TRI-BASE BLUE

TECHGUIDE

ELEVATE PERFORMANCE. COPPER DELIVERED DIFFERENTLY.



Tri-Base Blue delivers dependable control of key diseases with its best-in-class liquid Copper formulation. Take the next step today.

Superior liquid Copper. Save time and hassle through efficient measuring and handling.

Defend against Downy Mildew. Establish control and sustain it with the two-phase release of copper ions.

More efficient Copper delivery. Small particle size allows less applied Copper without compromising control

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.

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.

THE FORMULATION

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

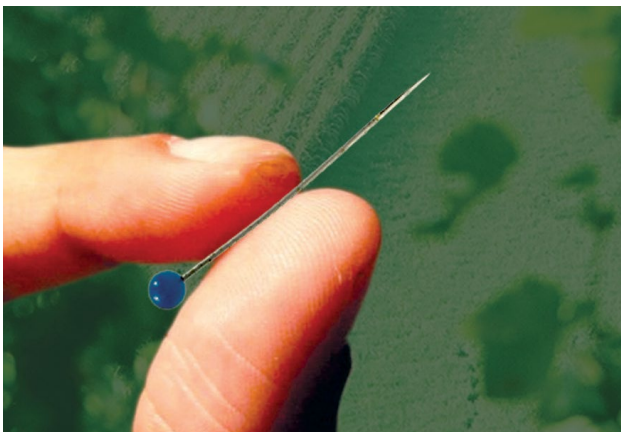
Using advanced technology Nufarm chemists at Linz developed a new, patented manufacturing method for tri-basic copper.

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.

1. **Description**
   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 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.

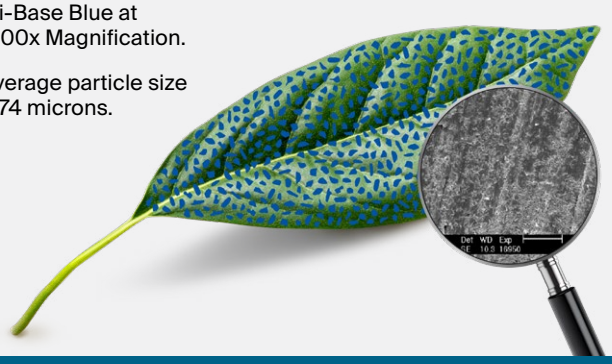
Coverage is far more important than the quantity of actual copper on the plant surface. And that is why particle size is important.

The ultra fine particles of 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 at 1500x Magnification.

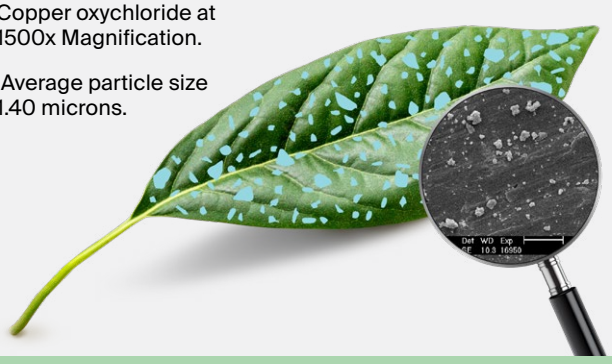
Average particle size 0.74 microns.



Tri-Base Blue

Copper oxychloride at 1500x Magnification.

Average particle size 1.40 microns.



Conventional Copper

The smaller the particle size the greater the potential distribution.

TRI-BASE BLUE COPPER RELEASE PROFILE FOR EXTENDED PROTECTION

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 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

- Tri-Base Blue should be applied as a protectant treatment prior to disease infection.
- 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
Beans	Common blight *(Xanthomonas campestris* pv. *phaseoli)*
	Halo blight *(Pseudomonas syringae* pv. *phaseolicola)*
	Bacterial brown spot *(Pseudomonas syringae* pv. *syringae)*
	Rust *(Uromyces* spp.*)*
	Chocolate spot *(Botrytis* spp.*)*
Beetroot	Downy mildew *(Peronospora farinosa)*
	Rust *(Uromyces betae)*
Brassicas	Black rot *(Xanthomonas campestris)*
	Peppery leaf spot *(Pseudomonas syringae pv. maclicola)*
	Ring spot *(Mycosphaerella brassicicola)*
	Downy mildew *(Peronospora parasitica)*
Capsicum	Bacterial spot *(Xanthomonas campestris* pv. *vesicatoria)*
	Bacterial canker *(Corynebacterium michiganense* pv. *michiganense)*
Carrots	Leaf spot *(Alternaria, Cercospora Septoria)*
Celery	Leaf spot *(Septoriaapiicola)*
	Bacterial soft rot *(Erwinia carotovora* pv. *carotovora)*
Cucurbits	Angular leaf spot *(Pseudomonas syringae* pv. *lachrymans)*
	Bacterial leaf spot *(Xanthomonas campestris* pv. *cucurbitae)*
Lettuce	Downy mildew *(Bremia lactucae)*
	Bacterial leaf spot *(Xanthomonas campestris* pv. *vitians)*
	Anthracnose *(Marssonina panattoniana)*
Onions	Downy mildew *(Peronospora destructor)*
Parsnips	Leaf spot *(Septoria* spp.*)*
Peas	Ascochyta blight *(Ascochyta* spp.*)*
	Bacterial blight *(Pseudomonas syringae* pv. *syringae)*
Potatoes	Target spot/early blight *(Alternaria solani)*
	Irish blight/late blight *(Phytophthora infestans)*
Rhubarb	Crown rot *(Phytophthora* spp.*)*
Spinach	Downy mildew *(Peronospora farinosa)*
Tomatoes	Bacterial spot *(Xanthomonas campestris* pv. *vesicatoria)*
	Bacterial speck *(Pseudomonas syringae* pv. *tomato)*
	Bacterial canker *(Corynebacterium michiganese* pv. *michiganese)*
	Target spot/early blight *(Alternaria solani)*
	Septoria leaf spot *(Septoria* spp.*)*
	Irish blight/late blight *(Phytophthora infestans)*

NUT CROPS

Key benefits

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 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/1 L	140 mL/1 L	
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, 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 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#				
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

- 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.

Specific application

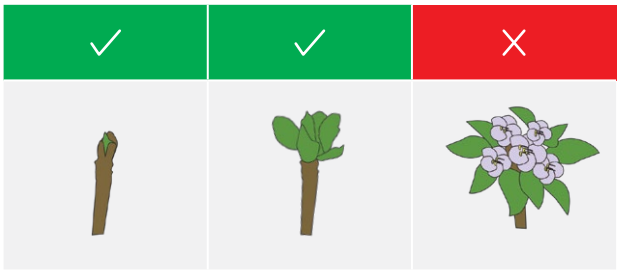
- The timing of application of Tri-Base Blue is critical for the control of disease in temperate fruit crops.
- Many diseases are carried over or may be expressed in developing buds so the timing of initial protectant application of copper is critical.
- Coppers can be damaging to buds once opened so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

Citrus

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

TRI-BASE BLUE IN APPLES

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



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.

Tri-Base Blue compatibility

Active ingredient	Brand Name	Compatibility
Fungicides		
Amisulbrom	Amishield	✓
Cyprodinil + fludioxonil	Switch	✓
Dithianon	Dragon	✗
Fenhexamid	Teldor 500SC	✗
Iprodione	Rovral Aquaflo	✓
Mancozeb	Penncozeb 750DF	✓
Mancozeb + metalaxyl	Ridomil Gold MZ WG	✓
Penconazole	Topas 100EC	✓
Phosphoric acid	Agri-Fos 600	✗
Polyoxin-D	Intervene	✓
Procymidone	Sumislex 500	✓
Pyrimethanil	Scala 400EC	✓
Pyraclostrobin	Cabrio	✓
Quinoxyfen	Legend	✓
Sulphur	Microthiol Disperss	✓
Aureobasidium pullulans	Botector	✓
Bacillus amyloliquefaciens	Serenade opti	✓
Insecticides		
Cyclaniliprole	Teppan	✓
Emamectin	Proclaim	✓
Indoxacarb	Avatar	✓
Tebufenozide	Mimic 700WP	✓
Adjuvants		
Non-ionic wetter	Activator	✓
Organosilicone	Expand	✓
Organosilicone + sticker	Designer	✓

For more information, contact your local Nufarm Business Development Manager

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