Vitazyme

Agreva Sustainable Agriculture

Chemwatch Hazard Alert Code: 1

Chemwatch: **5680-99**
Version No: **2.1**
Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Issue Date: **15/07/2024**
Print Date: **16/07/2024**
S.GHS.AUS.EN.E

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

Product Identifier

Product name	Vitazyme
Chemical Name	Not Applicable
Synonyms	A special proprietary liquid foliar and soil spray.
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	Use according to manufacturer's directions.

Details of the manufacturer or supplier of the safety data sheet

Registered company name	**Agreva Sustainable Agriculture**	**Sustainable Farming Solutions**
Address	160 Pine Ave, Mildura VIC 3500 Australia	160 Pine Ave, Mildura VIC 3500 Australia
Telephone	+613 9008 6352; +618 93883623	+613 9008 6352; +618 93883623
Fax	Not Available	Not Available
Website	http://agreva.com/	sustainablefarming.com.au
Email	Not Available	Not Available

Emergency telephone number

Association / Organisation	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	+61 1800 951 288
Other emergency telephone numbers	+61 3 9573 3188

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

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

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

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Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
9005-38-3	NotSpec	sodium alginate
9000-07-1	NotSpec	carrageenan
1415-93-6	NotSpec	humic acids
479-66-3	NotSpec	fulvic acid
87-51-4	<1	indole-3-acetic acid
77-06-5	<1	gibberellic acid
525-79-1	<1	kinetin
Not Available		Fermented Grain Extract
7732-18-5	balance	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: ▸ Wash out immediately with water. ▸ If irritation continues, seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ 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

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

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. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ 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.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). ▸ May emit acrid smoke. ▸ Mists containing combustible materials may be explosive. Combustion products include: carbon dioxide (CO_2) nitrogen oxides (NO_x) 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

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Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Contain spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Absorb remaining product with sand, earth or vermiculite. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ 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 all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ Avoid smoking, naked lights or ignition sources. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Glass container is suitable for laboratory quantities ▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
Vitazyme	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
sodium alginate	Not Available	Not Available
carrageenan	Not Available	Not Available
humic acids	Not Available	Not Available
fulvic acid	Not Available	Not Available
indole-3-acetic acid	Not Available	Not Available
gibberellic acid	Not Available	Not Available
kinetin	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

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Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
humic acids	E	≤ 0.01 mg/m³
indole-3-acetic acid	E	≤ 0.01 mg/m³
gibberellic acid	E	≤ 0.01 mg/m³
kinetin	D	> 0.01 to ≤ 0.1 mg/m³
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.***	

Exposure controls

Appropriate engineering controls

Enclosed local exhaust ventilation is required at points of dust, fume or vapour generation.
HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapours.
Barrier protection or laminar flow cabinets should be considered for laboratory scale handling.
A fume hood or vented balance enclosure is recommended for weighing/ transferring quantities exceeding 500 mg.
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.
Manufacturing and pilot plant operations require barrier/ containment and direct coupling technologies.
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.
Fume-hoods and other open-face containment devices are acceptable when face velocities of at least 1 m/s (200 feet/minute) are achieved.
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.

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,

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

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.

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

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Information on basic physical and chemical properties

Appearance	Dark reddish-brown liquid with pungent typical of most poly ferments; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.007
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	3.5-4.2 @ 25 C	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	0	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	100	**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 Available
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

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

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 material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
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.

Vitazyme	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
sodium alginate	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >5000 mg/kg[2]	Not Available
carrageenan	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
humic acids	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
fulvic acid	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
indole-3-acetic acid	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
gibberellic acid	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[2]	Skin: adverse effect observed (irritating)[1]

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	Oral (Rat) LD50: 6300 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]
kinetin	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
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***

CARRAGEENAN	Equivocal tumorigen by RTECS criteria degraded carrageenan MW 20000-40000 (derived from Eucheuma spinosum) native carrageenan Carrageenan, native - IARC Group 3; Carrageenan, degraded - IARC Group 2B) The available data do not provide evidence that native (undegraded) carrageenan is carcinogenic to experimental animals. In the absence of epidemiological data, no evaluation of the carcinogenicity of native carrageenan to humans could be made. Experiments in rats with doses of degraded carrageenan comparable to those used to test native carrageenan provide sufficient evidence for the carcinogenicity of degraded carrageenan in rats. No data on humans were available. Oral administration of the substance to rats produced colon tumours. Administration of the degraded product resulted in identifiable cancerous growths in the colon and the development of Hodgkin's Disease lymphomas. Other experimental work has also demonstrated adverse immunological effects and liver damage. Carrageenan administered in animal models consistently result in intestinal ulcerations with histopathological features similar to human inflammatory bowel disease (IBD). Although the set of precise mechanisms through which these emulsifiers induce lesions and inflammation remains unknown, disruption of the epithelial barrier and dysregulation of the immune response to the gut microbiome have been repeatedly implicated. The only successful dietary interventions to have induced Crohn's disease remission exclude processed foods containing carrageenan and carboxymethyl cellulose (CMC) further supporting the possibility that carrageenan is a potential triggering or magnifying substance of inflammation in IBD. Crohn's disease is a chronic relapsing and remitting inflammatory bowel disease (IBD) that causes damage to the mucosal lining of the gastrointestinal tract, resulting in abdominal pain, (bloody) diarrhea, intestinal ulceration, and often progression toward stricturing/penetrating complications requiring surgery, malnutrition, impaired growth, disability, and even mortality . Most of the toxicological studies in which an identifiable type of carrageenan and an identifiable seaweed species were used were undertaken with kappa or kappa/lambda-carrageenan from C crispus. The results of the few parallel studies suggest that there are no large differences in the effects of the different forms of carrageenan or in the effects of carrageenans prepared from different species of seaweed. Studies of the carcinogenicity of carrageenan in rats have shown no effect. In addition, the results of assays for the genotoxicity of carrageenan have been negative. A proliferative response of the mucosa of the gastrointestinal tract of rats fed two forms of carrageenan at 2.6 or 5% of the diet has been reported; the response was reversible in the study in which 5% carrageenan was given. This response might explain the promotion of the action of known experimental colon carcinogens in rats given 2.5 or 6% of carrageenan. There was evidence that carrageenan can affect the immune response of the gastrointestinal tract; however, no validated tests for assessing the nature and potential consequences of such an effect were available. The promising pharmacologic potential and importance of marine algae or seaweeds are increasing. Marine algae attributes most of its biological activity to a natural polymer that can be isolated from it which is known as sulfated polysaccharides (SPs) .SPs, including fucoidans, are complex heterogenous natural polymers with an abundance found in different species of marine algae. Depending on whether it is isolated from green (Chlorophyta), brown (Phaeophyta) or red (Rhodophyta) algae, its chemical composition and structure varies These variabilities,including the presence and quantitative contents of carbohydrates, proteins, sulfate and its degree of sulfation, can yield different pharmacologic applications that have been tested in vitro, ex vivo and in vivo in animal models with promising results. Sulfated polysaccharides from algae possess important pharmacological activities such as anticoagulant, antioxidant, anti-proliferative, anticancer, antitumoral, anticomplementary, anti-inflammatory,antiviral, antipeptic and antiadhesive activities. The relationship between structure and biological activities of algal sulfated polysaccharides are not yet clearly established.However, it is most likely than some structural features are required for biological activities, especially sulfate clusters to ensure interactions with cationic proteins. Indeed, the importance of the molecular size has been reported.. Anticoagulant activity is among the most widely studied properties of sulfated polysaccharides. Unfractionated heparins and low molecular weight heparins are the only sulfated polysaccharides currently used as anticoagulant drugs. However,these compounds have several side effects such as bleeding and thrombocytopenia, which increasing the necessity to look for Algal sulfated polysaccharides have been described to possess anticoagulant activity similar to heparin. The proposed mechanisms of action of these compounds are predominantly related to the ‘‘in vitro inhibition of factors Xa and IIa mediated by antithrombin and heparin cofactor. Algal sulfated polysaccharides,especially that extracted from Phaeophyta, have been demonstrated to play an important role as free-radical scavengers and antioxidants for the prevention of oxidative damage in living organisms. Antioxidants compounds play a role in a wide range of common diseases and age-related degenerative conditions. These include cardiovascular disease, inflammatory conditions and neurodegenerative disease such as Alzheimer s disease, mutations and cancer. A role of sulfated polysaccharides from algae as antineoplastic agents has also been suggested. Several investigations have reported that sulfated polysaccharides have antiproliferative activity in cancer cell lines in vitro, as well as inhibitive activity in tumors growing in mice. Moreover, these polymers have been reported to induce apoptosis in several cancer lines and stimulate immune system cells to induce tumor cell death.In addition, they have antimetastatic activity blocking the interactions between cancer cells and the basement membrane. Finally, some algal sulfated polysaccharides have been found to inhibit angiogenesis by interfering with the binding of vascular endothelial growth factor and basic fibroblast growth factor (bFGF) to their respective receptors
HUMIC ACIDS	For humic acid and derivatives and salts (Humates) The particle size of the notified polymer (120 µm) indicates that a portion may be respirable. The notified polymer has a molecular weight 10,000 Da and is water soluble and therefore if the notified polymer is inhaled at low levels, it is likely to be cleared from the upper respiratory tract readily through mucociliary action. Small proportions of the notified polymer may reach the lower respiratory tract, but it should still be readily cleared from the lungs unless high levels are inhaled. When high concentrations of the notified polymer are inhaled, it is likely to be cleared from the lungs, but this may be slower and temporary respiratory impairment is possible. The expected use of dust masks and local exhaust ventilation when handling the powdered notified polymer by re formulation workers should reduce inhalation exposure levels and hence lower the risk of temporary lung overload Toxicokinetics, metabolism and distribution. Based on the high molecular weight (Mn 1000 Da), high water solubility (980 g/L at 65 degC) and low partition coefficient (log P tw = -2.84 to -2.30), absorption across biological membranes is expected to be low. Systemic toxicity after dermal exposure to the notified polymer is therefore expected to be low. In the analogous chemical, humic acid, absorption across the isolated gastrointestinal tract of the rat ranged from 0.05 to 0.07% (EMEA, 1999). Acute toxicity. The notified polymer is considered to be of low acute toxicity via the oral route based on tests conducted in rats. No acute inhalation toxicity data were provided for the notified chemical or its close analogues. Irritation and Sensitisation. Based on tests conducted in rabbits the notified polymer is considered to be slightly irritating to the skin and eye. Repeated Dose Toxicity. There were no repeated dose studies available on the notified polymer. However, studies on the analogous polymers (humic acid or its sodium salts) in rats (1000 mg/kg bw/day for 30 and 90days), dogs (300 mg/kg

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	bw/day for 90 days) and rabbits (1000 mg/kg bw/day for 90days) reported no adverse effects (EMEA, 1999). Mutagenicity. There are no mutagenicity studies available for the notified polymer. However, the analogous polymer humic acid was found to not be mutagenic using a bacterial reverse mutation test (Sato et al., 1986). Toxicity for reproduction. Tests on the analogous polymer humic acid in rats showed no teratogenic effects following oral and intraperitoneal application NICNAS FULL PUBLIC REPORT: LTD/1462; JUly 2010
INDOLE-3-ACETIC ACID	The PROTAC technology offers a number of potential advantages, while it also faces significant challenges in the perspectives of cancer therapy. First, despite their relatively large molecular weights, PROTACs are more drug-like, which is in contrast to RNA/DNA-based protein reduction agents. By choosing drug-like ligands of protein of interest (POI) and E3 followed by medicinal chemistry optimization, PROTACs can have good ADME (absorption, distribution, metabolism, and elimination) properties, which are required to become a clinically useful drug. Second, PROTAC may eliminate the POI sub-stoichiometrically, because it can be reused after one round of protein degradation. It is therefore possible that the DC50 of a PROTAC can be significantly lower than its binding affinity (or inhibitory IC50) to the POI. At concentrations as low as 10 pM, a PROTAC can efficiently induce BRD4 degradation . This feature provides a potentially huge advantage over pharmacological protein inhibition. Third, since PROTAC could only require a transient binding to the POI, it provides an opportunity to overcome mutation-directed drug resistance Fourth, PROTAC only requires a ligand that binds to the POI, which may not necessarily affect POI's function. Therefore, PROTAC can possibly target any proteins, including those considered undruggable. Moreover, PROTAC-induced degradation also depends on the lysine residues on the POI surface, which represent additional selectivity requirements. This might lead to a higher selectivity and has been successfully used to develop selective PROTACs targeting an isoform of a protein family, such as CDK9, BRD4 , and HDAC6 , starting from a pan-inhibitor of the protein family On the other hand, there are significant challenges for PROTAC to be a successful drug development approach. First, unlike nucleic acid-based methods which are routinely performed using commercially available agents to knockdown or knockout a POI, the major challenge for PROTAC technology is the uncertainty, difficulty, and high costs, even when there are available ligands/inhibitors of the POI. Enormous amount of medicinal chemistry, biochemistry, and cell biology studies is needed to optimize the site of linkage, the linker, and the E3 ligand of the PROTAC. Unfortunately, these efforts may not guarantee a success. Only a limited number (~ 50) of POI-PROTACs have been reported to date. Second, biological activities of a PROTAC, which reduces the POI, may be different from those caused by pharmacological inhibition of the POI. Therefore, it is unreliable to predict the biological or clinical outcomes of a PROTAC based on the POI inhibitor it contains. Third, because of their relatively large molecular weights (mostly > 800), ADME properties of PROTACs could be different from small-molecule drugs (typically < 500). Fourth, PROTAC's activity is dependent on its associated E3, whose expression may vary in different cell types, tissues, or species Fifth, PROTAC technology has possible off-target effects related to its E3 ligand moiety. However, given the well-studied pharmacology and toxicology of these ligands (e.g., thalidomide and its analogs), these off-target effects may be predicted with no significant toxicity. For example, CRBN ligand thalidomide and its analogs are used in the clinic to treat multiple myeloma. These drugs are generally inactive to irrelevant tumor and normal cells, although their binding to CRBN may show certain biological effects.MDM2-based PROTACs could block the interactions between MDM2 and p53 and show related biological activities Finally, cancer can also develop resistance to a PROTAC with a different mechanism Unlike conventional chemotherapeutics that non-specifically inhibit cell proliferation including that of normal cells and cause undesired toxicities and side effects, a targeted cancer therapeutics suppresses cancer proliferation and progression by interacting with its protein of interest (POI) that cancer cells (but not normal cells) are heavily dependent on. Ideally, it should be more effective without toxicities to normal tissues. In reality, targeted therapeutics still has undesired toxicities and side effects because of selectivity issues: the drug itself is less specific to the POI with off-target activities on other proteins, or the POI is not cancer-specific with physiological functions in normal cells. Another problem for these small molecule-based, protein-interacting agents in the clinic is that cancer can develop resistance. One common mechanism is mutation through which the mutant POI no longer interacts strongly with the drug. Another mechanism of resistance is that cancer can evade or become insensitive to the drug by overexpression of the POI or adopting to an alternative signaling pathway for growth or survival. Given these limitations, strategies have been developed for targeted protein reduction as an alternative approach to cancer therapy. Safety insight gained from the first generation of PROTACs will help direct efforts towards safer PROTAC molecules, which may be particularly important for non-oncology indications where higher therapeutic safety margins are typically required, for example, for chronic therapy and non-life-threatening diseases and where other modalities provide some therapeutic benefit and therefore efficacy/safety balance is a higher hurdle for clinical use. And although no clinical safety data are yet available for PROTAC molecules, one can ask whether "safer" PROTAC can be developed. For example, it has been shown that each Immunomodulatory imide drug (IMiD has a distinct degradation profile with pomalidomide inducing the degradation of a larger set of proteins, compared with those degraded with thalidomide, The IMiD class includes thalidomide and its analogues (lenalidomide, pomalidomide, and iberdomide. These drugs may also be referred to as 'Cereblon modulators'. Cereblon (CRBN) is the protein targeted by this class of drugs. The name "IMiD" alludes to both "IMD" for "immunomodulatory drug" and the forms imide, imido-, imid-, and imid. suggesting that CRBN ligands may have different safety profiles. Therefore optimizing the E3 ligase warhead could decrease off-target degradation activity and improve the therapeutic index of PROTAC molecules. Another way to minimize off-target degradation is to modify the linker and its attachment orientation to the E3 ligase warhead. This has been shown in several studies.
GIBBERELLIC ACID	Tumorigenic - equivocal tumorigenic agent by RTECS criteria. ADI: 5 mg/kg/day NOEL: 550 mg/kg/day
SODIUM ALGINATE & HUMIC ACIDS & FULVIC ACID & WATER	No significant acute toxicological data identified in literature search.
HUMIC ACIDS & INDOLE-3-ACETIC ACID	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.
GIBBERELLIC ACID & KINETIN	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation.

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*

Continued...

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

SECTION 12 Ecological information

Toxicity

Vitazyme

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

sodium alginate

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	168h	Crustacea	2000mg/L	4

carrageenan

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	96h	Fish	1mg/l	1

humic acids

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

fulvic acid

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

indole-3-acetic acid

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	1008h	Algae or other aquatic plants	1mg/L	4

gibberellic acid

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	19.4mg/l	4
LC50	96h	Fish	>150mg/L	4
EC50(ECx)	48h	Crustacea	19.4mg/l	4

kinetin

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	0.64mg/l	4
EC50(ECx)	48h	Crustacea	0.64mg/l	4

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 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***

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
indole-3-acetic acid	HIGH	HIGH
gibberellic acid	HIGH	HIGH
kinetin	HIGH	HIGH
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
indole-3-acetic acid	LOW (LogKOW = 1.41)
gibberellic acid	LOW (LogKOW = 0.24)
kinetin	LOW (LogKOW = 0.5989)

Mobility in soil

Ingredient	Mobility
indole-3-acetic acid	LOW (Log KOC = 160.9)
gibberellic acid	LOW (Log KOC = 10)
kinetin	LOW (Log KOC = 612.6)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

Continued...

A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
- **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

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
sodium alginate	Not Available
carrageenan	Not Available
humic acids	Not Available
fulvic acid	Not Available
indole-3-acetic acid	Not Available
gibberellic acid	Not Available
kinetin	Not Available
water	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
sodium alginate	Not Available
carrageenan	Not Available
humic acids	Not Available
fulvic acid	Not Available
indole-3-acetic acid	Not Available
gibberellic acid	Not Available
kinetin	Not Available
water	Not Available

SECTION 15 Regulatory information

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

sodium alginate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

carrageenan is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

humic acids is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

fulvic acid is found on the following regulatory lists

Not Applicable

indole-3-acetic acid is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

Continued...

gibberellic acid is found on the following regulatory lists

Australia Chemicals with non-industrial uses removed from the Australian Inventory of Chemical Substances (old Inventory)

kinetin is found on the following regulatory lists

Australia Chemicals with non-industrial uses removed from the Australian Inventory of Chemical Substances (old Inventory)

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	No (fulvic acid)
Canada - DSL	No (fulvic acid; indole-3-acetic acid)
Canada - NDSL	No (sodium alginate; carrageenan; humic acids; fulvic acid; gibberellic acid; kinetin; water)
China - IECSC	No (fulvic acid)
Europe - EINEC / ELINCS / NLP	No (sodium alginate; fulvic acid)
Japan - ENCS	No (carrageenan; humic acids; fulvic acid; kinetin)
Korea - KECI	No (fulvic acid)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (fulvic acid; kinetin)
USA - TSCA	No (fulvic acid)
Taiwan - TCSI	Yes
Mexico - INSQ	No (fulvic acid; kinetin)
Vietnam - NCI	Yes
Russia - FBEPH	No (sodium alginate; fulvic acid)
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	15/07/2024
Initial Date	15/07/2024

SDS Version Summary

Version	Date of Update	Sections Updated
2.1	15/07/2024	Toxicological information - Acute Health (eye), Toxicological information - Acute Health (inhaled), Toxicological information - Acute Health (skin), Toxicological information - Acute Health (swallowed), First Aid measures - Advice to Doctor, Toxicological information - Chronic Health, Disposal considerations - Disposal, Exposure controls / personal protection - Engineering Control, Ecological Information - Environmental, Firefighting measures - Fire Fighter (extinguishing media), Firefighting measures - Fire Fighter (fire/explosion hazard), Firefighting measures - Fire Fighter (fire fighting), Firefighting measures - Fire Fighter (fire incompatibility), First Aid measures - First Aid (eye), First Aid measures - First Aid (inhaled), First Aid measures - First Aid (skin), First Aid measures - First Aid (swallowed), Handling and storage - Handling Procedure, Stability and reactivity - Instability Condition, Exposure controls / personal protection - Personal Protection (other), Exposure controls / personal protection - Personal Protection (Respirator), Exposure controls / personal protection - Personal Protection (eye), Exposure controls / personal protection - Personal Protection (hands/feet), Accidental release measures - Spills (major), Accidental release measures - Spills (minor), Handling and storage - Storage (storage incompatibility), Handling and storage - Storage (storage requirement), Handling and storage - Storage (suitable container), Transport information - Transport

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.

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

Continued...

- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration

- 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