



# Impact of Peroxsil<sup>®</sup> on Water used in Citrus Packhouses

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PILOT TRIAL RESULTS

# Impact of Peroxsil® on Water used in Citrus Packhouses

## Silver as an Effective Disinfectant:

Silver possesses natural antimicrobial properties due to its ions binding to the DNA of viruses, fungi and bacteria, preventing their replication. When combined with (unstable) hydrogen peroxide, which corrodes cell walls, silver forms a stable product with dual action. This results in a highly effective disinfectant that is not only biodegradable but also eco-friendly.



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Type of Presentation: Abstract

## Introduction:

The CRI received a formulation claimed to be micronised silver in a peroxide blend. It is anticipated that this formulation will be effective against *Penicillium digitatum* (PD) and *Galactomyces citri-aurantii* (GCA) in the packhouse. Given that *Penicillium* is the more prevalent and more easily controlled of the two organisms, we have decided to use PD exclusively as the test organism.

**Crop:** Valencia

**Origin:** Ngodwana District

**Trial date:** 1 and 8 September 2020

**Trial site:** CRI, 2 Baker Street, Mbombela, 1201

**First report date:** 25 September 2019

## Materials and Methods:

- Freshly picked, mature Valencia fruit were collected from a commercial packhouse, rinsed in chlorine (150 ppm total chlorine, pH 6 for 90 seconds), and allowed to air dry.
- The fruit was stored at ~8°C for three days before the trial commenced. The day before the trial began, the fruit was moved to ambient temperature (22°C) to allow the fruit temperature to reach ambient, and any possible condensation to evaporate.
- pH adjustments were made to achieve a pH of 6.5.
- Solutions were prepared with tap water at the correct temperature ~30°C immediately before the fruit was dipped. The temperature of the water entering the laboratory is about 20°C, and adjustments were made to closely resemble typical temperatures found in a postharvest packhouse.
- Each treatment had 3 replicates with 10 fruit in each replicate.
- A *Penicillium* spore suspension was prepared from a virulent, purified culture harvested from fruit, at a concentration of 106-spore.
- Buckets with 50 litres of a 2% Peroxsil® solution were seeded with 50 millilitres of *Penicillium* spores to achieve a final concentration of ~104.
- The control treatments were a standard 150 ppm chlorine solution (FREXUS Chlorine) and clean water to which spore suspensions were added.
- The solutions were left for 3 minutes to react with the spores.
- Immediately before treatment, the fruit were injured using a metal plate with 9 x 7mm spikes that were rolled across the cheek section of the fruit on two sides.
- The injured fruit was placed in the sanitiser solution along with the spores and left in the solution for one minute while being gently agitated.
- The treated fruits were removed and dried before placing the 10 fruits from individual replicates in a nectarine liner to separate them during incubation. The liners are placed in an open-top carton, slipped into a transparent polyethylene bag, and sealed.

# IN VITRO STUDY RESULTS

## Materials and Methods:

- Four small holes are punched into the bags to facilitate gaseous exchange and prevent the build-up of CO<sub>2</sub> and ethylene.
- The treatments are incubated until decay greater than 80% is visible on the water controls.

## Results & Discussion:

- Table 1:**  
Table of the levels of control achieved by a 2% Peroxsil® solution compared to standard chlorine as a water sanitiser for use in aqueous applications.

TREATMENT	% CONTROL
Water	0
Chlorine (Frexus)	72
Peroxsil 2%	80

- The products may be considered for further development as chlorine replacements due to their efficacy observed in this pilot trial. The silver residues are immeasurable, are well within Acceptable Daily Intake (ADI) limits, and therefore pose no regulatory issues or health risks. The lower efficacy of chlorine was noted, with usual control levels ranging from 83% to 87% in these pilot trials.
- No phytotoxicity was observed.

## Conclusion

- The product tested has potential to be used as a water sanitiser on citrus lines.



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## Disclaimer:

- This report contains information and results from a confidential trial to determine any combination of product efficacy, compatibility and phytotoxicity. By conducting these trials, the CRI is assisting the citrus industry in finding postharvest sanitation and disease control options. This does not imply any product endorsement by the CRI. Any successful interaction still requires that the necessary accreditations be acquired from the appropriate regulating body (National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008), or Fertilizers, Farm Feeds, Seeds and Remedies Act 36 of 1947).