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

Catalogue Number	CS-O-01912
Product Name	Methylchloroisothiazolinone
CAS No.	26172-55-4
Category	Pesticide Standards
Synonyms	2-Methyl-5-chloro-3-isothiazolone; 2-Methyl-5-chloroisothiazolin-3-one; 5-Chloro-2-methyl-2H-isothiazol-3-one; 5-Chloro-2-methyl-2H-isothiazolin-3-one; 5-Chloro-2-methyl-3(2H)-isothiazolinone; 5-Chloro-2-methyl-3-isothiazolone; 5-Chloro-2-methyl-4-isothiazolin-3-one; 5-Chloro-2-methyl-4-isothiazoline-3-ketone; 5-Chloro-2-methylisothiazolin-3-one; 5-Chloro-N-methylisothiazolin-3-one; 5-Chloro-N-methylisothiazolone;
Brand	Clearsynth Labs Ltd.
Identified uses	Laboratory Chemicals
Uses advised against	Not available
Company	Clearsynth Labs Ltd. Mumbai, India
Emergency Phone #	+91-22-245045900
REACH No.	Not available

SECTION 2: Hazards identification

Disclaimer: This is sample MSDS. Please email **sales@clearsynth.com** for more details.

2.1 Classification of the substance or mixture-Regulation (EC) No 1272/2008:

Not available

2.2 Label Elements

Signal Word: Warning

Hazard Statement(s)

Code	Statement
H300	Not available
H301+H311	Not available
H301	Not available
H310	Not available
H311	Not available
H314	Not available
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H330	Not available
H331	Not available
H335	Not available
H400	Not available
H410	Not available

Precautionary Statement(s)

Code	Statement
P260	Not available
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P262	Not available
P264	Wash hands thoroughly after handling.
P264+P265	Not available
P270	Not available
P271	Use only outdoors or in a well-ventilated area.
P272	Not available
P273	Not available
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Not available
P301+P316	Not available

P301+P330+P331	Not available
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P302+P361+P354	Not available
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P354+P338	Not available
P316	Not available
P317	Not available
P319	Get medical help if you feel unwell.
P320	Not available
P321	Specific treatment (see … on this label).
P330	Not available
P333+P317	Not available
P361+P364	Not available
P362+P364	Take off contaminated clothing and wash it before reuse.
P363	Not available
P391	Not available
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulatio

SECTION 3: Composition / information on ingredients

3.1 Substance

Component : Methylchloroisothiazolinone
CAS Number : 26172-55-4
Molecular Formula : C4H4ClNOS
Molecular Weight : 149.6
Parent Chemical : -
Synonyms : 2-Methyl-5-chloro-3-isothiazolone;
2-Methyl-5-chloroisothiazolin-3-one;
5-Chloro-2-methyl-2H-isothiazol-3-one;
5-Chloro-2-methyl-2H-isothiazolin-3-one;
5-Chloro-2-methyl-3(2H)-isothiazolinone;
5-Chloro-2-methyl-3-isothiazolone;
5-Chloro-2-methyl-4-isothiazolin-3-one;

5-Chloro-2-methyl-4-isothiazoline-3-ketone;
5-Chloro-2-methylisothiazolin-3-one;
5-Chloro-N-methylisothiazolin-3-one;
5-Chloro-N-methylisothiazolone;
Concentration : Not available

SECTION 4: First aid measures

SECTION 4: First-aid measures

4.1 Description of first aid measures
- General advice: Remove contaminated clothing and shoes. Seek medical attention if symptoms persist or are severe.
- Inhalation: Move person to fresh air. Keep at rest. If breathing is difficult, seek medical attention.
- Skin contact: Wash immediately with plenty of water and soap. Seek medical attention if irritation or sensitization occurs.
- Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention.
- Ingestion: Rinse mouth. Do NOT induce vomiting unless directed by medical personnel. Seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed
- May cause irritation to eyes, skin, and respiratory tract.
- May cause allergic skin reaction/sensitization.
- Additional symptoms/effects: Not available.

4.3 Indication of any immediate medical attention and special treatment needed
- Treat symptomatically.
- Special treatment: Not available.

SECTION 5: Firefighting measures

SECTION 5: Fire-fighting measures

5.1 Extinguishing media
- Suitable extinguishing media: Water spray, alcohol-resistant foam, dry chemical, carbon dioxide.
- Unsuitable extinguishing media: Not available.

5.2 Special hazards arising from the substance or mixture
- Hazardous combustion products: Not available.
- Specific hazards: Not available.

5.3 Advice for firefighters
- Wear self-contained breathing apparatus (SCBA) and full protective gear.
- Use water spray to cool unopened containers.
- Avoid inhalation of combustion products.

SECTION 6: Accidental release measures

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
- Evacuate unnecessary personnel.
- Avoid breathing dust/vapors/mist.
- Avoid contact with skin and eyes.
- Use appropriate personal protective equipment (see Section 8).

6.2 Environmental precautions
- Prevent further leakage or spillage if safe to do so.
- Avoid release to the environment. Prevent entry into drains, surface waters, or soil.

6.3 Methods and material for containment and cleaning up
- Contain spill. Collect spilled material using inert absorbent (e.g., sand, earth, vermiculite).
- Place in suitable, labeled containers for disposal.
- Clean contaminated area with water and detergent as appropriate.

6.4 Reference to other sections
- See Section 8 for personal protective equipment.
- See Section 13 for disposal considerations.

SECTION-7: Handling and storage

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Use only with adequate ventilation.
- Avoid contact with skin, eyes, and clothing.
- Avoid breathing dust/vapors/mist.
- Do not eat, drink, or smoke when using this product.
- Wash hands thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities
- Store in tightly closed container in a cool, dry, well-ventilated place.
- Protect from moisture.
- Keep away from incompatible materials.
- Incompatible materials: Not available.

7.3 Specific end use(s)
- Pesticide standard / laboratory use.
- Specific end uses: Not available.

SECTION 8: Exposure controls / personal protection

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
- Occupational exposure limits: Not available.
- Biological limit values: Not available.

8.2 Exposure controls
- Engineering controls: Provide local exhaust ventilation or general dilution ventilation to maintain exposure below applicable limits.

Personal protective equipment (PPE)
- Eye/face protection: Safety glasses with side shields or chemical splash goggles.
- Skin protection: Chemical-resistant gloves. Protective clothing as needed to prevent skin contact.
- Respiratory protection: If ventilation is inadequate or exposure is possible, use an appropriate NIOSH/EN-approved respirator.
- Hygiene measures: Remove contaminated clothing and wash before reuse. Wash hands and exposed skin after handling.

Environmental exposure controls
- Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Test	Result
Appearance	No data available
IR spectrum	No data available
pH	No data available
Solubility	No data available

Property	Value
a) Physical State	No data available
b) Color	No data available
c) Odor	No data available
d) pH	No data available
e) Vapour Pressure	No data available
f) Viscosity	No data available
g) Initial Boiling Point and boiling range	No data available
h) Melting Point / Freezing Point	No data available
i) Auto Ignition Temperature	No data available
j) Flash Point	No data available
k) Explosion Limit, Lower	No data available
l) Explosion Limit, Upper	No data available

Property	Value
m) Decomposition Temperature	No data available
n) Loss on Drying	No data available
o) Relative Density	No data available
p) Solubility (in DMSO)	No data available
q) Oxidizing Properties	No data available

SECTION 10: Stability and reactivity

SECTION 10: Stability and reactivity

10.1 Reactivity
- Not available.

10.2 Chemical stability
- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
- Not available.

10.4 Conditions to avoid
- Heat, moisture, and incompatible materials.
- Additional conditions to avoid: Not available.

10.5 Incompatible materials
- Not available.

10.6 Hazardous decomposition products
- Not available.

SECTION 11: Toxicological information

11.1 Information on toxicological effects
- Acute toxicity: IDENTIFICATION AND USE: 5-chloro-2-methyl-4-isothiazolin-3-one (CMI) forms crystals. It is used as antimicrobial preservative in cosmetics, hygiene products, paints, emulsions, cutting oils, paper coatings, and water storage and cooling units. CMI is also used in hydraulic fracturing fluids. It is registered for pesticide use in the USA but approved pesticide uses may change periodically and so federal, state and local authorities must be consulted for currently approved uses. CMI is often used in a combination products with 2-methyl-4-isothiazolin-3-one (MI). HUMAN EXPOSURE AND TOXICITY: Kathon CG, a cosmetics preservative containing, as active ingredients, 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one, appears to be a frequent cause of contact dermatitis in Europe. ANIMAL STUDIES: A mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (CMI/MIT) diluted in corn oil was administered by gavage to male and female rats at 0, 0.26, 0.78, 2.33 and 7.0 mg/kg body weight per day. Reduction of serum triglyceride levels in males and induction of hepatic phase 1 xenobiotic metabolizing enzymes in females accompanied by subtle histological changes in the liver were observed at the highest CMIT/MIT exposure. A mixture of CMI/MIT produced point mutations in the absence of a rat-liver metabolizing system in bacteria (strain TA 100) and mammalian cells in culture. In the presence of rat-liver metabolizing system a 10-fold higher

concentration was required to induce point mutations in mammalian cells in culture. No mutagenic activity was observed with the metabolizing system and S. typhimurium. Negative results were obtained in the sex-linked recessive lethal assay in Drosophila, the in vivo cytogenetic assay in mice, the unscheduled DNA synthesis assay in cultured rat hepatocytes, and the in vitro cell transformation assay. In immunotoxicity studies CMI, which binds to protein, induced an auricular lymph node cell proliferation response while MI, which poorly binds to protein, neither stimulated a proliferative response nor induced an increase in lymph node size at concentrations similar to CMI. /ALTERNATIVE and IN VITRO TESTS/ A 3:1 combination of 5-chloro-2-methyl-4-isothiazolin-3-one (CMI) and 2-methyl-4-isothiazolin-3-one (MI) is widely used to preserve cosmetic products. We show here that CMI/MI induced apoptosis in normal human keratinocytes (NHK) as at low concentrations (0.001-0.05% documented by subdiploid DNA content and phosphatidylserine exposure, while at the highest concentration (0.1% as supplied, 15 p.p.m.) the response was necrosis. Various molecular events accompanied the cytotoxic effects of CMI/MI. Generation of ROS and hyperpolarization of mitochondrial transmembrane potential (DeltaPsim) were early events, followed by increased Fas expression and activation of caspase-8, and then activation of caspase-3 and -9. The drop in DeltaPsim occurred only later in the cell death pathway, when NHK showed signs of apoptosis. Pretreatment of cells for 2 hr with the redox-active agent N-acetyl-L-cysteine conferred complete protection against the CMI/MI-induced cytotoxic effects, DeltaPsim loss, and apoptosis. The pan-caspase inhibitor Z-Val-Ala-Asp(OMe)-CH2F blocked the CMI/MI-induced apoptosis without preventing ROS generation and the drop in DeltaPsim. These results indicate that the generation of ROS plays an important part in mediating apoptosis and necrosis associated with CMI/MI treatment. This new aspect of the in vitro toxicity of CMI/MI may provide important information about the relationship between the preservative's in vitro apoptotic activity and its in vivo toxicity. /Mixture/

- Skin corrosion/irritation: No data available.
- Serious eye damage/eye irritation: No data available.
- Respiratory or skin sensitization: /EPIDEMIOLOGY STUDIES/ The frequency of sensitization to methylchloroisothiazolinone (MCI)/ methylisothiazolinone (MI) observed in the Information Network of Departments of Dermatology (IVDK) was constantly around 2.1% from 1998 to 2009. After that, it increased to 3.9% in 2011, paralleled by an increase in the frequency of allergic reactions to MI in the preservative series from 1.9% in 2009 to 4.4% in 2011. MI without MCI has increasingly been used as a preservative in cosmetics and skin care products in recent years. /The objective of the study was/ to epidemiologically investigate the possible reasons for this development and to analyze concomitant reactions to MCI/MI and MI. A retrospective analysis of IVDK data from 2009 to 2011 was performed. Stratified data analysis revealed pronounced increases in reactivity to MCI/MI and MI in females, face dermatitis patients, and patients tested because of suspected cosmetic intolerance. The proportion of MI-positive patients among those reacting to MCI/MI increased from 43% to 59% between 2009 and 2011. More widespread consumer exposure has most likely led to the increase in primary sensitization to MI and subsequently to a rise in MCI/MI reactions resulting from immunological cross-reactions ... /GENOTOXICITY/ A variety of shampoos, conditioners, skin-care lotions, and other cosmetic products contain the biocide Kathon CG, which is a mixture of two heterocyclic isothiazolinones: methylisothiazolinone and methylchloroisothiazolinone. This mixture and the related biocide, Kathon 886, have been shown to be potent sensitizers and bacterial mutagens. Five cosmetic products that list the components of Kathon on their labels and two that do not were screened for mutagenicity with Salmonella typhimurium TA100 without S-9. Five of these products and Kathon 886 were further evaluated in TA100 without and with S-9. Kathon 886, a cosmetic product that contained Kathon, and thin layer chromatography-separated components of Kathon 886 were identified by GC/MS analysis. Three of the five products that listed Kathon were direct acting mutagens with TA100. The remaining two products were considerably more toxic than the other products and could not be evaluated for mutagenicity. The addition of S-9 reduced toxicity but did not eliminate mutagenicity. The mutagenic evaluation of Kathon 886 resulted in a dose response similar to that seen with some cosmetic products but at a 1,000-fold lower concentration, and activity was also reduced by the addition of S-9 mix. S-9 reduced activity both with and without cofactors present. Thin layer chromatography

separation of the components and subsequent identification by GC/MS indicated that methylisothiazolinone was nonmutagenic while methylchloroisothiazolinone was mutagenic. Additionally, a dichlorinated compound was identified which was also mutagenic. In light of these findings and the reported skin sensitization by Kathon CG in various cosmetics, we recommend that additional testing be done to assure the safety of products containing Kathon CG. /Mixture/
- Germ cell mutagenicity: IDENTIFICATION AND USE: 5-chloro-2-methyl-4-isothiazolin-3-one (CMI) forms crystals. It is used as antimicrobial preservative in cosmetics, hygiene products, paints, emulsions, cutting oils, paper coatings, and water storage and cooling units. CMI is also used in hydraulic fracturing fluids. It is registered for pesticide use in the USA but approved pesticide uses may change periodically and so federal, state and local authorities must be consulted for currently approved uses. CMI is often used in a combination products with 2-methyl-4-isothiazolin-3-one (MI). HUMAN EXPOSURE AND TOXICITY: Kathon CG, a cosmetics preservative containing, as active ingredients, 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one, appears to be a frequent cause of contact dermatitis in Europe. ANIMAL STUDIES: A mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (CMI/MIT) diluted in corn oil was administered by gavage to male and female rats at 0, 0.26, 0.78, 2.33 and 7.0 mg/kg body weight per day. Reduction of serum triglyceride levels in males and induction of hepatic phase 1 xenobiotic metabolizing enzymes in females accompanied by subtle histological changes in the liver were observed at the highest CMIT/MIT exposure. A mixture of CMI/MIT produced point mutations in the absence of a rat-liver metabolizing system in bacteria (strain TA 100) and mammalian cells in culture. In the presence of rat-liver metabolizing system a 10-fold higher concentration was required to induce point mutations in mammalian cells in culture. No mutagenic activity was observed with the metabolizing system and S. typhimurium. Negative results were obtained in the sex-linked recessive lethal assay in Drosophila, the in vivo cytogenetic assay in mice, the unscheduled DNA synthesis assay in cultured rat hepatocytes, and the in vitro cell transformation assay. In immunotoxicity studies CMI, which binds to protein, induced an auricular lymph node cell proliferation response while MI, which poorly binds to protein, neither stimulated a proliferative response nor induced an increase in lymph node size at concentrations similar to CMI. /GENOTOXICITY/ Kathon biocide, an aqueous solution containing a mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one in an approximate ratio of 3:1, was tested for mutagenic activity in Salmonella typhimurium, L5178Y mouse lymphoma cells in culture and Drosophila melanogaster. Tests also were conducted for chromosome aberrations in vivo on mouse bone marrow cells, for DNA damage/repair in primary rat hepatocytes in culture, and for morphological transformation in C3H 10T1/2 cells in culture. Kathon biocide produced point mutations in the absence of a rat-liver metabolizing system in bacteria (strain TA 100) and mammalian cells in culture. In the presence of rat-liver metabolizing system a 10-fold higher concentration was required to induce point mutations in mammalian cells in culture. No mutagenic activity was observed with the metabolizing system and S. typhimurium. Negative results were obtained in the sex-linked recessive lethal assay in Drosophila, the in vivo cytogenetic assay in mice, the unscheduled DNA synthesis assay in cultured rat hepatocytes, and the in vitro cell transformation assay. /Mixture/
- Carcinogenicity: No data available.
- Reproductive toxicity: No data available.
- STOT-single exposure: No data available.
- STOT-repeated exposure: /LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Biocides are added to biodiesels to prevent degradation resulting from microbial growth. A 28-day repeated oral dose study was conducted to assess a potential risk arising from ingestion of isothiazolinone biocides in biodiesels. A mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (CMIT/MIT) diluted in corn oil was administered by gavage to male and female rats at 0, 0.26, 0.78, 2.33 and 7.0 mg/kg body weight per day. Rat water and food consumption was monitored. At the end of the dosing period, organs were weighed and histological examinations performed. Hematology, serum clinical chemistry and biomarkers of inflammation were assessed.

Reduction of serum triglyceride levels in males and induction of hepatic phase 1 xenobiotic metabolizing enzymes in females accompanied by subtle histological changes in the liver were observed at the highest CMIT/MIT exposure. These changes were more indicative of an adaptive, reversible response than overt toxicity. Based on recommended levels for the control of microbial growth in fuels, CMIT/MIT contained in accidentally ingested biodiesels is not expected to represent a significant health risk. /Mixture/
- Aspiration hazard: No data available.

Likely routes of exposure
- /LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Biocides are added to biodiesels to prevent degradation resulting from microbial growth. A 28-day repeated oral dose study was conducted to assess a potential risk arising from ingestion of isothiazolinone biocides in biodiesels. A mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (CMIT/MIT) diluted in corn oil was administered by gavage to male and female rats at 0, 0.26, 0.78, 2.33 and 7.0 mg/kg body weight per day. Rat water and food consumption was monitored. At the end of the dosing period, organs were weighed and histological examinations performed. Hematology, serum clinical chemistry and biomarkers of inflammation were assessed. Reduction of serum triglyceride levels in males and induction of hepatic phase 1 xenobiotic metabolizing enzymes in females accompanied by subtle histological changes in the liver were observed at the highest CMIT/MIT exposure. These changes were more indicative of an adaptive, reversible response than overt toxicity. Based on recommended levels for the control of microbial growth in fuels, CMIT/MIT contained in accidentally ingested biodiesels is not expected to represent a significant health risk. /Mixture/

Symptoms related to the physical, chemical and toxicological characteristics
- /ALTERNATIVE and IN VITRO TESTS/ A 3:1 combination of 5-chloro-2-methyl-4-isothiazolin-3-one (CMI) and 2-methyl-4-isothiazolin-3-one (MI) is widely used to preserve cosmetic products. We show here that CMI/MI induced apoptosis in normal human keratinocytes (NHK) as at low concentrations (0.001-0.05% documented by subdiploid DNA content and phosphatidylserine exposure, while at the highest concentration (0.1% as supplied, 15 p.p.m.) the response was necrosis. Various molecular events accompanied the cytotoxic effects of CMI/MI. Generation of ROS and hyperpolarization of mitochondrial transmembrane potential (DeltaPsim) were early events, followed by increased Fas expression and activation of caspase-8, and then activation of caspase-3 and -9. The drop in DeltaPsim occurred only later in the cell death pathway, when NHK showed signs of apoptosis. Pretreatment of cells for 2 hr with the redox-active agent N-acetyl-L-cysteine conferred complete protection against the CMI/MI-induced cytotoxic effects, DeltaPsim loss, and apoptosis. The pan-caspase inhibitor Z-Val-Ala-Asp(OMe)-CH2F blocked the CMI/MI-induced apoptosis without preventing ROS generation and the drop in DeltaPsim. These results indicate that the generation of ROS plays an important part in mediating apoptosis and necrosis associated with CMI/MI treatment. This new aspect of the in vitro toxicity of CMI/MI may provide important information about the relationship between the preservative's in vitro apoptotic activity and its in vivo toxicity. /Mixture/

SECTION 12: Ecological information

SECTION 12: Ecological information

12.1 Toxicity
- Not available.

12.2 Persistence and degradability
- Not available.

12.3 Bioaccumulative potential

- Not available.

12.4 Mobility in soil
- Not available.

12.5 Results of PBT and vPvB assessment
- Not available.

12.6 Endocrine disrupting properties
- Not available.

12.7 Other adverse effects
- Not available.

SECTION 13: Disposal considerations

SECTION 13: Disposal considerations

13.1 Waste treatment methods
- Dispose of contents/container in accordance with local/regional/national/international regulations.
- Do not discharge to drains or the environment.
- Contaminated packaging: Dispose of as unused product unless cleaned according to applicable regulations.
- Waste codes: Not available.

SECTION 14: Transport information

SECTION 14: Transport information

- UN number: Not available.
- UN proper shipping name: Not available.
- Transport hazard class(es): Not available.
- Packing group: Not available.
- Environmental hazards: Not available.
- Special precautions for user: Not available.
- Transport in bulk according to IMO instruments: Not available.

SECTION 15: Regulatory information

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
- Regulatory listings/status: Not available.

15.2 Chemical safety assessment
- Not available.

SECTION 16: Other information

SECTION 16: Other information

- Product name: Methylchloroisothiazolinone

- CAS No.: 26172-55-4
- Catalog No.: CS-O-01912
- Supplier: Clearsynth Labs Ltd., Mumbai, India
- Emergency phone: +91-22-245045900

Revision information
- Revision date: Not available.
- Version: Not available.

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