# Avixel

## Agreva Sustainable Agriculture

Chemwatch Hazard Alert Code: **1**

Chemwatch: **9046-78**
Version No: **3.1**
Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Initial Date: **13/07/2026**
Revision Date: **21/07/2026**
Print Date: **12/08/2026**
S.GHS.AUS.EN

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

### Product Identifier

| | |
|---|---|
| **Product name** | Avixel |
| **Chemical Name** | Not Applicable |
| **Synonyms** | Not Available |
| **Chemical formula** | Not Applicable |
| **Other means of identification** | Not Available |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| **Relevant identified uses** | Agriculture.<br>Use according to manufacturer's directions. |

### Details of the manufacturer or importer of the safety data sheet

| | |
|---|---|
| **Registered company name** | **Agreva Sustainable Agriculture** |
| **Address** | 160 Pine Ave Mildura VIC 3500 Australia |
| **Telephone** | +613 9008 6352\|+618 93883623 |
| **Fax** | Not Available |
| **Website** | www.agreva.com |
| **Email** | Not Available |

### Emergency telephone number

| | |
|---|---|
| **Association / Organisation** | **CHEMWATCH EMERGENCY RESPONSE (24/7)** |
| **Emergency telephone number(s)** | +61 1800 951 288 (ID#: 9046-78) |
| **Other emergency telephone number(s)** | +61 3 9573 3188 |

## SECTION 2 Hazards identification

### Classification of the substance or mixture

| | |
|---|---|
| **Poisons Schedule** | Not Applicable |
| **Classification [1]** | Non hazardous |
| ***Legend:*** | ***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*** |

### Label elements

| | |
|---|---|
| **Hazard pictogram(s)** | Not Applicable |
| **Signal word** | **Not Applicable** |

### Hazard statement(s)

Not Applicable

### Precautionary statement(s) General

| | |
|---|---|
| **P101** | If medical advice is needed, have product container or label at hand. |
| **P102** | Keep out of reach of children. |
| **P103** | Read carefully and follow all instructions. |

### Precautionary statement(s) Prevention

Not Applicable

### Precautionary statement(s) Response

Not Applicable

**Page 1 continued...**

**Precautionary statement(s) Storage**

Not Applicable

**Precautionary statement(s) Disposal**

Not Applicable

No further product hazard information.

## SECTION 3 Composition / information on ingredients

**Substances**

See section below for composition of Mixtures

**Mixtures**

| CAS No | %[weight] | Name |
|---|---|---|
| 107-43-7 | NotSpec | betaine |
| 74-79-3 | NotSpec | L-arginine |
| 7732-18-5 | NotSpec | water |
| ***Legend:*** | ***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*** | |

## SECTION 4 First aid measures

**Description of first aid measures**

| | |
|---|---|
| **Eye Contact** | If this product comes in contact with eyes:<br>▸ Wash out immediately with water.<br>▸ If irritation continues, seek medical attention.<br>▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| **Skin Contact** | If skin or hair contact occurs:<br>▸ Flush skin and hair with running water (and soap if available).<br>▸ Seek medical attention in event of irritation. |
| **Inhalation** | ▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area.<br>▸ Other measures are usually unnecessary. |
| **Ingestion** | ▸ Immediately give a glass of water.<br>▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

**Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

## SECTION 5 Firefighting measures

**Extinguishing media**

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

**Do not** use water jets.

**Special hazards arising from the substrate or mixture**

| | |
|---|---|
| **Fire Incompatibility** | ▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |

**Advice for firefighters**

| | |
|---|---|
| **Fire Fighting** | ▸ Alert Fire Brigade and tell them location and nature of hazard.<br>▸ Wear full body protective clothing with breathing apparatus.<br>▸ Prevent, by any means available, spillage from entering drains or water course.<br>▸ Use water delivered as a fine spray to control fire and cool adjacent area.<br>▸ Avoid spraying water onto liquid pools.<br>▸ **DO NOT** approach containers suspected to be hot.<br>▸ Cool fire exposed containers with water spray from a protected location.<br>▸ If safe to do so, remove containers from path of fire. |
| **Fire/Explosion Hazard** | ▸ Non combustible.<br>▸ Not considered a significant fire risk, however containers may burn.<br>Decomposition may produce toxic fumes of:<br>▸ carbon dioxide ($CO_2$)<br>nitrogen oxides (NOx)<br>▸ other pyrolysis products typical of burning organic material. |
| **HAZCHEM** | Not Applicable |

## SECTION 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

See section 8

**Environmental precautions**

See section 12

**Continued...**

**Methods and material for containment and cleaning up**

| | |
|---|---|
| **Minor Spills** | ▸ Remove all ignition sources.<br>▸ Clean up all spills immediately.<br>▸ Avoid breathing vapours and contact with skin and eyes.<br>▸ Control personal contact with the substance, by using protective equipment.<br>▸ Contain and absorb spill with sand, earth, inert material or vermiculite.<br>▸ Wipe up.<br>▸ Place in a suitable, labelled container for waste disposal. |
| **Major Spills** | Moderate hazard.<br>▸ Clear area of personnel and move upwind.<br>▸ Alert Fire Brigade and tell them location and nature of hazard.<br>▸ Wear breathing apparatus plus protective gloves.<br>▸ Prevent, by any means available, spillage from entering drains or water course.<br>▸ No smoking, naked lights or ignition sources.<br>▸ Increase ventilation.<br>▸ Stop leak if safe to do so.<br>▸ Contain spill with sand, earth or vermiculite.<br>▸ Collect recoverable product into labelled containers for recycling.<br>▸ Absorb remaining product with sand, earth or vermiculite.<br>▸ Collect solid residues and seal in labelled drums for disposal.<br>▸ Wash area and prevent runoff into drains.<br>▸ If contamination of drains or waterways occurs, advise emergency services. |

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

## SECTION 7 Handling and storage

**Precautions for safe handling**

| | |
|---|---|
| **Safe handling** | ▸ Avoid skin contact, including inhalation.<br>▸ Wear protective clothing when risk of exposure occurs.<br>▸ Use in a well-ventilated area.<br>▸ Prevent concentration in hollows and sumps.<br>▸ **DO NOT** enter confined spaces until atmosphere has been checked.<br>▸ Avoid smoking, naked lights or ignition sources.<br>▸ Avoid contact with incompatible materials.<br>▸ When handling, **DO NOT** eat, drink or smoke.<br>▸ Keep containers securely sealed when not in use.<br>▸ Avoid physical damage to containers.<br>▸ Always wash hands with soap and water after handling.<br>▸ Work clothes should be laundered separately.<br>▸ Use good occupational work practice.<br>▸ Observe manufacturer's storage and handling recommendations contained within this SDS.<br>▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions. |
| **Other information** | ▸ Store in original containers.<br>▸ Keep containers securely sealed.<br>▸ Store in a cool, dry, well-ventilated area.<br>▸ Store away from incompatible materials and foodstuff containers.<br>▸ Protect containers against physical damage and check regularly for leaks.<br>▸ Observe manufacturer's storage and handling recommendations contained within this SDS.<br>Store between 5 and 35 deg. C |

**Conditions for safe storage, including any incompatibilities**

| | |
|---|---|
| **Suitable container** | ▸ Glass container is suitable for laboratory quantities<br>▸ Metal can or drum<br>▸ Packaging as recommended by manufacturer.<br>▸ Check all containers are clearly labelled and free from leaks. |
| **Storage incompatibility** | strong acids<br>▸ Avoid strong bases. |

## SECTION 8 Exposure controls / personal protection

**Control parameters**

**Occupational Exposure Limits (OEL)**

**INGREDIENT DATA**

Not Available

**Exposure controls**

| | |
|---|---|
| **Appropriate engineering controls** | Enclosed local exhaust ventilation is required at points of dust, fume or vapour generation.<br>HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapours.<br>Barrier protection or laminar flow cabinets should be considered for laboratory scale handling.<br>A fume hood or vented balance enclosure is recommended for weighing/ transferring quantities exceeding 500 mg.<br>When handling quantities up to 500 gram in either a standard laboratory with general dilution ventilation (e.g. 6-12 air changes per hour) is preferred. Quantities up to 1 kilogram may require a designated laboratory using fume hood, biological safety cabinet, or approved vented enclosures. Quantities exceeding 1 kilogram should be handled in a designated laboratory or containment laboratory using appropriate barrier/ containment technology.<br>Manufacturing and pilot plant operations require barrier/ containment and direct coupling technologies.<br>Barrier/ containment technology and direct coupling (totally enclosed processes that create a barrier between the equipment and the room) typically use double or split butterfly valves and hybrid unidirectional airflow/ local exhaust ventilation solutions (e.g. powder containment booths). Glove bags, isolator glove box systems are optional. HEPA filtration of exhaust from dry product handling areas is required.<br>Fume-hoods and other open-face containment devices are acceptable when face velocities of at least 1 m/s (200 feet/minute) are achieved.<br>Partitions, barriers, and other partial containment technologies are required to prevent migration of the material to uncontrolled areas. For non-routine emergencies maximum local and general exhaust are necessary. 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. |

**Continued...**

| Type of Contaminant: | Air Speed: |
|---|---|
| solvent, vapours, 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 (released at low velocity into zone of active generation) | 0.5-1 m/s (100-200 f/min.) |
| direct spray, 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.) |

Within each range the appropriate value depends on:

| 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 |

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 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 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.
The need for respiratory protection should also be assessed where incidental or accidental exposure is anticipated: Dependent on levels of contamination, PAPR, full face air purifying devices with P2 or P3 filters or air supplied respirators should be evaluated.
The following protective devices are recommended where exposures exceed the recommended exposure control guidelines by factors of:
10; high efficiency particulate (HEPA) filters or cartridges
10-25; loose-fitting (Tyvek or helmet type) HEPA powered-air purifying respirator.
25-50; a full face-piece negative pressure respirator with HEPA filters
50-100; tight-fitting, full face-piece HEPA PAPR
100-1000; a hood-shroud HEPA PAPR or full face-piece supplied air respirator operated in pressure demand or other positive pressure mode.

**Individual protection measures, such as personal protective equipment**

**Eye and face protection**

When handling very small quantities of the material eye protection may not be required.
For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:
- Chemical goggles.[AS/NZS 1337.1, EN166 or national equivalent]
- Face shield. 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].

**Skin protection**

See Hand protection below

**Hands/feet protection**

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:
· Excellent when breakthrough time > 480 min
· Good when breakthrough time > 20 min
· Fair when breakthrough time < 20 min
· Poor when glove material degrades
For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.
Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
- Rubber gloves (nitrile or low-protein, powder-free latex, latex/ nitrile). Employees allergic to latex gloves should use nitrile gloves in preference.

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| | |
|---|---|
| | ‣ Double gloving should be considered.<br>‣ PVC gloves.<br>‣ Change gloves frequently and when contaminated, punctured or torn.<br>‣ Wash hands immediately after removing gloves.<br>‣ Protective shoe covers. [AS/NZS 2210]<br>‣ Head covering. |
| **Body protection** | See Other protection below |
| **Other protection** | ‣ For quantities up to 500 grams a laboratory coat may be suitable.<br>‣ For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.<br>‣ For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.<br>‣ For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.<br>‣ Eye wash unit.<br>‣ Ensure there is ready access to an emergency shower.<br>‣ For Emergencies: Vinyl suit |

### 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:
Avixel

| Material | CPI |
|---|---|
| BUTYL | A |
| NEOPRENE | A |
| VITON | A |
| NATURAL RUBBER | C |
| PVA | 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.

**Ansell Glove Selection**

| **Glove** — *In order of recommendation* |
|---|
| AlphaTec® Solvex® 37-185 |
| AlphaTec® 38-612 |
| AlphaTec® 58-008 |
| AlphaTec® 58-530B |
| AlphaTec® 58-530W |
| AlphaTec® 58-735 |
| AlphaTec® 79-700 |
| AlphaTec® Solvex® 37-675 |
| DermaShield™ 73-711 |
| MICROFLEX® 63-864 |

***The suggested gloves for use should be confirmed with the glove supplier.***

### Respiratory protection

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

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

| Required minimum protection factor | Maximum gas/vapour concentration present in air p.p.m. (by volume) | Half-face Respirator | Full-Face Respirator |
|---|---|---|---|
| up to 10 | 1000 | A-AUS / Class1 | - |
| up to 50 | 1000 | - | A-AUS / Class 1 |
| up to 50 | 5000 | Airline * | - |
| up to 100 | 5000 | - | A-2 |
| up to 100 | 10000 | - | A-3 |
| 100+ | | | Airline** |

* - Continuous Flow ** - Continuous-flow or positive pressure demand
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)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

## SECTION 9 Physical and chemical properties

### Information on basic physical and chemical properties

| | |
|---|---|
| **Appearance** | Dark brown liquid with characteristic odour; partly mixes with water. |

| | | | |
|---|---|---|---|
| **Physical state** | Liquid | **Relative density (Water = 1)** | ~1.085 |
| **Odour** | Characteristic | **Partition coefficient n-octanol / water** | Not Available |
| **Odour threshold** | Not Available | **Auto-ignition temperature (°C)** | Not Applicable |
| **pH (as supplied)** | ~9 | **Decomposition temperature (°C)** | Not Available |
| **Melting point / freezing point (°C)** | Not Applicable | **Viscosity (mm2/s)** | Not Available |
| **Initial boiling point and boiling range (°C)** | Not Available | **Molecular weight (g/mol)** | Not Applicable |
| **Flash point (°C)** | Not Applicable | **Taste** | Not Available |
| **Evaporation rate** | Not Available | **Explosive properties** | Not Available |

**Continued...**

| | | | |
|---|---|---|---|
| **Flammability** | Not Applicable | **Oxidising properties** | Not Available |
| **Upper Explosive Limit (%)** | Not Applicable | **Surface Tension (dyn/cm or mN/m)** | Not Available |
| **Lower Explosive Limit (%)** | Not Applicable | **Volatile Component (%vol)** | Not Available |
| **Vapour pressure (kPa)** | Not Available | **Gas group** | Not Available |
| **Solubility in water** | Partly miscible | **pH as a solution (1%)** | Not Available |
| **Vapour density (Air = 1)** | Not Available | **VOC g/L** | Not Available |
| **Heat of Combustion (kJ/g)** | Not Available | **Ignition Distance (cm)** | Not Available |
| **Flame Height (cm)** | Not Available | **Flame Duration (s)** | Not Available |
| **Enclosed Space Ignition Time Equivalent (s/m3)** | Not Available | **Enclosed Space Ignition Deflagration Density (g/m3)** | Not Available |

## SECTION 10 Stability and reactivity

| | |
|---|---|
| **Reactivity** | See section 7 |
| **Chemical stability** | Product is considered stable and hazardous polymerisation will not occur. |
| **Possibility of hazardous reactions** | See section 7 |
| **Conditions to avoid** | See section 7 |
| **Incompatible materials** | See section 7 |
| **Hazardous decomposition products** | See section 5 |

## SECTION 11 Toxicological information

### Information on toxicological effects

| | |
|---|---|
| **a) Acute Toxicity** | Based on available data, the classification criteria are not met. |
| **b) Skin Irritation/Corrosion** | Based on available data, the classification criteria are not met. |
| **c) Serious Eye Damage/Irritation** | Based on available data, the classification criteria are not met. |
| **d) Respiratory or Skin sensitisation** | Based on available data, the classification criteria are not met. |
| **e) Mutagenicity** | Based on available data, the classification criteria are not met. |
| **f) Carcinogenicity** | Based on available data, the classification criteria are not met. |
| **g) Reproductivity** | Based on available data, the classification criteria are not met. |
| **h) STOT - Single Exposure** | Based on available data, the classification criteria are not met. |
| **i) STOT - Repeated Exposure** | Based on available data, the classification criteria are not met. |
| **j) Aspiration Hazard** | Based on available data, the classification criteria are not met. |

| | |
|---|---|
| **Inhaled** | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| **Ingestion** | 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. |
| **Skin Contact** | The liquid may be able to be mixed with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives. |
| **Eye** | The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. |
| **Chronic** | Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. |

| | | |
|---|---|---|
| **Avixel** | **TOXICITY** | **IRRITATION** |
| | Not Available | Not Available |
| **betaine** | **TOXICITY** | **IRRITATION** |
| | Oral (Rat) LD50: >11148 mg/kg[1] | Eye: no adverse effect observed (not irritating)[1] |
| | | Skin: no adverse effect observed (not irritating)[1] |
| **L-arginine** | **TOXICITY** | **IRRITATION** |
| | Oral (Rat) LD50: 3792 mg/kg[1] | Eye: no adverse effect observed (not irritating)[1] |
| | | Skin: no adverse effect observed (not irritating)[1] |
| **water** | **TOXICITY** | **IRRITATION** |
| | Oral (Rat) LD50: >90000 mg/kg[2] | 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*** |

**Continued...**

| | |
|---|---|
| **BETAINE** | he most common side effect is elevated levels of methionine in the blood<br>Poor and short-term clinical responses have become a significant issue in the use of pan-BET small-molecule inhibitors for the clinical treatment of cancer.<br>New technologies have been developed to facilitate the discovery of novel inhibitors, such as BD1-, BD2-, or BRD4-selective inhibitors, BET proteolysis targeting chimeras (PROTACs), dual-target inhibitors, and protein-protein interaction (PPI) inhibitors. Among these inhibitors, pan-BET inhibitors show no selectivity against specific BET protein isoforms or bromodomains, BD1- and BD2-selective inhibitors imply pan-BET activity toward BRD2/3/4/T but with selectivity for specific bromodomains, and BRD4-selective inhibitors mean target preference for BRD4 rather than BRD2/3/T but without bromodomain selectivity. A report depicting functional differences between BD1 and BD2 highlights the potential for developing BD1-specific inhibitors in cancer therapy and BD2-specific inhibitors in immuno inflammation that may be more favorable compared with nonselective BET bromodomain targeting.<br>bromodomain and extraterminal (BET) proteins bind acetylated lysine residues in histones and nonhistone proteins via tandem bromodomains and regulate chromatin dynamics, cellular processes, and disease procession. Thus targeting BET proteins is a promising strategy for treating various diseases, especially malignant tumors and chronic inflammation. Many pan-BET small-molecule inhibitors have been described, and some of them are in clinical evaluation. Nevertheless, the limited clinical efflcacy of the current BET inhibitors is also evident and has inspired the development of new technologies to improve their clinical outcomes and minimize unwanted side effects.Although small-molecule pan-BET inhibitors show promising effects in clinical evaluation, there are still problems and challenges to overcome, such as the moderate clinical efflcacy and the occurrence of preclinical resistance<br>However, the clinical advancement of most pan-BET inhibitors is still in the early stages and mainly focuses on cancer treatment. The results of clinical trials published to date raise several key issues to be considered. First, some inhibitors display toxicity during clinical trials, including dose-limiting toxicity (DLT). The most common adverse effects are thrombocytopenia, diarrhea, fatigue, vomiting, anemia, and hyperbilirubinemia. A commonly observed DLT is thrombocytopenia with undamaged platelet function. Reduced platelet counts were reversible and could be restored within 1 week after drug withdrawal.46 In addition, complications and immunodeficiency are potential undesirable reactions to the use of pan-BET inhibitors. several inhibitors exhibited much lower antitumor activity than those observed in preclinical trials. Pan-BET inhibitors show a significant survival advantage in tumor models, which are often abrogated in transplants of drug-resistant cells The main reason for the lack of clinical efficacy is likely due to a failure to identify the right group of patients most likely to benefit from pan-BET inhibitor treatment, resulting in ineffectual dosing before DLT occurs. Moreover, modest outcomes may be partly attributed to the development of resistance, diminishing the clinical response to pan-BET inhibitors.<br>ch of BRD4, problems with preclinical drug resistance have attracted significant attention. In drug resistance, the activation of alternative or compensatory pathways such as WNT/ß-catenin and hedgehog signaling can maintain MYC expression independently of BRD4 In pan-BET inhibitor-resistant leukemia cells, genome-wide BRD4 binding is decreased upon BET inhibitor treatment, but alternative binding by ß-catenin to key oncogenic sites or nearby WNT-responsive enhancers maintains MYC expression.48 In addition, the activation of the hedgehog signaling pathway is another mechanism to restore MYC expression through altered transcription programming.<br>The phosphorylation of BRD4, which is crucial for chromatin binding and factor recruitment,8 also has a great effect on the drug resistance, as shown in triple-negative breast cancer (TNBC) cells. Significantly increased BRD4 phosphorylation (or hyperphosphorylation) due to reduced PP2A activity results in a stronger association of BRD4 with the MED1 component of the mediator complex that recruits RNA Pol II to the promoter region, thereby promoting bromodomain-independent gene activation via an alternative protein-protein (i.e., BRD4-mediator) recruitment mechanism.11,51 BRD4 hyperphosphorylation has also been observed in NMC to support its oncogenic activity<br>Furthermore, adapted apoptotic signaling through AMPK/ULK1-mediated autophagy represents another resistance mechanism to BRD4 inhibitors in certain JQ1-resistant acute myelogenous leukemia (AML) cells, where reduced apoptosis is achieved by JQ1-induced prosurvival autophagy, as the pharmacological inhibition of AMPK leads to diminished ULK1-mediated autophagy and increased apoptosis..<br>Conceivably, the activity of the E3 ubiquitin ligase adaptor SPOP (speckle-type POZ protein) and deubiquitinase DUB3 that directly modulate the BRD4 protein stability may potentially account for the drug resistance, as a deficiency in SPOP binding to BRD4 results in the enhanced BRD4-dependent expression of RAC1 GTPase and the activation of cholesterol biosynthetic enzymes and AKT-mTORC1 to mediate intrinsic resistance. Likewise, a mutation in NCOR2 that negatively regulates DUB3 gene transcription frequently observed in castration-resistant prostate cancer (CRPC) leads to enhanced DUB3 and BRD4 protein levels, thus contributing to resistance to BRD4 inhibitor treatment. Moreover, a mutation in PI3KCA has also been identified as a resistance determinant to BRD4 inhibitors based on whole-genome shRNA dropout screens performed in 77 breast cancer cell lines.<br>Notably, in preclinical models, the complexity of drug resistance with diverse factors and pathways involved greatly diminishes the clinical responses.<br>Tang P, Zhang J, Liu J, Chiang CM, Ouyang L. Targeting Bromodomain and Extraterminal Proteins for Drug Discovery: From Current Progress to Technological Development. J Med Chem. 2021 Mar 11;64(5):2419-2435. doi: 10.1021/acs.jmedchem.0c01487. Epub 2021 Feb 22. PMID: 33616410; PMCID: PMC8106541 |
| **L-ARGININE** | in animal primary neuronal cell cultures, excess nitric oxide is partially responsible for glutamate neurotoxicity. These glutamate derangements affect neurodegenerative disorders, including stroke, epilepsy, Alzheimer's disease, amyotrophic lateral sclerosis, and Huntington's disease. However, it is more likely that these neurotoxic mechanisms are subject to mediation through peroxynitrite, the product of an NO and superoxide anion reaction. Peroxynitrite and excess oxygen free radicals can be generated from severe cellular damage and cross the blood-brain barrier as lipid-soluble products accumulate within neuronal tissue. The newer FDA-approved iNO delivery system limits the toxicity of nitric oxide by delivering a controlled level of nitric oxide with oxygen.<br>iNO's adverse effects are primarily dose-dependent, and the recommended limit for clinical use is 20 ppm for up to 14 days in a preterm infant. However, even low doses may exert cellular toxicity. Infants who received iNO and ventilation for PPHN for 1 to 4 days showed nitro tyrosine residues within their lungs, indicating potential long-term pulmonary complications. Clinical doses of iNO have also exhibited adverse effects. Infants weaning from nitric oxide, when it was withdrawn rapidly, suffered from severe rebound pulmonary vasospasm, most likely due to the actions of exogenous nitric oxide downregulating nitric oxide synthase activity.<br>NO can also rapidly interact with other atoms or anions to facilitate damage. It can combine with oxygen in the lungs to form nitrogen dioxide, a potent pulmonary irritant. Additionally, it can interact with a superoxide anion to form peroxynitrite. Peroxynitrite is cytogenic and can disrupt surfactant functioning within the lungs<br>contratraindications of iNO include severe left ventricular dysfunction and congenital heart disease involving a right to left shunt. Echocardiogram findings should rule out congenital cyanotic heart disease before initiating iNO, as this drug can further exacerbate heart failure in systems dependent on ductal systemic blood flow Abrupt discontinuation of iNO can worsen oxygenation and increase pulmonary artery pressure, resulting in rebound pulmonary hypertension syndrome.<br>Clinical adverse effects of iNO include the following:<br>· Worsening heart failure<br>· Hypotension<br>· Pulmonary vasospasm<br>· Methemoglobinemia: The risk of methemoglobinemia increases with the simultaneous use of the eutectic mixture of local anesthetics. (EMLA-Lidocaine/Prilocaine |
| **L-ARGININE & WATER** | No significant acute toxicological data identified in literature search. |

| | | | |
|---|---|---|---|
| **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***

**Continued...**

## SECTION 12 Ecological information

### Toxicity

**Avixel**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| Not Available | Not Available | Not Available | Not Available | Not Available |

**betaine**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| EC10(ECx) | 72h | Algae or other aquatic plants | 120.2mg/l | 2 |
| EC50 | 72h | Algae or other aquatic plants | 1199mg/l | 2 |
| EC50 | 48h | Crustacea | 4335mg/l | 2 |

**L-arginine**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| NOEC(ECx) | 24h | Crustacea | <1000mg/L | 2 |
| LC50 | 96h | Fish | >1000mg/L | 2 |

**water**

| 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 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data***

**DO NOT** discharge into sewer or waterways.

### Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|---|---|
| betaine | LOW | LOW |
| L-arginine | LOW | LOW |
| water | LOW | LOW |

### Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|---|
| betaine | LOW (LogKOW = -4.93) |
| L-arginine | LOW (LogKOW = -4.2) |
| water | LOW (LogKOW = -1.38) |

### Mobility in soil

| Ingredient | Mobility |
|---|---|
| betaine | HIGH (Log KOC = 1.557) |
| L-arginine | LOW (Log KOC = 20.86) |

## SECTION 13 Disposal considerations

### Waste treatment methods

**Product / Packaging disposal**

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- 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.
- **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.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

## SECTION 14 Transport information

### Labels Required

| | |
|---|---|
| **Marine Pollutant** | NO |
| **HAZCHEM** | Not Applicable |

**Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Continued...**

**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 |
|---|---|
| betaine | Not Applicable |
| L-arginine | Not Applicable |
| water | Not Applicable |

**14.7.3. Transport in bulk in accordance with the IGC Code**

| Product name | Ship Type |
|---|---|
| betaine | Not Applicable |
| L-arginine | Not Applicable |
| water | Not Applicable |

## SECTION 15 Regulatory information

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

**betaine is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**L-arginine is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**water is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**Additional Regulatory Information**

Not Applicable

**National Inventory Status**

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (betaine; water) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | All chemical substances in this product have been designated as TSCA Inventory 'Active' |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (betaine) |
| UAE - Control List (Banned/Restricted Substances) | No (betaine; L-arginine; water) |
| ***Legend:*** | ***Yes = All CAS declared ingredients are on the inventory***<br>***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** | 21/07/2026 |
| **Initial Date** | 13/07/2026 |

**SDS Version Summary**

| Version | Date of Update | Sections Updated |
|---|---|---|
| 2.1 | 13/07/2026 | Physical and chemical properties - Appearance, Firefighting measures - Fire Fighter (fire/explosion hazard), Handling and storage - Storage (storage requirement) |
| 3.1 | 21/07/2026 | Physical and chemical properties - Appearance, Handling and storage - Storage (storage requirement) |

**Other information**

**Continued...**

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.

**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
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships
- IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- IBC: International Bulk Chemical Code

- 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

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