



# Cutting Edge / Snykant

RESEARCH NEWS FROM CITRUS RESEARCH INTERNATIONAL  
NAVORSINGSNUUS VAN CITRUS RESEARCH INTERNATIONAL



July / Julie 2004

No. / Nr. 22

## High residue levels of the post-harvest fungicide Imazalil

Recent feedback to the CGA and CRI regarding the evaluation of random samples from citrus packhouses in the **Southern** production areas, has indicated the occurrence of high Imazalil residue levels. Some samples contained residues as high as 31ppm whereas the MRL is only 5ppm.

Similar random samples of fruit produced in the **Northern** citrus production areas were also evaluated for Imazalil residues, but these generally complied with the MRL level of 5ppm.

The use of Imazalil in accordance with Registration and standard industry guidelines should not result in residue levels above the MRL of 5ppm. We are currently investigating the matter and would appreciate the cooperation of all affected parties in establishing the reasons for these high residue test results.

In the interim, the following recommendations should be diligently implemented. The application of fungicides to export citrus fruit is a critical control point that has to be managed correctly to be effective. Inappropriate or haphazard management of this critical control point in the packhouse, not only jeopardises the reputation of the industry, but also increases the risk of reducing the effectiveness of Imazalil. Application of Imazalil at higher than recommended concentrations, and even lower concentrations could lead to the development of Imazalil-resistant *Penicillium*. The loss of Imazalil as an effective post-harvest fungicide would be very damaging to the industry.

The following is a summary of the standard industry recommendation on how to use Imazalil. Section A describes making up the original fungicide bath. This will result in the required Imazalil concentration of 500ppm **in the bath**. Section B and C describe the **top up procedure** once fruit has passed through the bath.

### A. MAKE UP OF ORIGINAL FUNGICIDE BATH

The recommended **ratio** of Imazalil to water is 670g per 1000L.

#### EXAMPLE ONLY FOR A 2000 LITRE BATH

Water	-2000L			
Imazalil Sulphate	-1340g -	(500 ppm)		
Guazatine	-	{ Deccotine	-	10.0ℓ (1000 ppm)
		{ Kenopel	-	10.0ℓ (1000 ppm)
		{ Citricure	-	9.6ℓ (1000 ppm)
		{ Ultracure	-	9.6ℓ (1000 ppm)
Deccomone (2,4-D Sodium salt)	-			20.0ℓ (250 ppm)



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## B. PROCEDURE TO TOP UP FUNGICIDE BATH

Packhouses must top up the fungicide bath at regular intervals. This means top ups must occur after "X" tons of fruit have passed through the packline (or after a known number of bins have been processed). Therefore the first step is to calculate the tons of fruit passed through the packline before a top up.

STEP	INSTRUCTION
1	Calculate the tons of fruit passed through the packline: "X" tons.
2	Every packhouse must physically measure the volume of water lost from the fungicide bath after "X" tons of fruit.
3	Make a 'normal strength' fungicide mix to replace the lost water as determined in Step 1. Use the procedure in Section A above to create a normal strength fungicide mix. <b>Do not add this to the fungicide bath yet.</b>
4	Add the following fungicide to the top up mix to compensate for removal of fungicide from the bath on the surface of fruit: <ul style="list-style-type: none"> <li><input type="checkbox"/> 5g Imazalil WSP <b>per ton of fruit handled.</b></li> <li><input type="checkbox"/> 4ml Guazatine SL per ton of fruit handled.</li> <li><input type="checkbox"/> 20ml Deccomone (sodium salt) per ton of fruit handled.</li> </ul>
5	Once steps 1 to 4 have been followed, add the top up mix to the fungicide bath.

It is necessary to calculate steps 1 and 2 every time a top up is made **provided that the tons of fruit are known and the volume of water lost per ton of fruit has been calculated.**

The volume of water lost per ton is **different for each citrus cultivar**, and therefore STEP 1 to 5 must be followed for each new cultivar packed.

Below is an example where 100 litres of water was removed from the bath after 30 tons of fruit had passed through.

### EXAMPLE where 100ℓ is lost per 30 tons of fruit:

STEP	EXAMPLE
1	Tons of fruit passed through: <b>30 tons</b>
2	$2000\ell - 1900\ell = 100\ell$
3	To replace the 100ℓ lost at normal strength: <ul style="list-style-type: none"> <li><input type="checkbox"/> Imazalil Sulphate: <b>67g</b></li> <li><input type="checkbox"/> Guazatine: 500 ml or 480 ml</li> <li><input type="checkbox"/> Deccomone: 1.0ℓ</li> </ul>
4	For 30 tons: <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>5g x 30T = 150g</b></li> <li><input type="checkbox"/> 40ml x 30T = 1200ml</li> <li><input type="checkbox"/> 20ml x 30T = 600ml</li> </ul>
5	$100\ell$ (plus 67g + 150g Imazalil) + 1900ℓ = 2000ℓ



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## C. ALTERNATIVE PROCEDURE TO TOP UP FUNGICIDE BATH

As an alternative to, or in combination with the top up procedure described above, the imazalil concentration can be determined through titration, **but this can only be done where the only fungicide in the bath is imazalil.**

The following Excel spreadsheet has been constructed to assist packhouses to calculate the amount of Imazalil to add during an initial make up of the bath (green shaded block) and a top up (Yellow shaded block). Packhouses need only change the blue shaded areas. Please contact Keith Lesar or Paul Hardman for an electronic copy of the spreadsheet.

### EXAMPLE:

#### IMAZALIL TOP UP CALCULATOR

<u>Normal Strength Concentration</u>			<u>Notes</u>
Required Concentration in Bath	500	ppm	A
Imazalil Sulphate per 1000 litres	670	g/1000litres	B
Imazalil Sulphate per litre	0.67	g/litre	C
Grams per ton fruit (topup)	5	g	D
<b><u>Make up ORIGINAL fungicide bath</u></b>			
* Bath Volume	2000	Litres	E
Imazalil Sulphate Required	1340	g	= E x C
<b><u>Top up procedure:</u></b>			
* Tons of fruit per day	60	Tons	F
* Number of top ups	2	times per day	G
Tons of fruit per top up	30.0	Tons	= F / G
* Litres of water carried out by fruit between top ups	100	Litres	H
Grams Imazalil required to replace lost water	67	g	= C x H
Grams Imazalil required to maintain concentration	150	g	= (F / G) x D
<b>Total Imazalil to add during top up</b>	<b>217</b>	<b>g</b>	

\* Information required for the packhouse

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