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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

ALBRITE CIX(N) ACTIVE COMPONENT

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

ALBRITE CIX(N) ACTIVE COMPONENT

1. APPLICANT

Solvay Interox Pty Ltd of 20-22 McPherson St, Banksmeadow, NSW 2019

2. IDENTITY OF THE CHEMICAL

ALBRITE CIX(N) Active Component is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae and exact use have been exempted from publication in the Full Public Report and the Summary Report

Trade name: ALBRITE CIX(N) is a 35-40% (w/w) aqueous solution of the notified chemical

Molecular weight: 490 (acid form)

Method of detection and determination:

Titration with copper sulphate solution. Ion exchange column chromatography using nitric acid elution and detection of ferric ion complexes at 335nm.

Spectral data:

A ^{31}P NMR spectrum provided was consistent with structure.

3. PHYSICAL AND CHEMICAL PROPERTIES

The physico-chemical properties listed below are those of the formulation to be imported except where indicated

Appearance at 20°C and 101.3 kPa:	straw coloured liquid
Odour:	none
Boiling Point:	105°C
Density:	1290 kg/m^3 (chemical itself, salt form)
Vapour Pressure:	characteristic of water vapour
Water Solubility:	freely soluble
Hydrolysis as a function of pH:	hydrolytic stability is indicated by the conditions used in manufacture, ie, several hours at temperatures above 100°C

Dissociation Constant pK_a**:**	due to a high level of impurities an accurate measurement was not possible but can be predicted from the chemical structure
Flash Point:	not applicable
Flammability Limits:	not applicable
Decomposition Temperature:	above 200°C the notified chemical in the formulation decomposes (often violently) forming phosphine
Reactivity/Stability:	the notified chemical reacts with strong oxidising agents and in the acid form reacts with alkalis and aluminium (liberating hydrogen gas)

Comments on physico-chemical properties

Characteristics of chemicals of this nature are their high stability as a result of their resistance to abiotic and biotic degradation mechanisms. Bacteria which can degrade xenobiotic molecules of this type have been found to be relatively scarce in the environment. As they are recognised by microorganisms mainly as phosphorus sources, high phosphorus concentrations can be inhibitory towards degradation. In such cases abiotic degradation processes may become essential for removal.

4. PURITY OF THE CHEMICAL

Degree of purity: 42%

Impurities:

Two impurities related to the notified chemical make up 47% (w/w) of the commercial form together with phosphorus acid 8% (w/w) and phosphoric acid 3% (w/w).

Additives/Adjuvants: none

5. INDUSTRIAL USE

The notified chemical, to be used as an additive for the stabilisation of a biocide, will be imported at a rate of less 1 tonne per year for the first five years.

6. OCCUPATIONAL EXPOSURE

The notified chemical is to be imported as a 31% aqueous solution in sealed 200 L drums. Two workers are involved in transferring small amounts of the formulation from the drums to biocide blending tanks. With the drum in a drum cradle, liquid transfer is accomplished by replacing the bung of the drum with a closed valve following which the drum is tilted and an amount of the formulation is run into a small container (usually 5 L

capacity). This small amount is then carried to a biocide blending tank and poured through the manway opening into the biocide solution. The tank contents are allowed to mix, tested and pumped into bulk storage. The final concentration of the notified chemical in the biocide solution is less than 0.1%.

Initially the stabilised biocide is expected to be used in aseptic packaging and janitorial applications. For the aseptic packaging the biocide is connected to the process or added to a small holding tank to service the process. The packaging is treated by using either dipping or spraying techniques on a continuous process line.

Janitorial applications include dilution of the biocide solution 1:20 in water prior to application with a mop or using the neat solution on, say, toilet bowls and applying it with a scrubbing brush.

7. PUBLIC EXPOSURE

The public is unlikely to be exposed to the notified chemical during its importation, mixing with biocide, industrial use and disposal.

8. ENVIRONMENTAL EXPOSURE

. Release

The notified chemical is used as a stabiliser for biocide solutions typically at levels less than 1%. When biocide containing the notified chemical is formulated, there could be a release to the environment of the notified chemical from the biocide solution into the sewage system. It is likely that, since the biocide is classed as a dangerous good, it should be kept in a bunded compound and therefore any spillage would be contained.

It is likely that spills of aqueous the notified chemical would be absorbed onto an inert medium such as sand or vermiculite and then be disposed of as a non-toxic waste. Spills of the biocide containing the notified chemical should be dealt with according to the requirements for the biocide and as such should be diluted with water to less than 1% and then flushed to drain with water.

When used as a janitorial application the notified chemical is likely to be released into the sewers at concentrations up to 200 ppm (no dilution).

. Fate

The notified chemical will predominately enter the environment from the disposal of wash water from the cleaning process and also via effluent at the notifier' s site where it is formulated into cleaning products and from aseptic packaging process sites.

No biodegradation data is required for the limited notification of chemicals according to the *Act*. The MSDS states that chemicals of this class are not readily biodegradable, but they are inherently biodegradable undergoing photolysis.

When the notified chemical enters the sewer stream it may adsorb to suspended matter. Biodegradation at sewerage treatment plants is unlikely to be extensive. The notified chemical is unlikely to be readily biodegraded in the environment due to the enzymes required for the uptake and degradation of this class of chemical being relatively scarce in the environment. Photodegradation, hydrolysis and free radical mediated breakdown are likely to contribute to the degradation in the environment. It is predicted that under favourable environmental conditions (15-25^{O}C, aerobic conditions) chemicals of this class in solution will hydrolyse, with half-lives in the order of 50 - 200 days.

9. EVALUATION OF TOXICOLOGICAL DATA

Toxicological data are not required for chemicals proposed to be imported at less than 1 tonne per year according to the *Industrial Chemicals (Notification and Assessment) Act, 1989*. However, some data were available, were supplied and are evaluated below. The studies were performed using the commercially available form of the notified chemical, a brown liquid with a specific gravity of 1.71.

9.1 Acute Toxicity

Table 1 Summary of the acute toxicity of ALBRITE CIX(N) Active Component

Test	Species	Outcome	Reference
Acute oral toxicity	Rat	LD_{50} > 2000 mg/kg	(1)
Skin Irritation	Rabbit	slight irritant	(2)
Skin sensitisation	Guinea-pig	non-sensitiser	(3)

9.1.1 Oral Toxicity (1)

LD_{50}: > 2000 mg/kg *Species/strain:* Rat, Sprague-Dawley

Number/sex of animals: 5M, 5F *Observation period:* 14 days

Method of administration (vehicle): gavage (none)

Clinical observations: no signs of systemic toxicity

Mortality: no deaths

Morphological findings: no abnormalities observed

Test Method: OECD Guidelines for the Testing of Chemicals (4) No. 401

9.1.2 Skin Irritation (2)

Result: slight irritant *Species/strain:* New Zealand White rabbits (1M, 5F)

Method of administration: semi-occluded patch, four hour duration

Test Method: OECD Guidelines for the Testing of Chemicals (4) No. 404

Skin Reactions: Very slight erythema in 2 animals at 1 hour and 2 animals at 1 hour, 1 and 2 days after decontamination. Very slight oedema in 2 animals 1 hour after decontamination.

9.1.3 Skin Sensitisation (3)

Result: non-sensitiser

Species/strain: Albino Dunkin-Hartley guinea-pigs *Number of animals:* 20 test, 10 control

Induction: 1% (w/v) in distilled water and 1% in FCA plus distilled water (intradermal); undiluted (topical)

Results:

Challenge Concentration	24 hrs		48hrs	
	test	control	test	control
75%	0/20	0/10	0/20	0/10
100%	0/20	0/10	0/20	0/10

Test Method: OECD Guidelines for the Testing of Chemicals (4) No. 406 and Commission Directive 84/449/EEC (5) Test

9.4 Overall Assessment of Toxicological Data

The notified chemical is of low oral toxicity in rats, is a slight skin irritant in rabbits and is not a skin sensitiser in guinea-pigs. It would not be classified as hazardous according to Worksafe Australia's *Approved Criteria for Classifying Hazardous Substances* (6) in relation to Acute lethal effects (oral); Irritant effects (skin) or Sensitising effects (skin).

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data is required for the limited notification of chemicals according to the *Act*. However, the notifier has provided a study report on the acute toxicity of the product CIX (contains 35-40% of the notified chemical) to rainbow trout. The study was conducted according to OECD TG 203. Results were based on nominal concentrations as the product was shown to be stable over 24 hours under a light/dark regime. At the end of the study measured concentrations were 91-96% of the nominal concentrations. The result was a 96h LC50 > 100 mg/L and a NOEC > 100 mg/L. Therefore, the product containing the notified chemical is practically non-toxic to the fish species tested.

Also, a result of an activated sludge respiration inhibition study of 3h EC_{50} = 880 mg/L in the MSDS indicates the notified chemical is practically non-toxic to microorganisms present in wastewater treatment plants.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Approximately 1000 kg of the notified chemical per annum would be formulated into janitorial cleaning products and used in the aseptic packaging process. Assuming 300 kg may be used in a metropolitan area (eg Melbourne) per year, a worst case situation may occur where 1 kg enters the sewer per day from the use of cleaning products and waste from the formulation/aseptic packaging processes . The resultant concentration of the notified chemical at a sewerage treatment plant (500 ML flow per day) would be ~2 ppb. Further dilution in the order of 1:5 to 1:25 is likely to occur in the receiving waters. Therefore the expected environmental concentration of the notified chemical is likely to be in the order of sub-ppb.

These calculations are based on a worst case scenario and assume no adsorption to suspended matter or degradation in the environment. The notified chemical's hazard to the environment from the proposed use is likely to be low as it is not expected to exist at concentrations that would prove toxic to aquatic organisms.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

From the available toxicological data the notified chemical is not expected to exhibit acute toxic effects, is not likely to cause skin sensitisation but may cause slight irritation of the skin.

Exposure to the notified chemical is most likely to occur when small amounts (less than 5 L of the formulation to be imported) are run into 5 L containers prior to addition to large tanks containing biocide. As these operations will occur no more than once per week for 15 minutes duration, exposure is likely to be low.

Once the chemical is mixed with biocide its concentration will be less than 0.1%. Consequently, exposure to the notified chemical will be low in all subsequent operations including end use for aseptic packaging and janitorial applications. The same will be true for end uses not immediately envisaged such as pulp, paper and textile bleaching, hydrometallurgy, water and effluent treatment and chemical synthesis.

In conclusion the risk of adverse occupational or public health effects occurring as a result of transport, storage, dilution in biocide or end use of the notified chemical is expected to be low.

13. RECOMMENDATIONS

To minimise occupational exposure to ALBRITE CIX(N) Active Component the following guidelines and precautions should be observed:

. if engineering controls and work practices are insufficient to reduce exposure to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards (AS) for eye protection (AS 1336, AS 1337) (7,8), impermeable gloves (AS 2161) (9), protective clothing (AS 2919) (10) and footwear (AS 2210) (11) should be worn;

. a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The attached Material Safety Data Sheet for ALBRITE CIX(N) Active Component was provided in Worksafe Australia format (12).

This MSDS was provided by Solvay Interox Pty Ltd as part of their notification statement and is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Solvay Interox Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of ALBRITE CIX(N) Active Component shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

1. Safepharm Laboratories Limited, 1992, ' Product CIX: Acute Oral Toxicity (Limit Test) in the Rat' , Project No. 71/86, data on file, Albright and Wilson Ltd, Warley, West Midlands, U K.

2. Safepharm Laboratories Limited, 1992, ' Product CIX: Acute Dermal Irritation Test in the Rabbit' , Project No. 71/87, data on file, Albright and Wilson Ltd, Warley, West Midlands, U K.

3. Safepharm Laboratories Limited, 1992, ' Product CIX: Magnusson and Kligman Maximisation Study in the Guinea-Pig' , Project No. 71/89, data on file, Albright and Wilson Ltd, Warley, West Midlands, U K.

4. Organisation for Economic Co-operation and Development, *OECD Guidelines for Testing of Chemicals*, OECD, Paris, France[1].

[1] The Guidelines relevant to the current notification are as follows:

. No. 401 Acute Oral Toxicity
. No. 404 Acute Dermal Irritation/Corrosion

5. EEC Council Directive 84/449 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous preparations, *Official Journal of the European Communities,* No. L251 (19 September 1984)[2].

6. National Occupational Health and Safety Commission, 1994, *Approved Criteria for Classifying Hazardous Substances* [NOHSC: 1008], Australian Government Publishing Service.

7. Standards Australia, 1994, *Australian Standard 1336-1994*, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.

8. Standards Australia, 1992, *Australian Standard 1337-1992*, *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia.

9. Standards Australia, 1978, *Australian Standard 2161-1978*, *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.

10. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing*, Standards Association of Australia Publ., Sydney, Australia.

11. Standards Australia, 1994, *Australian Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications*, Standards Association of Australia Publ., Sydney, Australia.

12. National Occupational Health and Safety Commission, 1990. *, Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra , Australia.[3]

. No. 406 Dermal Sensitisation

[2] The tests specified in this directive relevant to the current notification are as follows:

. Test B6 Skin Sensitisation

[3] This Guidance Note, to which an MSDS must conform in accordance with the *Act,* has been superseded by Worksafe Australia's National Code of Practice for the Preparation of Material Safety Data Sheets (March 1994) published by the Australian Government Publishing Service.