be encountered.</p>
COPPER SULFATE, PENTAHYDRATE	<p>for copper and its compounds (typically copper chloride):</p> <p>Acute toxicity: There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw. Symptom of the hardness of skin, an exudation of hardness site, the formation of scar and reddish changes were observed on application sites in all treated animals. Skin inflammation and injury were also noted. In addition, a reddish or black urine was observed in females at 2,000, 1,500 and 1,000 mg/kg bw. Female rats appeared to be more sensitive than male based on mortality and clinical signs.</p> <p>No reliable skin/eye irritation studies were available. The acute dermal study with copper monochloride suggests that it has a potential to cause skin irritation.</p> <p>Repeat dose toxicity: In repeated dose toxicity study performed according to OECD TG 422, copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39 - 51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL value was 5 and 1.3 mg/kg bw/day for male and female rats, respectively. No deaths were observed in male rats. One treatment-related death was observed in female rats in the high dose group. Erythropoietic toxicity (anaemia) was seen in both sexes at the 80 mg/kg bw/day. The frequency of squamous cell hyperplasia of the forestomach was increased in a dose-dependent manner in male and female rats at all treatment groups, and was statistically significant in males at doses of =20 mg/kg bw/day and in females at doses of =5 mg/kg bw/day doses. The observed effects are considered to be local, non-systemic effect on the forestomach which result from oral (gavage) administration of copper monochloride.</p> <p>Genotoxicity: An in vitro genotoxicity study with copper monochloride showed negative results in a bacterial reverse mutation test with Salmonella typhimurium strains (TA 98, TA 100, TA 1535, and TA 1537) with and without S9 mix at concentrations of up to 1,000 ug/plate. An in vitro test for chromosome aberration in Chinese hamster lung (CHL) cells showed that copper monochloride induced structural and numerical aberrations at the concentration of 50, 70 and 100 ug/mL without S9 mix. In the presence of the metabolic activation system, significant increases of structural aberrations were observed at 50 and 70 ug/mL and significant increases of numerical aberrations were observed at 70 ug/mL. In an in vivo mammalian erythrocyte micronucleus assay, all animals dosed (15 - 60 mg/kg bw) with copper monochloride exhibited similar PCE/(PCE+NCE) ratios and MNPCE frequencies compared to those of the negative control animals. Therefore copper monochloride is not an in vivo mutagen.</p> <p>Carcinogenicity: there was insufficient information to evaluate the carcinogenic activity of copper monochloride.</p> <p>Reproductive and developmental toxicity: In the combined repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD TG 422), copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39-51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL of copper monochloride for fertility toxicity was 80 mg/kg bw/day for the parental animals. No treatment-related effects were observed on the reproductive organs and the fertility parameters assessed. For developmental toxicity the NOAEL was 20 mg/kg bw/day. Three of 120 pups appeared to have icterus at birth; 4 of 120 pups appeared runted at the highest dose tested (80 mg/kg bw/day).</p> <p>For copper sulfate</p> <p>Copper sulfate is corrosive. Side effects are diverse and multi-systemic, and include severe gastrointestinal symptoms and signs, metallic taste in the mouth, burning pain in the chest, headache, sweating, shock and damage to brain, liver and kidneys. It has been reported as a cause of human suicide. On exposure, it can cause dose dependent damage to the skin and eye, also, eczema and allergic reactions. Long term effects can lead to anaemia and degenerative changes and are more likely in individuals with Wilson's disease, a condition which causes excessive absorption and storage of copper. It has adverse effects on reproduction and fertility as well as cancer and embryo toxic effects. Although it is excreted in the faeces, there is residual accumulation the liver, brain, heart, kidney and muscles.</p>
POTASSIUM IODIDE	<p>Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins.</p> <p>Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema.</p> <p>Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.</p>
BORIC ACID	<p>The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.</p>

Murashige and Skoog modified basal medium (with2iP)

Murashige and Skoog modified basal medium (with2iP) & EDTA IRON SODIUM SALT & POTASSIUM IODIDE	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.
EDTA IRON SODIUM SALT & SODIUM MOLYBDATE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

11.2 Information on other hazards

11.2.1. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

11.2.2. Other information

See Section 11.1

SECTION 12 Ecological information

12.1. Toxicity

Murashige and Skoog modified basal medium (with2iP)	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Ammonium nitrate	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	480h	Fish	0.003mg/l	4
	LC50	96h	Fish	48.184-59.63mg/L	4
	EC50	48h	Crustacea	490mg/l	2

potassium nitrate	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	144h	Fish	0.1mg/l	4
	LC50	96h	Fish	>100mg/l	2
	EC50	48h	Crustacea	490mg/l	2

EDTA iron sodium salt	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>100mg/l	2
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
	EC50	48h	Crustacea	100.9mg/l	2
	EC50(ECx)	24h	Crustacea	16mg/l	2

copper sulfate, pentahydrate	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Crustacea	0.001mg/L	5
	EC50	72h	Algae or other aquatic plants	0.8mg/L	5
	LC50	96h	Fish	0.073mg/L	4
	EC50	48h	Crustacea	0.003mg/L	5

sodium molybdate	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	672h	Crustacea	0.67mg/l	2
	EC50	72h	Algae or other aquatic plants	26mg/l	2
	LC50	96h	Fish	>79.8mg/l	4
	EC50	48h	Crustacea	34.13-46.87mg/l	4

Murashige and Skoog modified basal medium (with2iP)

Manganese(II) sulphate monohydrate	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
potassium iodide	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	48h	Crustacea	1.27mg/l	2
	LC50	96h	Fish	>100mg/l	2
	EC50	48h	Crustacea	1.27mg/l	2
boric acid	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	70-80mg/l	4
	BCF	672h	Fish	<3.2	7
	EC50	72h	Algae or other aquatic plants	40.2mg/l	2
	EC50	48h	Crustacea	230mg/L	5
	NOEC(ECx)	576h	Fish	0.001mg/L	5
	EC50	96h	Algae or other aquatic plants	15.4mg/l	2
Adenine hemisulphate	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Harmful to aquatic organisms.

For ammonium nitrate

Fertility of *Daphnia magna* decreased at 50 g/l.

Post embryonic growth of crustacea was impaired at >10mg/l.

(*Aspergillus niger*) 40 hr. LC50: 15mg/l (36 C)

[CROPCARE]

Ammonium nitrate is soluble in water and acts as a source of nutrition for many microorganisms. Spills may produce massive eutrophication in static waters effecting the local aquatic community.

Ammonium nitrate penetrates soil at a rate which depends on soil type and water content. It is not expected to accumulate in the food chain.

For Nitrate/Nitrite

Environmental Fate: Nitrates form from nitrate or ammonium ions by micro-organisms in soil, water, sewage and the digestive tract. The concern with nitrate in the environment is related to its conversion to nitrite. Primary sources of organic nitrates include human sewage and livestock manure, especially from feedlots.

Atmospheric Fate: Nitrate/nitrites do not evaporate into the air; however, any nitrites released into the air slowly oxidize to nitrates.

Terrestrial Fate: Due to its high solubility and weak retention by soil, nitrates/nitrites are very mobile in soil, moving at approximately the same rate as water, and have a high potential to migrate to ground water. The substances can contaminate groundwater to unacceptable levels.

Aquatic Fate: Nitrate/nitrites do not evaporate from water surfaces. The substances are expected to remain in water until consumed by plants or other organisms. Ammonium nitrate will be taken up by bacteria. Nitrate is more persistent in water than the ammonium ion. Nitrate degradation is fastest under low oxygen conditions.

Ecotoxicity and Human Health Effects: Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. Nitrates are converted to nitrites by the body, which can interfere with the oxygen-carrying capacity of the blood, (methemoglobinemia). Children are much more sensitive to this effect than adults. Other health concerns relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Nitrosamines produce liver damage, hemorrhagic lung lesions, convulsions and coma in rats, and interfere with embryo development in experimental animals. The N-nitroso class of compounds includes potent carcinogens and mutagens. Nitrate/nitrites can be toxic to amphibians.

for Boron and Borates:

Environmental Fate - Boron is generally found in nature bound to oxygen and is never found as the free element. As an element, boron itself cannot be degraded in the environment, however; it may undergo various reactions that change the form of boron (e.g., precipitation, polymerization, and acid-base reactions) depending on conditions such as its concentration in water and pH. As boron is a natural component of the environment, individuals will have some exposure from foods and drinking water.

Atmospheric Fate: Atmospheric boron may be in the form of particulate matter or aerosols as borides, boron oxides, borates, borates, organoboron compounds, trihalide boron compounds, or borazines. Boron and borates will probably be removed from the atmosphere by precipitation and dry deposition. The half-life of airborne particles is usually on the order of days, depending on the size of the particle and atmospheric conditions.

Aquatic Fate: Borates are relatively soluble in water. Boron readily hydrolyses in water and, in concentrated solutions, may polymerize. The mineral content of water is not likely to control the fate of boron in water. Boron was found to not be significantly removed during the conventional treatment of waste water. Boron may, however; be co-precipitated with aluminium, silicon, or iron to form hydroxyborate compounds on the surfaces of minerals. Waterborne boron may be adsorbed by soils and sediments. Adsorption-desorption reactions are expected to be the only significant mechanism that will influence the fate of boron in water.

Terrestrial Fate: Soil - Boron is added to farmland as a soil improving agent, but there is not sufficient data to evaluate its effect on soil organisms. The extent of boron adsorption depends on the pH of the water and the chemical composition of the soil. The greatest adsorption is generally observed at pH 7.5-9.0. The single most important property of soil that will influence the mobility of boron is the abundance of amorphous aluminium oxide. The extent of boron adsorption has also been attributed to the levels of iron oxide, and to a lesser extent, the organic matter present in the soil, although other studies found that the amount of organic matter present was not important. The adsorption of boron may not be reversible in some soils. Most boron compounds are transformed to borates in soil due to the presence of moisture. Borates themselves are not further degraded in soil, however; borates can exist in a variety of forms in soil. Borates are removed from soils by water leaching and by assimilation by plants. Surface soil, unpolluted waterways and seawater all typically contain significant amounts of boron as borate. Plants - Boron is an essential micronutrient for healthy growth of plants, however, it can be harmful to boron sensitive plants in higher quantities. In some areas such as the American Southwest, boron occurs naturally in surface waters in concentrations that have been shown to be toxic to commercially important plants.

Ecotoxicity: It is unlikely that boron is bioconcentrated significantly by organisms from water. Boron is not expected to bioaccumulate and bioconcentration factors for fish, plants and invertebrates are low. Boron is not regarded to be dangerous to aquatic organisms. In aquatic environments low concentrations of borates generally promote the growth of algae, whereas higher concentrations inhibited algal growth. Boron has little effect on freshwater algae and water fleas. The toxicity of boron in fish is often higher in soft water than in hard water. Zebra fish and rainbow trout are the most sensitive species to the effects of boron.

DO NOT discharge into sewer or waterways.

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium nitrate	LOW	LOW
EDTA iron sodium salt	HIGH	HIGH

Continued...

Murashige and Skoog modified basal medium (with2iP)

Ingredient	Persistence: Water/Soil	Persistence: Air
copper sulfate, pentahydrate	HIGH	HIGH
sodium molybdate	HIGH	HIGH
potassium iodide	HIGH	HIGH
boric acid	LOW	LOW

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
potassium nitrate	LOW (LogKOW = 0.209)
EDTA iron sodium salt	LOW (LogKOW = -10.4414)
copper sulfate, pentahydrate	LOW (LogKOW = -2.2002)
sodium molybdate	LOW (LogKOW = 2.229)
potassium iodide	LOW (LogKOW = 0.0436)
boric acid	LOW (BCF = 0)

12.4. Mobility in soil

Ingredient	Mobility
potassium nitrate	LOW (KOC = 14.3)
EDTA iron sodium salt	LOW (KOC = 465.2)
copper sulfate, pentahydrate	LOW (KOC = 6.124)
sodium molybdate	LOW (KOC = 48.64)
potassium iodide	LOW (KOC = 14.3)
boric acid	LOW (KOC = 35.04)

12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT	✗	✗	✗
vPvB	✗	✗	✗
PBT Criteria fulfilled?	No		
vPvB	No		

12.6. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

12.7. Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

SECTION 13 Disposal considerations

13.1. Waste treatment methods


Product / Packaging disposal	<ul style="list-style-type: none"> Containers may still present a chemical hazard/ danger when empty. Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. Where possible retain label warnings and SDS and observe all notices pertaining to the product. <p>For ammonium nitrate: Add slowly to large amount of water, mix in slight excess of soda ash and neutralise with 6M hydrochloric acid before washing to sewer with large excess of water. Bury residue in an authorised landfill. Incineration requires scrubbers for NOx, oxidation or reduction processes require scrubbers for NO</p> <ul style="list-style-type: none"> DO NOT allow wash water from cleaning or process equipment to enter drains. It may be necessary to collect all wash water for treatment before disposal. In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. Where in doubt contact the responsible authority. <p>For small quantities of oxidising agent:</p> <ul style="list-style-type: none"> Cautiously acidify a 3% solution to pH 2 with sulfuric acid. Gradually add a 50% excess of sodium bisulfite solution with stirring. Add a further 10% sodium bisulfite. If no further reaction occurs (as indicated by a rise in temperature) cautiously add more acid.
Waste treatment options	Not Available
Sewage disposal options	Not Available

SECTION 14 Transport information

Labels Required

Continued...

Murashige and Skoog modified basal medium (with2iP)

	
Marine Pollutant	NO
HAZCHEM	1Y

Land transport (ADR-RID)

14.1. UN number or ID number	1479	
14.2. UN proper shipping name	OXIDIZING SOLID, N.O.S. (contains Ammonium nitrate and potassium nitrate)	
14.3. Transport hazard class(es)	Class	5.1
	Subsidiary risk	Not Applicable
14.4. Packing group	III	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Hazard identification (Kemler)	50
	Classification code	O2
	Hazard Label	5.1
	Special provisions	274
	Limited quantity	5 kg
	Tunnel Restriction Code	3 (E)

Air transport (ICAO-IATA / DGR)

14.1. UN number	1479	
14.2. UN proper shipping name	Oxidizing solid, n.o.s. * (contains Ammonium nitrate and potassium nitrate)	
14.3. Transport hazard class(es)	ICAO/IATA Class	5.1
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	5L
14.4. Packing group	III	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Special provisions	A3 A803
	Cargo Only Packing Instructions	563
	Cargo Only Maximum Qty / Pack	100 kg
	Passenger and Cargo Packing Instructions	559
	Passenger and Cargo Maximum Qty / Pack	25 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y546
	Passenger and Cargo Limited Maximum Qty / Pack	10 kg

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1479	
14.2. UN proper shipping name	OXIDIZING SOLID, N.O.S. (contains Ammonium nitrate and potassium nitrate)	
14.3. Transport hazard class(es)	IMDG Class	5.1
	IMDG Subrisk	Not Applicable
14.4. Packing group	III	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	EMS Number	F-A, S-Q
	Special provisions	223 274 900
	Limited Quantities	5 kg

Inland waterways transport (ADN)

14.1. UN number	1479	
14.2. UN proper shipping name	OXIDIZING SOLID, N.O.S. (contains Ammonium nitrate and potassium nitrate)	

Murashige and Skoog modified basal medium (with2iP)

14.3. Transport hazard class(es)	5.1	Not Applicable
14.4. Packing group	III	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Classification code	O2
	Special provisions	274
	Limited quantity	5 kg
	Equipment required	PP
	Fire cones number	0

14.7. Maritime transport in bulk according to IMO instruments

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
Ammonium nitrate	Not Available
potassium nitrate	Not Available
EDTA iron sodium salt	Not Available
copper sulfate, pentahydrate	Not Available
sodium molybdate	Not Available
Manganese(II) sulphate monohydrate	Not Available
potassium iodide	Not Available
boric acid	Not Available
Adenine hemisulphate	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
Ammonium nitrate	Not Available
potassium nitrate	Not Available
EDTA iron sodium salt	Not Available
copper sulfate, pentahydrate	Not Available
sodium molybdate	Not Available
Manganese(II) sulphate monohydrate	Not Available
potassium iodide	Not Available
boric acid	Not Available
Adenine hemisulphate	Not Available

SECTION 15 Regulatory information

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

Ammonium nitrate is found on the following regulatory lists

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

potassium nitrate is found on the following regulatory lists

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

EDTA iron sodium salt is found on the following regulatory lists

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

copper sulfate, pentahydrate is found on the following regulatory lists

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

sodium molybdate is found on the following regulatory lists

Continued...

Europe EC Inventory	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)
Manganese(II) sulphate monohydrate is found on the following regulatory lists	
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	
potassium iodide is found on the following regulatory lists	
Europe EC Inventory	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)
boric acid is found on the following regulatory lists	
Chemical Footprint Project - Chemicals of High Concern List	Europe EC Inventory
EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	Europe European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation
EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 6) Reproductive toxicants: Category 1 B	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)
EU REACH Regulation (EC) No 1907/2006 - Proposals to identify Substances of Very High Concern: Annex XV reports for commenting by Interested Parties previous consultation	European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI
Adenine hemisulphate is found on the following regulatory lists	
Europe EC Inventory	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

Information according to 2012/18/EU (Seveso III):

Seveso Category	Not Available
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15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier
Ammonium nitrate	6484-52-2	Not Available	Not Available
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Ox. Liq. 3; Eye Irrit. 2	GHS03; GHS07; Wng	H272; H319
2	Eye Irrit. 2; Skin Irrit. 2; STOT SE 3; STOT SE 1; Ox. Sol. 1; Acute Tox. 4; Acute Tox. 4; Acute Tox. 1	GHS03; Dgr; GHS08; GHS06	H319; H315; H335; H370; H271; H312; H332; H300
Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.			
Ingredient	CAS number	Index No	ECHA Dossier
potassium nitrate	7757-79-1	Not Available	Not Available
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Ox. Sol. 2; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3	GHS03; GHS07; Dgr	H272; H315; H319; H335
2	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; Ox. Sol. 1; Aquatic Chronic 3; Acute Tox. 4; Repr. 2; STOT SE 2; STOT RE 2	GHS03; Dgr; GHS08	H315; H319; H335; H271; H412; H302; H361; H371; H373
Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.			
Ingredient	CAS number	Index No	ECHA Dossier
EDTA iron sodium salt	15708-41-5	Not Available	Not Available
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3	GHS07; Wng	H315; H319; H335
2	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3	GHS07; Wng	H315; H319; H335
1	Not Classified	Not Available	Not Available
2	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; Acute Tox. 4	GHS07; Wng	H315; H319; H335; H302
Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.			
Ingredient	CAS number	Index No	ECHA Dossier
copper sulfate, pentahydrate	7758-99-8	029-004-00-0 029-023-00-4	Not Available
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1	GHS07; GHS09; Wng	H302; H315; H319; H410
Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.			

Murashige and Skoog modified basal medium (with2iP)

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
2	Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; Skin Sens. 1; Carc. 1A; Repr. 1B; STOT RE 2; Acute Tox. 3; Skin Corr. 1A; Muta. 2; STOT SE 1; STOT SE 3; Acute Tox. 4; Acute Tox. 4	GHS09; GHS05; Dgr; GHS08; GHS06	H318; H410; H317; H350; H360; H373; H400; H301; H314; H341; H370
1	Not Classified	Not Available	Not Available
2	Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; Acute Tox. 3; Skin Sens. 1; Muta. 2; Repr. 2; STOT SE 1; STOT RE 2; Resp. Sens. 1; Acute Tox. 1; Met. Corr. 1; Skin Corr. 1	GHS05; GHS09; Dgr; GHS06; GHS08	H318; H410; H400; H301; H317; H341; H361; H370; H373; H310; H290; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
sodium molybdate	10102-40-6	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1			
2	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; Acute Tox. 4; Acute Tox. 4; Aquatic Chronic 3; Acute Tox. 4	GHS07; Wng	H315; H319; H335; H302; H332; H412; H312
1	Not Classified	Not Available	Not Available
2	Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 4; Blood system; Aquatic Chronic 3; Acute Tox. 4; Carc. 2; Repr. 2; Skin Sens. 1; Muta. 2	Wng; GHS08	H315; H319; H332; H335; H412; H302; H351; H361; H317; H341

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
Manganese(II) sulphate monohydrate	10034-96-5	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	STOT RE 2; Aquatic Chronic 2	GHS08; GHS09; Wng	H411
2	Aquatic Chronic 2; Eye Dam. 1; Acute Tox. 4; Acute Tox. 3; Acute Tox. 3; Skin Irrit. 2; STOT SE 3; Carc. 2; Muta. 2; Repr. 1B; STOT RE 1	GHS08; GHS09; GHS05; Dgr; GHS06	H411; H318; H332; H301; H311; H315; H335; H351; H341; H360; H372

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
potassium iodide	7681-11-0	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Not Classified	Not Available	Not Available
2	STOT RE 1; Eye Irrit. 2; Skin Irrit. 2; Skin Sens. 1B; Resp. Sens. 1; STOT SE 3; Acute Tox. 4; Repr. 1B; Aquatic Chronic 2; Acute Tox. 4; Carc. 2; STOT SE 1	GHS08; Dgr; GHS09	H372; H319; H315; H317; H334; H335; H302; H411; H360; H312; H351; H370

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
boric acid	10043-35-3	005-007-00-2	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Repr. 1B	GHS08; Dgr	H360
2	Repr. 1A; Skin Irrit. 2; STOT SE 1; STOT RE 1; STOT SE 3; Eye Irrit. 2; STOT SE 3; Acute Tox. 4	GHS08; Dgr	H315; H370; H372; H335; H319; H336; H332; H360FD

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
Adenine hemisulphate	321-30-2	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1		GHS07; Wng	H302
2	Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 4; STOT SE 3; Acute Tox. 3; Acute Tox. 3	GHS06; Dgr	H332; H315; H319; H335; H301; H311

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	No (Manganese(II) sulphate monohydrate)

Continued...

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National Inventory	Status
Canada - NDSL	No (Ammonium nitrate; potassium nitrate; EDTA iron sodium salt; copper sulfate, pentahydrate; sodium molybdate; Manganese(II) sulphate monohydrate; potassium iodide; boric acid; Adenine hemisulphate)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (Manganese(II) sulphate monohydrate)
Japan - ENCS	No (EDTA iron sodium salt; Manganese(II) sulphate monohydrate; Adenine hemisulphate)
Korea - KECI	No (Manganese(II) sulphate monohydrate; Adenine hemisulphate)
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	No (Manganese(II) sulphate monohydrate)
Taiwan - TCSI	Yes
Mexico - INSQ	No (Adenine hemisulphate)
Vietnam - NCI	Yes
Russia - FBEPH	No (Manganese(II) sulphate monohydrate)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	26/05/2023
Initial Date	26/05/2023

Full text Risk and Hazard codes

H271	May cause fire or explosion; strong oxidiser.
H290	May be corrosive to metals.
H300	Fatal if swallowed.
H301	Toxic if swallowed.
H310	Fatal in contact with skin.
H311	Toxic in contact with skin.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H360FD	H360FD
H361	Suspected of damaging fertility or the unborn child.
H361d	Suspected of damaging the unborn child.
H370	Causes damage to organs.
H371	May cause damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
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.
H412	Harmful to aquatic life with long lasting effects.

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit.
IDLH: Immediately Dangerous to Life or Health Concentrations
ES: Exposure Standard
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index
AIIC: Australian Inventory of Industrial Chemicals
DSL: Domestic Substances List
NDSL: Non-Domestic Substances List
IECSC: Inventory of Existing Chemical Substance in China
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European List of Notified Chemical Substances
NLP: No-Longer Polymers
ENCs: Existing and New Chemical Substances Inventory
KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]

Classification according to regulation (EC) No 1272/2008 [CLP] and amendments	Classification Procedure
Acute Toxicity (Oral) Category 4, H302	On basis of test data
Serious Eye Damage/Eye Irritation Category 2, H319	Minimum classification
Oxidizing Solids Category 2, H272	Expert judgement
, EUH208	Calculation method

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