



Cutting Edge

RESEARCH NEWS FROM CITRUS RESEARCH INTERNATIONAL

December 2005

No. 34

THE CONTROL OF POST-HARVEST DISEASES ON SOUTHERN AFRICAN EXPORT CITRUS BY THE POST-HARVEST FUNGICIDE THIABENDAZOLE

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Introduction

There seems to be a general reduction in the use of thiabendazole within the SA citrus industry. This is particularly alarming since latent pathogen infections have been observed in abundance during both the 2004 and 2005 citrus production seasons.

Why use thiabendazole (TBZ)?

TBZ was the first fungicide registered (1960's) for the control the *Penicillium* moulds and the latent pathogens, *Diplodia* stem end rot and Anthracnose on citrus fruit. TBZ and benomyl belong to the benzimidazole group of fungicides.

The benzimidazoles are distinguished from other traditional fungicides in that they control diseases both by contact and systemic action.

Due to the extensive pre-harvest application of benomyl for the control of citrus black spot and the post-harvest application of TBZ for control of the *Penicillium* moulds, populations of the *Penicillium* moulds that were resistant to the benzimidazoles developed rapidly. **However TBZ is still effective in controlling the latent pathogens on citrus.**

There is an unfortunate perception in the industry that TBZ is of no value in controlling important post-harvest pathogens.

All export citrus should be treated with TBZ as the fungicide is still effective in controlling the latent pathogens, *Diplodia* stem end rot and Anthracnose.

TBZ is Internationally Accepted

Following an in-depth scientific study that was ultimately concluded during 2001, TBZ obtained full legal approval for use within the EU. It had

been successfully demonstrated that TBZ presented no risk to consumers, the environment or handlers applying the fungicide when used under standard good practices.

From 1995 until 2000 a Maximum Residue Level (MRL) of 6.0 mg/kg was applicable in the EU, and thereafter a level of 5.0 mg/kg was adopted - the current General Export Tolerance for SA exported citrus. The USA, Canada and Japan also accept the use of TBZ and apply a MRL of 10.0 mg/kg, while a Harmonized CODEX Alimentarius MRL of 10.0 mg/kg allows SA citrus producers using TBZ to send fruit to the Middle East and China.

Good Agricultural and Packhouse Practice

The occurrence and severity of post-harvest diseases – which all originate in the orchard – are determined by the pathogen load and its virulence, the susceptibility of the host (i.e. fruit) and the environmental conditions.

Prevention is the only effective means of reducing losses from the post-harvest diseases. Therefore it is essential to establish good cultural practices to ensure the delivery of sound, vigorous fruit to the citrus packhouse. The citrus packhouse is not a “hospital for sick fruit” and can, by no means, rectify the shortcomings of badly managed cultural practices.

Good packhouse practices and procedures must be well managed to maintain the status of healthy, vigorous, disease free fruit arriving on the overseas market.

In the packhouse citrus cultivars must be washed in sanitised washing systems to ensure a reduction in fungal spores and prevent carry over of a high spore load into the other systems.

After washing, the fruit should be treated with a mixture of post-harvest fungicides in a hot water bath dip application, dried to ensure retention of fungicide residues on the fruit and then waxed, dried again and then packed for export. Post-harvest citrus decay is controlled by a combination of the standard post-harvest fungicides, thiabendazole (TBZ), imazalil and guazatine with prochloraz and SOPP being seldom-used additional treatments. A second option is to apply the post-harvest fungicides, to the fruit, in the citrus wax. The dip application is the preferred method of application.

These systems of washing the fruit, fungicide applications, waxing and packing are essential critical control points that all constitute the good packhouse procedures.

The evaluation of the efficacy of guazatine formulated into citrus waxes (i.e. CitriWax and Deccowax)

It has been indicated to CRI, via the Spanish citrus industry, that the efficacy of guazatine, formulated into citrus waxes, decreases as the guazatine-wax formulation ages over a period of time. This scenario has been investigated by evaluating the efficacy of the guazatine in a newly formulated batch of CitriWax (formulated in December 2004), to determine after what period of manufacture this breakdown of efficacy of guazatine might occur.

Eight monthly evaluations have been completed and 100% control of the citrus pathogens *P. digitatum* (green mould) and *G. candidum* (sour rot) was recorded. A batch of Deccowax, formulated in 1996 was also evaluated for efficacy of the guazatine and 100% control of these two pathogens was also achieved.

These evaluations now prove that the guazatine-wax formulations CitriWax and Deccowax remain stable and that the fungicide retains its efficacy in inhibiting infections by the two major citrus pathogens, green mould and sour rot.

Packhouses using the two waxes must ensure that the waxes are used up within a short period of time and are not stored from one season to the next to avoid any possibility that might lead to a breakdown of the formulation. These waxes must also be stored under roof and not outside, exposed to any adverse environmental conditions.

NB! The use of Benomyl (Benlate) in the pre-degreening drench

Citrus packhouses must revert back to using **thiabendazole (TBZ i.e. Tecto 500)** in the pre-degreening drench at the start of the 2006 citrus season. The use of **Benomyl (Benlate)**, which breaks down to **Carbendazim**, is no longer permitted due to the current MRL issue, and Benomyl is not registered for **post-harvest** application.

Sitrus pakhuse moet terug gaan na die gebruik van **tiabendasool (TBZ d.i. Tecto 500)** in die voorontgroening storting tydens die begin van die 2006 sitrus seisoen. Die gebruik van **Benomyl (Benlate)**, wat afbreek na **Carbendazim**, is nie meer toegelaat nie weens die huidige MRL kwessie, en Benomyl is nie geregistreer vir **naoes** aanwending nie.