

Syngenta Crop Protection Canada, Inc.  
140 Research Lane, Research Park  
Guelph, ON N1G 4Z3

**In Case of Emergency, Call  
1-800-327-8633 (FAST MED)**

Date of MSDS Preparation (Y/M/D): 2007-12-31

Supersedes date (Y/M/D): 2005-12-31

MSDS prepared by:  
Department of Regulatory & Biology Development  
Syngenta Crop Protection Canada, Inc.

For further information contact:  
1-87-SYNGENTA (1-877-964-3682)

## SECTION – 1: PRODUCT IDENTIFICATION

**Product Identifier:** ARBOTECT® 20-S Fungicide

Formulation No.: A10345A

**Registration Number:** 16694 (Pest Control Products Act)

**Chemical Class:** Benzimidazole fungicide.

**Synonym:** None.

**Active Ingredient (%):** Thiabendazole (26.6 %)

CAS No.: 148-79-8

**Chemical Name:** 2-(thiazol-4-yl)-benzimidazole.

**Product Use:** ARBOTECT is a systemic fungicide that is used for the control of certain fungal diseases. For further details please refer to product label.

## SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen	WHMIS†
Hypophosphorus Acid (50% Solution)	Not Established	Not Established	Not Established	No	Not Established
Thiabendazole (20.0 %)	Not Established	Not Established	10 mg/m <sup>3</sup> TWA***	No	Not Established

\*\*\* Syngenta Occupational Exposure Limit (OEL)

† Material listed in Ingredient Disclosure List under Hazardous Products Act.

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

## SECTION – 3: HAZARDS IDENTIFICATION

### Symptoms of Acute Exposure

May cause mild skin irritation.

### Hazardous Decomposition Products

Can decompose at high temperatures and form toxic gases.

### Physical Properties

Appearance: Yellow orange liquid.

Odour: Weak, like hydrogen sulfide

### Unusual Fire, Explosion and Reactivity Hazards

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

### Potential Health Effects

**Relevant routes of exposure:** Skin, eyes, mouth, lungs.

## SECTION – 4: FIRST AID MEASURES

**IF POISONING IS SUSPECTED, immediately contact the poison information centre, doctor or nearest hospital.** Have the product container, label or Material Safety Data Sheet with you when calling Syngenta, a poison control center or doctor, or going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given. Call the Syngenta Emergency Line [**1-800-327-8633 (1-800-FASTMED)**], for further information.

**EYE CONTACT:** Flush eyes with clean water, holding eyelids apart for a minimum of 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta, a poison control center or doctor for treatment advice. Obtain medical attention immediately if irritation persists.

**SKIN CONTACT:** Immediately remove contaminated clothing and wash skin, hair and fingernails thoroughly with soap and water. Flush skin with running water for a minimum of 20 minutes. Obtain medical attention if irritation occurs.

**INHALATION:** Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is laboured, give oxygen. Obtain immediate medical attention.

**INGESTION:** If swallowed, immediately contact Syngenta, a poison control centre, doctor or nearest hospital for treatment advice. Provided the patient is conscious, wash out mouth with water. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless directed by a physician or a poison control center. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer water.

### NOTES TO PHYSICIAN:

There is no specific antidote if this product is ingested. Treat symptomatically. Persons suffering a temporary allergic reaction may respond to treatment with antihistamines or steroid creams and/or systemic steroids.

### MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED:

None known.

## SECTION – 5: FIRE FIGHTING MEASURES

**Flash point and method:** Not available.

**Upper and lower flammable (explosive) limits in air:** Not available.

**Auto-ignition temperature:** Not available.

**Flammability:** Not flammable.

**Hazardous combustion products:** During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion. Toxic gases include carbon dioxide, carbon monoxide, nitrogen and sulphur compounds.

**Conditions under which flammability could occur:** Product is not flammable. Keep fire exposed containers cool by spraying with water.

**Extinguishing media:** Use foam, carbon dioxide, dry powder, halon extinguishant or water fog or mist, (avoid use of water jet). Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. Contain run-off water with, for example, temporary earth barriers.

**Sensitivity to explosion by mechanical impact:** No.

**Sensitivity to explosion by static discharge:** No.

## SECTION – 6: ACCIDENTAL RELEASE MEASURES

**Personal Precautions:** Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices. A small spill can be handled routinely. Wear suitable protective clothing and eye protection to prevent skin and eye contact. Use adequate ventilation and wear an air-supplied respirator to prevent inhalation.

**Procedures for dealing with release or spill:** Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Sections 7 and 8. Pump or scoop large amounts of liquid into a disposable container.

Absorb remaining liquid or smaller spills with clay, sand or vermiculite. Scoop or sweep up material and place into a disposal container. Wash area with detergent and water. Pick up wash liquid with additional absorbent and place into compatible disposal container. On soils, skim off the upper contaminated layer and collect for disposal. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition. Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body.

## SECTION – 7: HANDLING AND STORAGE

**Handling practices:** KEEP OUT OF REACH OF CHILDREN and animals. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. After work, rinse gloves and remove protective equipment. Wash hands thoroughly with soap and water after handling, and before eating, tobacco use, drinking, or using the toilet. Wash contaminated clothing before re-use and separate from household laundry. Keep containers closed when not in use. Keep product, wash or rinse water, and contaminated materials out of water, away from crops, and away from access by people, animals and birds.

**Appropriate storage practices/requirements:** Store in original container only in a well-ventilated, cool, dry, secure area. Protect from heat, sparks and flame. Do not expose containers to temperatures below 0 °C or above 40 °C (i.e. prevent product from freezing). Keep separate from other products to prevent cross contamination. Rotate stock. Clean up spilled material immediately.

**National Fire Code classification:** Not applicable.

## SECTION – 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Applicable control measures, including engineering controls:** This product is intended for use outdoors where engineering controls are not necessary. If necessary, ensure work areas have ventilation, containment, and procedures sufficient to maintain airborne levels below the TLV. Warehouses, production area, parking lots and waste holding facilities must have adequate containment to prevent environmental contamination. Provide separate shower and eating facilities.

**THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.**

**FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.**

### **Personal protective equipment for each exposure route:**

General: Avoid breathing dust, vapours or aerosols. Avoid contact with eye, skin and clothing. Wash thoroughly after handling and before eating, drinking, or handling tobacco.

**INGESTION:** Do not eat, drink, handle tobacco, or apply cosmetics in areas where there is a potential for exposure to this material. Always wash thoroughly after handling.

**EYES:** Where eye contact is likely, use chemical splash goggles. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

**SKIN:** Where contact is likely, wear chemical-resistant (such as nitrile or butyl) gloves, coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.

**INHALATION:** A respirator is not normally required when handling this substance. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below exposure limits. A NIOSH-certified combination air-purifying respirator with an N, P or R 95 or HE class filter and an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a pressure demand atmosphere-supplying respirator if there is any potential for uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

## SECTION – 9: PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Yellow orange liquid

**Formulation Type:** Liquid (suspension).

**Odour:** Weak, like hydrogen sulfide

**pH:** 2.7 (1% suspension in water).

**Vapour pressure and reference temperature:**  $4.0 \times 10^{-9}$  mmHg @ 25 °C (Thiabendazole Technical)

**Vapour density:** Not available.  
**Boiling point:** 100 °C.  
**Melting point:** Not available.  
**Freezing point:** Not available.  
**Specific gravity or density:** 1.10 g/cm<sup>3</sup> @ 25 °C  
**Evaporation Rate:** Not available.  
**Water/oil partition coefficient:** Not available.  
**Odour threshold:** Not available.  
**Viscosity:** Not available.  
**Solubility in Water:** 30 mg/L @ 20 °C (Thiabendazole Technical)

## SECTION – 10: STABILITY AND REACTIVITY

**Chemical stability:** Stable under normal use and storage conditions.  
**Conditions to avoid:** Excessive heat or cold.  
**Incompatibility with other materials:** Oxidizing agents (e.g. chlorates, nitrates).  
**Hazardous decomposition products:** Can decompose at high temperatures forming toxic gases. Toxic gases include carbon dioxide, carbon monoxide, nitrogen and sulphur compounds.  
**Hazardous polymerization:** Will not occur.

## SECTION – 11: TOXICOLOGICAL INFORMATION

### Acute toxicity/Irritation Studies (Finished Product):

Ingestion:	<u>Practically Non-Toxic</u> Oral (LD50 Rat):	> 5,000 mg/kg body weight
Dermal:	<u>Practically Non-Toxic</u> Dermal (LD50 Rat):	> 5,050 mg/kg body weight
Inhalation:	<u>Not Available</u> Inhalation (NOEC Rat):	Not Available.
Eye Contact:	<u>Non-Irritating (Rabbit)</u>	
Skin Contact:	<u>Non-Irritating (Rabbit)</u>	
Skin Sensitization:	<u>Not a Sensitizer (Guinea Pig)</u>	

### **Reproductive/Developmental Effects**

Thiabendazole Technical: Decreased fetal weights and resorptions were observed in rats and rabbits given thiabendazole at levels that were maternotoxic. Skeletal defects and cleft palates were produced in mice given very high dose levels of thiabendazole.

### **Chronic/Subchronic Toxicity Studies**

Thiabendazole Technical: Animal studies with thiabendazole showed increased incidence of anemia in dogs; changes in the thyroid, liver, spleen, kidney and gall bladder, and slightly decreased red blood cell counts and haemoglobin levels in rats.

### **Carcinogenicity**

Thiabendazole Technical: None observed.

### **Other Toxicity Information:**

None.

### **Toxicity of Other Components**

The acute toxicity test results reported in Section 11, above, for the finished product take into account any acute hazards related to the “other components” in the formulation.

**Other materials that show synergistic toxic effects together with the product:** None known.

### **Target Organs**

#### Active Ingredients

Thiabendazole Technical: Thyroid, liver, spleen, kidneys, gall bladder and blood.

#### Inert Ingredients

Hypophosphorus Acid (50% Solution): Not Applicable.

## SECTION – 12: ECOLOGICAL INFORMATION

### **Summary of Effects**

ARBOTECT is a soluble concentrated fungicide that is mixed with water and used to control fungal diseases in trees. The active ingredient, thiabendazole, is practically non-toxic to birds but is highly toxic to fish and aquatic invertebrates (water flea).

### **Eco-Acute Toxicity**

Thiabendazole Technical:	
Bees LC <sub>50</sub> /EC <sub>50</sub>	Not available.
Invertebrates ( <i>Daphnia magna</i> ) 48-hour LC <sub>50</sub> /EC <sub>50</sub>	0.81 ppm
Fish (Rainbow Trout) 96-hour LC <sub>50</sub> /EC <sub>50</sub>	0.55 ppm
Fish (Bluegill) 96-hour LC <sub>50</sub> /EC <sub>50</sub>	19 ppm
Birds (8-day dietary - Bobwhite Quail) LC <sub>50</sub> /EC <sub>50</sub>	> 5,620 ppm
Birds (8-day dietary - Mallard Duck) LC <sub>50</sub> /EC <sub>50</sub>	> 5,620 ppm
Bobwhite Quail Oral LD <sub>50</sub>	> 2,250 mg/kg

### **Eco-Chronic Toxicity**

Thiabendazole Technical:	
Fish (Fathead minnow) Early Life Stage NOEC	0.11 ppm
Invertebrate ( <i>Daphnia magna</i> ) Life Cycle NOEC	0.042 ppm
Mallard Reproduction NOEC	400 ppm
Bobwhite Reproduction NOEC	400 ppm

### **Environmental Fate**

The active ingredient, thiabendazole, has a low bioaccumulation potential, low mobility, and moderate to high persistence in soil. The dissipation half-life in soil is 1093-1444 days; however, thiabendazole is not persistent in water (half-life of 29 hours via photolytic degradation). As a result, risks to aquatic receptors from exposure to ARBOTECT, based on the registered use pattern, are very low.

## SECTION – 13: DISPOSAL CONSIDERATIONS

**Waste disposal information:** Do not reuse empty containers. Empty container retains product residue. Triple rinse, or equivalent, empty container, return rinse water to dilution mixture, and dispose of dilution mixture as a hazardous waste if it cannot be disposed of by use according to label instructions. Dispose of empty containers in accordance with local regulations. Consult provincial environment ministry for advice on waste disposal. Industrial/commercial waste may be handled at licensed facilities only. Waste shipments must be securely packaged and properly labelled. Only licensed carriers may be used, and proper documents must accompany the shipment.

## SECTION – 14 : TRANSPORT INFORMATION

### Shipping information such as shipping classification:

TRANSPORTATION OF DANGEROUS GOODS CLASSIFICATION - ROAD/RAIL.

Not Regulated.

## SECTION – 15: REGULATORY INFORMATION

### WHMIS classification for product: Exempt

**A statement that the MSDS has been prepared to meet WHMIS requirements, except for use of the 16 headings.**

This MSDS has been prepared in accordance with WHMIS requirements, but the data are presented under 16 headings.

Other regulations; restrictions and prohibitions

Pest Control Products (PCP) Act Registration No.: 16694

## SECTION – 16: OTHER INFORMATION

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Syngenta will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years. This product is under the jurisdiction of the Pest Control Products Act and is exempt from the requirements for a WHMIS compliant MSDS. Hazardous properties of all ingredients have been considered in the preparation of this MSDS. Read the entire MSDS for the complete hazard evaluation of this product.

Prepared by: Syngenta Crop Protection Canada, Inc.  
1-87-SYNGENTA (1-877-964-3682)

Syngenta Crop Protection Canada, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date thereof. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.** The information provided herein relates to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and of the information referred to herein are beyond the control of Syngenta Crop Protection Canada, Inc., Syngenta Crop Protection Canada, Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

Product names marked ® or TM are registered trademarks of a Syngenta Group Company