

TRI-BASE BLUE

TECHGUIDE

 Nufarm

AUSTRALIAN  
THROUGH  
& THROUGH

# AUSTRALIA'S BEST COPPER. PROVEN. SEASON AFTER SEASON.



Nufarm's unique liquid formulation of a copper compound that provides a useful alternative to the traditional copper products.

Flowable copper fungicide for the control of various diseases of certain fruits, nuts, vegetables and ornamentals.

 Nufarm **TRI-BASE  
BLUE**®



## WHAT IS NUFARM TRI-BASE BLUE?

Copper fungicides have been used by fruit and vegetable growers for many years as protectant treatments to prevent spore germination on plant tissue.

Fungicides based on copper provide cost effective disease control but also have an additional benefit over non-copper fungicides which is their activity against bacterial pathogens.

Nufarm Tri-Base Blue is a unique liquid formulation of a copper compound that provides a useful alternative to the traditional copper products based on granule or wettable powder formulations.



## NUFARM TRI-BASE BLUE - THE FORMULATION

Copper compounds, once dried, can never fully regain the previous level of hydration or activity.

Using advanced technology Nufarm chemists at Linz developed a new, patented manufacturing method for tri-basic copper.

To further enhance the performance of this novel product, the tri-basic copper sulphate was blended with high quality wetting and dispersing agents to produce a liquid copper fungicide of exceptional quality.

### Did you know?

The oldest fungicides in the world are those based upon compounds of copper and they remain an important element of disease control programs to this day.

## NUFARM TRI-BASE BLUE - FORMULATION SPECIFICATIONS

### 1. Description

Nufarm Tri-Base Blue is a blue green suspension of extremely fine particles of tri-basic copper sulphate in an aqueous phase together with a range of additives that results in a water-based solvent-free formulation.

### 2. Active constituent

190 g/L (Cu) present as tri-basic copper sulphate.

### 3. Particle size

Minimum 70% below 1 micron.

### 4. pH Range

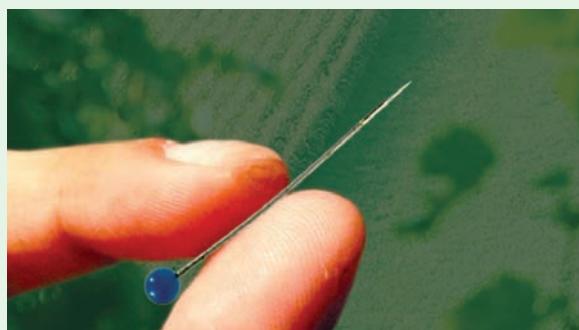
6.0 – 8.0.

### 5. Odour

Practically odourless.

### Did you know?

Approximately 100 particles of Nufarm Tri-Base Blue would fit on the point of this pin.





## HOW DO COPPER FUNGICIDES WORK?

The key to successful disease protection with copper is two words – foliar coverage.

Plant surfaces need to have a complete coverage of copper fungicide to defend the plant against infection. Copper fungicides work by preventing spore germination and can act at several stages in the fungus development. Any plant surface left untreated remains a potential disease infection site.

Coverage is far more important than the quantity of actual

copper on the plant surface. And that is why particle size is important.

The ultra fine particles of Nufarm Tri-Base Blue, where 70% of particles are less than one micron, provide a greater surface area than alternative products with larger particles. This allows the copper to exert its full potential against fungi and bacteria.

In the presence of moisture the copper ions become active. Therefore they protect against diseases that develop in the same conditions e.g. downy mildew in grapes.

 **Tri-Base Blue**



Nufarm Tri-Base Blue at 1500x Magnification.  
Average particle size 0.74 microns.

**Conventional Copper**



Copper oxychloride at 1500x Magnification.  
Average particle size 1.40 microns.

**The smaller the particle size the greater the potential distribution.**

# TRI-BASE BLUE COPPER RELEASE PROFILE FOR EXTENDED PROTECTION

Nufarm Tri-Base Blue is superior to many other copper formulations because of the unique dual release profile.



75%

## Immediate Release

On application and in the presence of moisture, approximately 75% of the copper ions are released immediately to provide rapid activity on the disease.



25%

## Slow Release

The remaining 25% of copper ions become fungicidal when exposed to atmospheric carbon dioxide and moisture.

This two-step release profile means Nufarm Tri-Base Blue delivers rapid initial activity followed by a slower, more uniform release thus providing extended protection. Unlike copper oxychlorides and copper oxides, 100% of the copper ions present in Tri-Base Blue become available.





## BRASSICAS AND VEGETABLES

### KEY BENEFITS

- Can be utilised by brassica and vegetable growers for disease control in a wide range of vegetable crops.
- The 1 day WHP provides flexibility for harvest intervals.
- Low risk of phytotoxicity when used as directed ensures quality of crop harvest can be maximised.
- 75% fast release & 25% slow release copper ions providing effective compromise between speed of release and length of activity.

### SPECIFIC APPLICATION

- Nufarm Tri-Base Blue should be applied as a protectant treatment prior to disease infection.
- Nufarm Tri-Base Blue can be used in mixtures or in rotation with fungicides from other groups.
- Do not apply to copper shy brassica varieties (such as wombok) or to lettuce or cabbages if frost is expected as damage may occur.

Vegetable Crop	Diseases Controlled
<b>BEANS</b>	Common blight ( <i>Xanthomonas campestris</i> pv. <i>phaseoli</i> ) Halo blight ( <i>Pseudomonas syringae</i> pv. <i>phaseolicola</i> ) Bacterial brown spot ( <i>Pseudomonas syringae</i> pv. <i>syringae</i> ) Rust ( <i>Uromyces</i> spp.) Chocolate spot ( <i>Botrytis</i> spp.)
<b>BEETROOT</b>	Downy mildew ( <i>Peronospora farinosa</i> ) Rust ( <i>Uromyces betae</i> )
<b>BRASSICAS</b>	Black rot ( <i>Xanthomonas campestris</i> ) Peppery leaf spot ( <i>Pseudomonas syringae</i> pv. <i>maculicola</i> ) Ring spot ( <i>Mycosphaerella brassicicola</i> ) Downy mildew ( <i>Peronospora parasitica</i> )
<b>CAPSICUM</b>	Bacterial spot ( <i>Xanthomonas campestris</i> pv. <i>vesicatoria</i> ) Bacterial canker ( <i>Corynebacterium michiganense</i> pv. <i>michiganense</i> )
<b>CARROTS</b>	Leaf spot ( <i>Alternaria</i> , <i>Cercospora</i> <i>Septoria</i> )
<b>CELERY</b>	Leaf spot ( <i>Septoriaapiicola</i> ) Bacterial soft rot ( <i>Erwinia carotovora</i> pv. <i>carotovora</i> )
<b>CUCURBITS</b>	Angular leaf spot ( <i>Pseudomonas syringae</i> pv. <i>lachrymans</i> ) Bacterial leaf spot ( <i>Xanthomonas campestris</i> pv. <i>cucurbitae</i> )
<b>LETTUCE</b>	Downy mildew ( <i>Bremia lactucae</i> ) Bacterial leaf spot ( <i>Xanthomonas campestris</i> pv. <i>vitiensis</i> ) Anthracnose ( <i>Marssonina panattoniana</i> )
<b>ONIONS</b>	Downy mildew ( <i>Peronospora destructor</i> )
<b>PARSNIPS</b>	Leaf spot ( <i>Septoria</i> spp.)
<b>PEAS</b>	Ascochyta blight ( <i>Ascochyta</i> spp.) Bacterial blight ( <i>Pseudomonas syringae</i> pv. <i>syringae</i> )
<b>POTATOES</b>	Target spot/early blight ( <i>Alternaria solani</i> ) Irish blight/late blight ( <i>Phytophthora infestans</i> )
<b>RHUBARB</b>	Crown rot ( <i>Phytophthora</i> spp.)
<b>SPINACH</b>	Downy mildew ( <i>Peronospora farinosa</i> )
<b>TOMATOES</b>	Bacterial spot ( <i>Xanthomonas campestris</i> pv. <i>vesicatoria</i> ) Bacterial speck ( <i>Pseudomonas syringae</i> pv. <i>tomato</i> ) Bacterial canker ( <i>Corynebacterium michiganense</i> pv. <i>michiganense</i> ) Target spot/early blight ( <i>Alternaria solani</i> ) Septoria leaf spot ( <i>Septoria</i> spp.) Irish blight/late blight ( <i>Phytophthora infestans</i> )

# NUT CROPS

## KEY BENEFITS

- Nufarm Tri-Base Blue provides good coverage and adhesion to buds, wood and leaves ensuring good control early in the disease lifecycle.

## SPECIFIC APPLICATION

### Almonds

- Correct timing is critical - apply when buds are swelling, but before and within one week of bud opening.
- Monitor orchards and varieties closely as bud movement will vary seasonally.
- For effective control of leaf curl, apply an additional spray of Nufarm Tri-Base Blue in autumn at leaf fall.

### Walnuts

- Walnut blight disease overwinters primarily in dormant buds.
- Apply Tri-Base Blue for the control of walnut blight from when catkins are partially opened.
- A minimum of 3 sprays will be required at 7 to 10 day intervals.
- Further sprays may be required when conditions favour infection eg. prolonged spring rainfall.

### Macadamias and pecans

- Phytophthora stem canker may be controlled by stem application diluted either in water or a water-based paint solution. Remove dead tissue and apply directly to infected stem area.

DISEASE	CROP			
	Almonds	Macadamias	Pecans	Walnuts
Leaf curl	280 mL			
Shot hole	280 mL			
Phytophthora stem canker		140 mL/ 1L	140 mL/ 1L	
Walnut blight				420 mL*

\* plus 175 mL miscible summer oil or 50 mL Activator.

Note: All rates are per 100 L of water unless otherwise stated.



# TROPICAL FRUIT CROPS

## KEY BENEFITS

- When applied as per label directions, Nufarm Tri-Base Blue results in a reduced visible residue on fruit such as avocado and mango and it presents well to consumers.
- As a liquid formulation Nufarm Tri-Base Blue is ideal for handling and transport on farm in the tropics where wet conditions are quite prevalent.
- Efficient copper formulation resulting in 33% less grams active of copper required vs red copper to achieve equivalent performance.

### Avocados

- Quality avocados require diligent copper application as anthracnose infection occurs early at flowering, yet is expressed post-harvest.
- For control of anthracnose apply from the end of flowering and every 4 weeks until harvest.
- Under extended wet conditions apply every 14 days.

### Mangoes

- To prevent anthracnose post harvest apply Tri-Base Blue from the end of flowering to harvest.
- For control of bacterial black spot spray at the first sign of infection or use as a preventative fungicide and repeat every 10 to 14 days if required.

DISEASE	CROP					
	Avocados	Bananas	Kiwifruit	Litchi	Mangoes	Passionfruit
Anthracnose	280 mL				420 mL	
Phytophthora stem canker	140 mL/ 1 L	140 mL/ 1 L	140 mL/ 1 L	140 mL/ 1 L		140 mL/ 1 L
Cercospora leaf spot		280 mL <sup>#</sup>				
Parasitic algae					560 mL*	
Bacterial black spot						240 - 420 mL

\* plus Nufarm Activator.

# plus 600 mL/ha miscible summer oil.

Note: All rates are per 100 L of water unless otherwise stated.





## TEMPERATE FRUIT CROPS

### KEY BENEFITS

- Nufarm Tri-Base Blue provides good coverage of dormant wood during autumn and winter applications.
- Fine particles provide good coverage and sound disease protection against a range of bacterial and fungal diseases in temperate fruit crops.

### Nufarm Tri-Base Blue in apples

When to spray and when not to spray copper on apples.



### SPECIFIC APPLICATION

- The timing of application of Tri-Base Blue is critical for the control of disease in temperate fruit crops.
- Many diseases are carried over or may be expressed in developing buds so the timing of initial protectant application of copper is critical.
- Coppers can be damaging to buds once opened so application at the correct timing is essential.

#### Citrus

- Nufarm Tri-Base Blue should be applied at petal fall.
- Apply as a dilute spray only.

DISEASE	CROP							
	Nectarines	Peaches	Apples	Apricots	Cherries	Citrus	Plums	Pears
Leaf curl	280 mL	280 mL						
Black spot			280 mL			280 - 420 mL		280 mL
Shot hole	280 mL	280 mL		280 mL	280 mL		280 mL	
Freckle				280 mL				
Bacterial gummosis				185 - 350 mL	185 - 350 mL			
Phytophthora stem canker	140 mL/ 1 L	140 mL/ 1 L				140 mL/ 1 L	140 mL/ 1 L	
Melanose						280 - 420 mL		
Smoky blotch						280 - 420 mL		
Scab						280 - 420 mL		

Note: All rates are per 100 L of water unless otherwise stated.



# NUFARM TRI-BASE BLUE COMPATIBILITY

ACTIVE INGREDIENT	BRAND NAME	COMPATIBILITY
<b>FUNGICIDES</b>		
Amisulbrom	Amishield	Yes
Cyprodinil + fludioxonil	Switch	Yes
Dithianon	Dragon	No
Fenhexamid	Teldorf 500SC	No
Iprodione	Rovral Aquaflo	Yes
Mancozeb	Penncozeb 750DF	Yes
Mancozeb + metalaxyl	Ridomil Gold MZ WG	Yes
Penconazole	Topas 100EC	Yes
Phosphoric acid	Agri-Fos 600	No
Polyoxin-D	Intervene	Yes
Procymidone	Sumislex 500	Yes
Pyrimethanil	Scala 400EC	Yes
Pyraclostrobin	Cabrio	Yes
Quinoxyfen	Legend	Yes
Sulphur	Microthiol Disperss	Yes
Aureobasidium pullulans	Botector	Yes
Bacillus amyloliquefaciens	Serenade opti	Yes
<b>INSECTICIDES</b>		
Cyclaniliprole	Teppan	Yes
Emamectin	Proclaim	Yes
Indoxacarb	Avatar	Yes
Tebufenozide	Mimic 700WP	Yes
<b>ADJUVANTS</b>		
Non-ionic wetter	Activator	Yes
Organosilicone	Expand	Yes
Organosilicone + sticker	Designer	Yes

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Please refer to respective product labels for registered uses in specific crops.

For more information, contact your local  
Nufarm Business Development Manager

[nufarm.com.au/product/tri-base-blue](http://nufarm.com.au/product/tri-base-blue)

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