

Technical Bulletin #82:

# Agrochemical General Information Sheet - Copper Pesticide

## Copper Pesticide

Formulation types: Wettable Powder (WP), Suspension Concentrate (SC), Water Dispersible Granule (WG) and others.

Chemical family: Inorganic

## What is Copper pesticide?

Copper pesticides are copper compounds found widely dispersed over many parts of the world and extracted from soils, rocks and geological formations. Copper compounds are used to control many bacterial and fungal soil and foliar pathogens such as *Phytophthora infestans*-late blight, *Alternaria solani*-alternaria leaf spot, Anthracnose leaf spot, mildew, brown rot, rust, and as a bacterial prevention on Brassica crops, papaya, tomato, eggplant, pepper, beans, potatoes and a wide range of vegetable and fruit crops.

There are many copper compounds available, but only two common copper compounds are recommended by the Cambodia HARVEST program - **copper hydroxide** and **copper oxide**.

Copper hydroxide is used in numerous crops against fungal and bacterial diseases and copper/cuprous oxide is used in agriculture as a fungicide to protect coffee, cocoa, tea, banana, citrus, and other plants from major fungal leaf and fruit diseases such as blight, downy mildew, and rust.

## How does it work? (Mode of Action)

Copper is a non-systemic contact pesticide, which means that the sprayed droplets must come into contact with the pathogen to effectively kill and control the organism and will not spread to a large extent across the fruit or leaf surface.

When copper hydroxide (or any other copper fungicide) comes into contact with fungi or bacterium, it disrupts the energy transport and reproduction systems of the organism. For best results, it must be applied as a preventative on the crop before there are visual symptoms. Copper compounds can be alternated with other products on the market such as Mancozeb, Chlorothalonil, etc.

## pH Mixture:

It is important that this product be applied in a spray solution (water) at a pH above 6.0. If the solution is more acidic (less pH: 6), phytotoxicity can occur.

The phytotoxic effects of copper are more common when:

- copper is applied with other products (especially acidic ones) in the one tank mix
- 3 – 4 consecutive applications of copper are used at high rates
- copper is applied to wet fruit (e.g. early morning before the dew has lifted or spraying immediately after rain)
- copper is applied at high temperatures (especially when fruit and plant surface temperatures are above 25°C)
- there is cool and slow drying weather or when humidity is low

## Resistance:

Resistance by fungal pathogens to fungicides usually evolves following the intensive use of the same fungicides for controlling the same diseases. A good Integrated Pest Management system with chemical rotation should always be implemented when attempting to control plant diseases. Below are examples of management guidelines for bacterial spot on tomato and pepper to reduce the risk of copper resistance:

- Do not use a fungicide or fungicide chemical from the same chemical group that it is no longer effective.



- Bacterial spot pathogen that is resistant to copper may have to see an increase in the frequency of copper applications to overcome the level of resistance in bacteria. This especially occurs during periods of hot, rainy weather. The use of Mancozeb pesticides to accompany applications of fixed copper may overcome the level of copper resistance that exists for tomato. Mancozeb products are not labeled on peppers.

Human Hazards	Environmental Fate
Highly toxic if swallowed	Bird (quail): Nontoxic
Unlikely carcinogen	Fish (trout): Highly toxic
Skin and eyes irritation	Mammals (rabbit): Low toxic
	Bee (honey): Toxic
	Ground/surface water: unlikely to leach

**First aid measures:**

Inhalation: Move person to fresh air. If person is not breathing, call the health center or doctor for further treatment advice.

Skin Contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a Poison Control Center or doctor for treatment advice.

Eye Contact: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call the health center or doctor for treatment advice.

Ingestion: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if they are able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

**Mitigation Measures:**

- Monitor plants regularly and spray only when necessary.
- Read and follow the label instructions carefully, particularly, dosage, pre-harvest intervals and safety measures. Ask for assistance from your local extension agriculture office or HARVEST’s technicians, if unsure.
- Spray in the early morning or late afternoon.
- Wear full protective clothing for applicator such as long-sleeved shirt, long pants, rubber gloves, boots, glasses, etc. while mixing and spraying.
- Do not have a direct contact with the crude extract while in the process of the preparation and during the application.
- Wash with soap and water after use.
- Do not smoke, drink, eat or chew anything while spraying.
- Avoid allowing children, pets, or sensitive people in treatment areas to prevent accidental exposures during pesticide applications.
- Chemical sprayers and mix tanks have to be cleaned in designated areas.
- Application timing (less wind).
- Do not contaminate water, food, or feed by storage or disposal of chemical.
- Never use or store in or around the home.
- Do not reuse containers for any purpose.
- Practice chemical rotation.
- Practice correct implementation of integrated pest management (IPM) practices.
- Do not apply around open bodies of water (fish ponds) and water sources.
- Do not apply pesticide when bees are active.

# Copper Hydroxide

## 1. Registered Product Name: Kocide™ 3000



Downy Mildew



Late blight



Bacterial leaf blight

## 2. Directions for use

Crop	Disease	Recommendation Rate	Application
Rice	Bacterial leaf blight	25g/tank of 16l (Apply 25 tanks/ha)	Foliar application at early infestation of diseases
Cabbage	Bacterial rot		
Tomato	Late blight	25g/tank of 16l (Apply 25-50tank/ha)	
Cashew	Anthraxnose		
Litchi	Downy Mildew		

**Note:** - Pre-harvest interval: 7 days  
- Be careful not to apply when high temperatures are present.

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