

**MATERIAL SAFETY DATA SHEET**

**SECTION 1 - IDENTIFICATION**

**Product identifier** : **ZORO MITICIDE / INSECTICIDE**

**Product Code(s)** : None reported.

**Product Use** : Insecticide for controlling a broad range of pests on crops.

**Chemical Family** : Mixture

**Supplier's name and address:**  
**Cheminova Inc.**  
 PO Box 110566  
 One Park Drive  
 Research Triangle Park, NC, USA  
 27709

**Manufacturer's name and address:**  
 Refer to Supplier

**Information Telephone #** : 919-474-6600 (8:00 AM - 5:00 PM, EST, Monday-Friday)

**24 Hr. Emergency Tel #** : Chemtrec 1-800-424-9300 (Within Continental U.S.); Chemtrec 703-527-3887 (Outside U.S.).  
 For Medical Emergencies: (800) 303-6950

**SECTION 2 - HAZARDS IDENTIFICATION**

**Classification** : OSHA: This material is classified as hazardous under OSHA regulations (29CFR 1910.1200). Hazardous classification: Combustible liquid; Acute Health Hazard; Chronic Health Hazard

WHMIS information: This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA). For informational purposes, this product would have the following WHMIS classification: Class B3 (Combustible Liquids); Class D1B (Materials Causing Immediate and Serious Toxic Effects, Toxic Material); Class D2B (Materials Causing Other Toxic Effects, Toxic Material)

**Emergency Overview** : Pale yellow liquid. Slightly soap-like amine odor.  
 Warning! Combustible liquid and vapor. POISON! May be fatal if swallowed. Causes eye irritation. May cause skin and respiratory irritation. May cause central nervous system depression. May cause long-term adverse effects in the environment. This material is highly toxic to aquatic invertebrates, toxic to fish and harmful to aquatic plants and earthworms.

**POTENTIAL HEALTH EFFECTS:**

**Signs and symptoms of short-term (acute) exposure**

*Inhalation* : May cause irritation to the nose, throat and upper respiratory tract. May cause headache, nausea, dizziness and other symptoms of central nervous system depression.

*Skin* : May cause mild to moderate skin irritation.

*Eyes* : May cause moderate to severe irritation.

*Ingestion* : May be fatal if ingested. May cause dizziness, drowsiness, nausea, headache, hypotension, vomiting, convulsions, tremors, coma, and other symptoms of central nervous system depression. Could eventually cause death as a result of respiratory failure.

**Effects of long-term (chronic) exposure**

: Prolonged or repeated skin contact may cause irritation, defatting or dermatitis (rash).

**Carcinogenic status** : See TOXICOLOGICAL INFORMATION, Section 11.

**Additional health hazards** : See TOXICOLOGICAL INFORMATION, Section 11.

**Potential environmental effects** : This material is highly toxic to aquatic invertebrates, toxic to fish and harmful to aquatic plants and earthworms. See ECOLOGICAL INFORMATION, Section 12.

**SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS**

<u>Ingredients</u>	<u>CAS #</u>	<u>Wt.%</u>
Abamectin	71751-41-2	1.00 - 5.00

N-Methyl-2-pyrrolidone	872-50-4	15.00 - 40.00
1-Hexanol	111-27-3	15.00 - 40.00
Calcium dodecylbenzene sulfonate	26264-06-2	1.00 - 3.00
2,6-Di-tert-butyl-p-cresol	128-37-0	0.50 - 1.50

**SECTION 4 - FIRST AID MEASURES**

- Inhalation** : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. Obtain medical attention if symptoms develop and persist.
- Skin contact** : Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention if symptoms develop and persist. Wash contaminated clothing before reuse.
- Eye contact** : Immediately flush eyes with running water for at least 20 minutes. Obtain medical attention immediately.
- Ingestion** : If material is swallowed, get immediate medical attention. Do not induce vomiting, unless directed to do so by qualified medical personnel. Have victim rinse mouth with water, then give one to two glasses of water to drink. Never give anything by mouth to an unconscious person.
- Notes For Physician** : Treat symptomatically.

**SECTION 5 - FIRE FIGHTING MEASURES**

- Fire hazards/conditions of flammability** : Combustible liquid and vapor. Product will ignite when exposed to extreme heat and flame. Material may decompose when exposed to heat and flame. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.
- Flammability classification (OSHA 29 CFR 1910.1200)** : Combustible Liquid Class III A.
- Oxidizing properties** : None known.
- Explosion data: Sensitivity to mechanical impact / static discharge** : Not expected to be sensitive to mechanical impact or static discharge.
- Suitable extinguishing media** : Carbon dioxide or dry chemical for small fires. For large fires, use water spray or foam. Do not use water jet, as this may spread burning material.
- Special fire-fighting procedures/equipment** : Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame. Avoid spreading burning solid with water spray used for cooling purposes.
- Hazardous combustion products** : Carbon oxides; nitrogen oxides (NOx); Aldehydes; irritating fumes and smoke.
- NFPA Rating** : 0 - Minimal    1 - Slight    2 - Moderate    3 - Serious    4 - Severe  
 : *Health: 2    Flammability: 2    Instability: 1    Special Hazards: None*

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

- Personal precautions** : Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.
- Environmental precautions** : Ensure spilled product does not enter drains, sewers, waterways, or confined spaces. If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply.
- Spill response/cleanup** : Remove all sources of ignition. Ventilate area of release. Stop the spill at source if it is safe to do so. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Place used absorbent in containers for disposal. For a water spill, confine the spill immediately with booms. Notify the appropriate authorities as required.
- Prohibited materials** : None known.
- Special spill response procedures**

- : In case of a transportation accident, in the United States contact CHEMTREC at 1-800-424-9300 or International at 1-703-527-3887. If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8002).  
US CERCLA Reportable quantity (RQ): Calcium dodecylbenzene sulfonate (1000 lbs / 454 kg)

**SECTION 7 - HANDLING AND STORAGE**

- Safe Handling procedures** : This material is a combustible, harmful liquid. Wear chemically resistant protective equipment during handling. Use only in well-ventilated areas. Avoid contact with eyes, skin and clothing. Avoid breathing vapors or mists. Do not ingest. Keep away from children and all unprotected persons. Do not use near sources of heat, flame or direct sunlight. Keep away from incompatibles. Use caution when opening cap. Keep containers tightly closed when not in use. Wash thoroughly after handling.
- Storage requirements** : Store in a cool, dry, well ventilated area. Keep away from excessive heat, open flames, sparks and other possible sources of ignition. Keep away from incompatibles. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.
- Incompatible materials** : Strong oxidizing agents; Acids; Bases; halogens; Alkali metals.
- Special packaging materials** : Always keep in containers made of the same materials as the supply container.

**SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION**

Exposure Limits

<u>Ingredients</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
	<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Abamectin	N/Av	N/Av	N/Av	N/Av
N-Methyl-2-pyrrolidone	*10 ppm (skin)	N/Av	N/Av	N/Av
1-Hexanol	N/Av	N/Av	N/Av	N/Av
Calcium dodecylbenzene sulfonate	N/Av	N/Av	N/Av	N/Av
2,6-Di-tert-butyl-p-cresol	2 mg/m <sup>3</sup> (inhalable fraction and vapor)	N/Av	10 mg/m <sup>3</sup> (final rule limit)	N/Av

\* Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: N-methyl-2-pyrrolidone

**Ventilation and engineering measures**

- : Provide sufficient ventilation to keep vapour concentration below the given TLV and/or PEL.

**Respiratory protection**

- : Respiratory protection is required if the concentrations exceed the TLV. Wear a pesticide respirator jointly approved by the MSHA and NIOSH. Advice should be sought from respiratory protection specialists.

**Skin protection**

- : Impervious gloves must be worn when using this product. Small tears in gloves and cross-contamination can easily occur. Change gloves frequently and limit manual work. Advice should be sought from glove suppliers.

**Eye / face protection**

- : Chemical splash goggles must be worn when handling this material.

**Other protective equipment**

- : Wear impervious chemical apron and protective clothing (water-proof pants, coat, hat and boots) to prevent skin contact. An eyewash station and safety shower should be made available in the immediate working area.

**General hygiene considerations**

- : Avoid breathing vapors or mists. Avoid contact with skin, eyes and clothing. Do not eat, drink, smoke or use cosmetics while working with this product. Before removing gloves clean them with soap and water. Always wash hands, face and arms with soap and water before smoking, eating or drinking. After work, take off all protective equipment, work clothes and shoes, and wash with soap and water. Respirator should be cleaned and filter replaced according to manufacturer's instructions. Wear only clean, uncontaminated clothes when leaving place of work.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

- Physical state** : Liquid. **Appearance** : Pale yellow liquid.
- Odour** : Slightly soap-like amine odor. **Odour threshold** : N/Av

**ZORO MITICIDE / INSECTICIDE**

MSDS Revision Date (dd/mm/yyyy): 15/03/2010

Page 4 of 7

<b>pH</b>	: 6.5 @ 20°C (1% emulsion in water)	<b>Specific gravity</b>	: 0.961 @ 20°C
<b>Boiling point</b>	: Decomposition temperature: 314.6°F / 157°C (1-Hexanol)	<b>Coefficient of water/oil distribution</b>	: Abamectin: log Kow = 2.0
<b>Melting/Freezing point</b>	: N/Av	<b>Solubility in water</b>	: Miscible Abamectin: 0.54 mg/L @ 20°C
<b>Vapour pressure (mmHg @ 20° C / 68° F)</b>	: Abamectin: 1.5 x 10 <sup>-9</sup> mmHg @ 20°C; N-methyl-2-pyrrolidone: 0.3 mmHg @ 20°C; 1-Hexanol: 0.7 mmHg @ 20°C	<b>Evaporation rate (n-Butyl acetate = 1)</b>	: N/Av
<b>Vapour density (Air = 1)</b>	: N/Av	<b>Volatiles (% by weight)</b>	: N/Av
<b>Volatile organic Compounds (VOC's)</b>	: N/Av	<b>Auto-ignition temperature</b>	: N-methyl-2-pyrrolidone: 473°F / 245°C
<b>Flash point</b>	: 158°F / 70°C	<b>Upper flammable limit (% by vol.)</b>	: 7.7 - 9.5 (based on ingredients)
<b>Flash point Method</b>	: Pensky Martens Closed Cup	<b>Flashback observed</b>	: N/Av
<b>Lower flammable limit (% by vol.)</b>	: 1.2 - 1.3 (based on ingredients)		
<b>Flame Projection Length</b>	: N/Av		

**Section 10: Stability And Reactivity**

<b>Stability and reactivity</b>	: Stable under the recommended storage and handling conditions prescribed. When exposed to air, product may form hydroperoxides which may be accelerated by direct sunlight.
<b>Hazardous polymerization</b>	: Will not occur.
<b>Conditions to avoid</b>	: Keep this product away from heat, sparks, flame, and other sources of ignition (e.g. pilot lights, electric motors, static electricity). Direct local heating, such as electric or steam heating must be avoided. Keep away from direct sunlight.
<b>Materials To Avoid And Incompatibility</b>	: Avoid contact with incompatible materials. See Section 7 (Handling and Storage) for further details.
<b>Hazardous decomposition products</b>	: None known, refer to hazardous combustion products in Section 5.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

<b>Target organs</b>	: Eyes, skin, respiratory system, digestive system, central nervous system.
<b>Routes of exposure</b>	: <i>Inhalation:</i> YES <i>Skin Absorption:</i> NO <i>Skin &amp; Eyes:</i> YES <i>Ingestion:</i> YES
<b>Toxicological data</b>	: Estimated value(s) based on measurements on a similar product: LD50 Oral (rat): 250 mg/kg LD50 Dermal (rat): >4000 mg/kg LC50 Inhalation (rat): >3.87 mg/L/4hrs
<b>Carcinogenic status</b>	: No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.
<b>Reproductive effects</b>	: Not expected to have other reproductive effects.
<b>Teratogenicity</b>	: Not expected to be a teratogen.
<b>Mutagenicity</b>	: Not expected to be mutagenic in humans.
<b>Epidemiology</b>	: Not available.
<b>Sensitization to material</b>	: Not expected to be a skin or respiratory sensitizer.
<b>Synergistic materials</b>	: Not available.
<b>Irritancy</b>	: Irritating to eyes, respiratory system and skin.
<b>other important hazards</b>	: See Section 2 for additional information.
<b>Conditions aggravated by overexposure</b>	: Pre-existing skin, eye, respiratory and central nervous system disorders.

**SECTION 12 - ECOLOGICAL INFORMATION**

**ZORO MITICIDE / INSECTICIDE**

MSDS Revision Date (dd/mm/yyyy): 15/03/2010

- Ecotoxicity** : This product is an insecticide. The active ingredient is: Abamectin  
The toxicity of the active ingredient to wildlife species is measured to be:  
Fish - 96-Hr LC50, Mirror carp (Cyprinus carpio) = 3.28 mg/L  
Birds - LD50, Japanese quail (Coturnix coturnix japonica) = >2000 mg/kg  
Bees - 48-Hr LD50, Bees = 4.2 µg/bee
- Mobility** : The active ingredient is mobile in soil.
- Persistence** : The active ingredient is not readily biodegradable. Degradation half-lives vary with circumstances and have been found to vary from 14 to 20 days in different soil types. The active ingredient is degraded photochemically in soil and water.
- Bioaccumulation potential** : The active ingredient is not considered to have a bioaccumulative potential. The bioconcentration factor (BCF) was measured to be: 54 in zebrafish (Danio rerio, whole fish)
- Other Adverse Environmental effects** : This product is an insecticide. This material is highly toxic to aquatic invertebrates, toxic to fish and harmful to aquatic plants and earthworms. This product is not considered as harmful to birds or soil microorganisms. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

- Handling for Disposal** : Handle waste according to recommendations in Section 7.
- Methods of Disposal** : Do not contaminate water, foodstuffs, feed or seed by storage or disposal. For disposable containers, triple rinse (or equivalent) containers and add rinse material to disposal tank. Follow any additional local, state or federal requirements for cleaning containers prior to disposal. Make the empty, rinsed container unsuitable for further use by puncturing. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.
- RCRA** : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

**SECTION 14: TRANSPORT INFORMATION**

Regulatory Information	UN Number	Shipping Name	Class	Packing Group	Label
49CFR/DOT	UN2902	PESTICIDES, LIQUID, TOXIC, N.O.S. (Abamectin)	6.1	III	
<b>49CFR/DOT Additional information</b>	For shipments by ground within the United States, the Limited Quantity exception may apply. Refer to 49CFR section 173.153 for additional information.				
TDG	UN2902	PESTICIDE, LIQUID, TOXIC, N.O.S. (Abamectin )	6.1	III	
<b>TDG Additional information</b>	Within Canada, the Limited Quantity Exemption may apply for containers which hold specific quantities of the product. Under the TDGR, refer to section 1.17 for Limited Quantity Exemption information, if shipping under this exemption.				

**SECTION 15 - REGULATORY INFORMATION**

**US Federal Information:**

OSHA: This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

CERCLA Reportable Quantity (RQ) (40 CFR 117.302): See Section 6

**ZORO MITICIDE / INSECTICIDE**

MSDS Revision Date (dd/mm/yyyy): 15/03/2010

SARA TITLE III: Sec. 302, Extremely Hazardous Substances, 40 CFR 355: No Extremely Hazardous Substances are present in this material.

SARA TITLE III: Sec. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes: Fire Hazard; Immediate (Acute) health hazard; Chronic Health Hazard. Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product may be subject to SARA notification requirements, since it contains Toxic Chemical constituents above their de minimus concentrations. This product contains: N-methyl-2-pyrrolidone; Abamectin.

**US State Right to Know Laws:**

California Proposition 65: This product contains a chemical known to the State of California to cause developmental harm. This product contains: N-methyl-2-pyrrolidone.

**International Information:**

This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA).


**This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.**

**SECTION 16 - OTHER INFORMATION**

**HMIS Rating** : \* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe  
*Health: \*2 Flammability: 2 Reactivity: 1*

**Legend** : ACGIH: American Conference of Governmental Industrial Hygienists  
CA: California  
CAS: Chemical Abstract Services  
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980  
CFR: Code of Federal Regulations  
DOT: Department of Transportation  
EPA: Environmental Protection Agency  
HMIS: Hazardous Materials Identification System  
HSDB: Hazardous Substances Data Bank  
IARC: International Agency for Research on Cancer  
Inh: Inhalation  
N/Ap: Not Applicable  
N/Av: Not Available  
NFPA: National Fire Protection Association  
NIOSH: National Institute of Occupational Safety and Health  
NTP: National Toxicology Program  
OSHA: Occupational Safety and Health Administration  
PEL: Permissible exposure limit  
RCRA: Resource Conservation and Recovery Act  
RTECS: Registry of Toxic Effects of Chemical Substances  
SARA: Superfund Amendments and Reauthorization Act  
STEL: Short Term Exposure Limit  
TDG: Canadian Transportation of Dangerous Goods Act & Regulations  
TLV: Threshold Limit Values  
TPQ: Threshold Planning Quantity  
TSCA: Toxic Substance Control Act  
TWA: Time Weighted Average  
WHMIS: Workplace Hazardous Materials Identification System

**References** : 1. ACGIH, Threshold Limit Values and Biological Exposure Indices  
2. International Agency for Research on Cancer Monographs  
3. Canadian Centre for Occupational Health and Safety, CCHInfoWeb databases (Chempendium, HSDB, RTECs).  
4. Material Safety Data Sheet from manufacturer.  
5. US EPA Title III List of Lists  
6. California Proposition 65 List

<p><b>Prepared for:</b> Cheminova Inc PO Box 110566 One Park Drive, Suite 150 Research Triangle Park, NC 27709 Please direct all enquiries to Cheminova.</p>	
<p><b>Prepared by:</b> ICC The Compliance Center Inc. <a href="http://www.thecompliancecenter.com">http://www.thecompliancecenter.com</a></p>	

**DISCLAIMER OF LIABILITY**

This Material Safety Data Sheet was prepared by ICC The Compliance Center Inc. using information provided by / obtained from Cheminova Inc and CCOHS' Web Information Service. The information in the Material Safety Data Sheet is offered for your consideration and guidance when exposed to this product. ICC The Compliance Center Inc and Cheminova Inc expressly disclaim all expressed or implied warranties and assume no responsibilities for the accuracy or completeness of the data contained herein. The data in this MSDS does not apply to use with any other product or in any other process.

This Material Safety Data Sheet may not be changed, or altered in any way without the expressed knowledge and permission of ICC The Compliance Center Inc. and Cheminova Inc.

**Preparation Date (dd/mm/yyyy)**

: 22/11/2006

**Reviewed Date (dd/mm/yyyy)**

: 15/03/2010

**Revision No.**

: 2

**Revision Information**

: (M)SDS sections updated: All

**END OF DOCUMENT**