

ENVIRONMENT FRIENDLY TREATMENT OF BROWN ROT (MONILINIA) IN STONE FRUIT USING LOXYDE

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FOREWORD

As I am preparing to write this paper, I have just come across a news article on the BBC which describes how workers in the DR Congo who are exposed to pesticides from palm-oil plantations have complained about becoming impotent. Furthermore they also had: shortness of breath, headaches and weight loss all symptoms related to chemical pesticide poisoning. Most of the workers had in fact been indirectly exposed due to the run-off of these chemicals in the local drinking and washing water. The company apparently spent \$ 360,000 on protective equipment for workers, but sadly the protective equipment wasn't being used because either: it "disappeared", workers didn't know it was available or they weren't trained in how to use it. To make matters worse, although the company had money to buy this equipment, they didn't have the money to install a water treatment system to treat POME (Palm Oil Mill Effluent) water. Then why did they get a licence to have a palm oil farm? They made it seem that installing a water treatment system is massively expensive when in fact it is not and can easily be done by digging some open air ponds – I have a document on how easy and actually cheap this can be. And don't think those responsible were just some Paul, Dick or Harry, nooooo.... You are talking about Feronia a Canadian based firm of which the UK government development bank (CDC) owns 35% and who claim that they are committed to operating to international standards!

In this day and age with bees being under extreme duress due to certain chemicals, with the warming up of the planet, with ground water pollution becoming more of a problem you would really want to believe that these poisonous chemicals would be totally banned from use in every country of the world and that Eco-friendly alternatives - which do exist - but are not being given a chance due to the difficulties and huge costs involved. That means that small business with great alternatives just never get a chance and that the future of pesticide chemicals remains in the hands of the "chosen" few!

INTRODUCTION:

Brown rot is one of the most destructive diseases of fruits and is very difficult to control. In the European Union it is listed as a quarantine pathogen.

Brown rot in stone fruit is caused by the spores of *Monilinia fructicola*. But actually under this name there are several types of *Monilinia*:

- *Monilinia polystroma* - brown rot in temperate regions on members of the Rosaceae¹ (almonds)
- *Monilinia fructicola* - colonizes blossoms, twigs and fruit, primarily on *Prunus* spp., but also on pome fruit or other Rosaceae
- *Monilinia fructigena* - *Prunus* spp., but also on pome² fruit or other Rosaceae



¹ Rosaceae: apples, pears, quinces, apricots, plums, cherries, peaches, raspberries, loquats, strawberries, almonds.

² Pome fruits: members of the plant family Rosaceae. They are fruits that have a "core" of several small seeds such as apples

- *Monilinia laxa* - colonize blossoms, twigs and fruit, but is generally considered more of a problem on blossoms and twigs.

Figure 1- Brown rot in apple

The problem of fruit infection occurs mainly during the flowering period when spores of *Monilinia* - that have remained dormant over winter - infect blossoms and can then remain inactive until just before the fruit matures. This means that the spread of the infection is often not noticed until much later and because of this has led to enormous crop losses in some areas.

Other methods of fruit infection is through an open wound to the fruit caused accidentally or by insects that injure fruit. It can also occur when infected fruit contaminate other fruit during the washing process after harvest. Moisture often remains around the fruit stem and this will give the fungus a chance to contaminate the fruit.

Monilinia may also infect leaves, and new shoots. Shoots infected by the brown rot fungus develop sunken, brown, elliptical cankers that may become gummy.



Figure 2 - Shoot of peach tree infected with *Monilinia*

CURRENT TREATMENT:

Current methods of treatment rely on:

- Increased hygiene of the orchard
- Resistant varieties
- Removing infected fruit, shoots, etc.
- Pruning to increase sunlight penetration and reduce moisture retention. Use a pruning sealer to insure that cuts are not a source of infection!
- Harvest fruit carefully and try to avoid injuries that predispose the fruit to brown rot during storage.
- Remove all fruit so that they do not become a source of infection during winter.
- New research has demonstrated that excess nitrogen with increased susceptibility to brown rot. Do not apply excess amounts.
- Fungicides
 - Copper fungicides or sulphur powders – insure minimum of 12 hours dry weather after application
- Insecticide if there are a large number of fruit damaging insects.

LOXYDE

Loxyde is based on hydrogen peroxide that has been extra stabilised and activated through the addition of a small amount of specially formulated gel. This makes the hydrogen peroxide much more stable and also much more powerful. All ingredients in Loxyde fully break down into water and oxygen. Please note that normal hydrogen peroxide has no effect on spores whereas Loxyde is actually very effective at eliminating spores as well as fungi and bacteria.

Over the last years Loxyde has been trialled in many countries against a wide variety of problem cases.

In an earlier report (copy can be found on www.loxyde.com) I mentioned that Loxyde was responsible for obtaining 100% success rate in rose propagation (increase of 30-70%) by simple adding 50-100 ml in the water used for fogging the cuttings. The addition of Loxyde to the fogging water, has significantly increased hygiene levels in the greenhouse to completely control any bacterial, fungi or spore infection which in turn has led to the dramatic increase in rose plants obtained from cuttings.

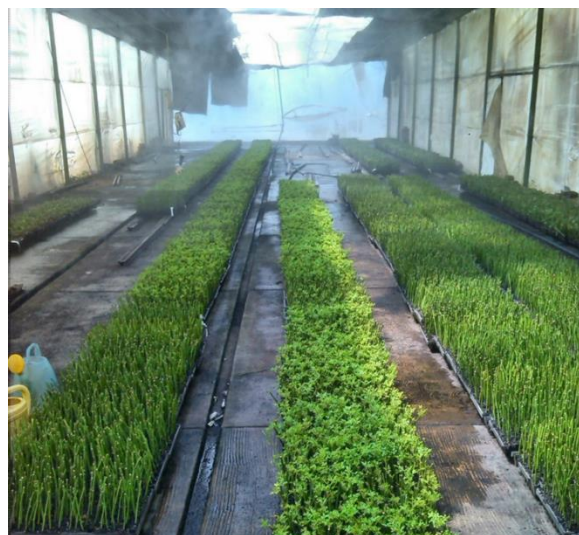


Figure 3 - Rose cuttings are fogged regularly with water containing 50-100 ml Loxyde per m² water. Notice that there is no algae growth in the greenhouse and success rate increased from 30-70% to 100% on all rose varieties.

TREATING MONILINIA WITH LOXYDE

Fruit Orchards

Loxyde was trialled as an environment friendly method to control Monilinia in apricot tree orchards. The reason it was done was because growers were not obtaining a good results from using traditional chemical fungicides and because Loxyde fully breaks down into water and oxygen. It was found that an effective dosage was 0.05% diluted in clean water and sprayed/fogged over the fruit trees during flowering season.

The treatment was done in an orchard which had recurring Monilinia problems year after year. Treatment with copper or sulphur where not very successful and the grower was open to try new possible alternatives especially if they were environment friendly.

Results were actually much better than anticipated as after treatment no fruit were found to be infected and there were also no cases of infected shoots or leaves. The treatment has been duplicated on numerous occasions on different fruit tree varieties (peach, plum, apples) and results are similar.

Fruit washing

Most fruit are washed after harvest. One of the main problems is moisture that remains in the cavity formed by the stem often becomes a source of infection for Monilinia – as well as other bacteria and fungi. Loxyde was used in the final rinse of the fruit after washing. Dosage is 50-100 ml per m³ water. The main aim of the product is to insure that the last water to come into contact with the fruit is free from any contaminants and rinses-off the water used during the washing process which flushes out any contaminants. The reason for this is that the water in the main washing tank rapidly get contaminated due to infected fruit being washed with healthy fruit. This leads to cross-contamination. Adding Loxyde to the rinse water when the fruit come out of the main wash tank will significantly reduce any cross-contamination. Results clearly showed that fruit that were rinsed with clean water treated with Loxyde did not develop any infection.

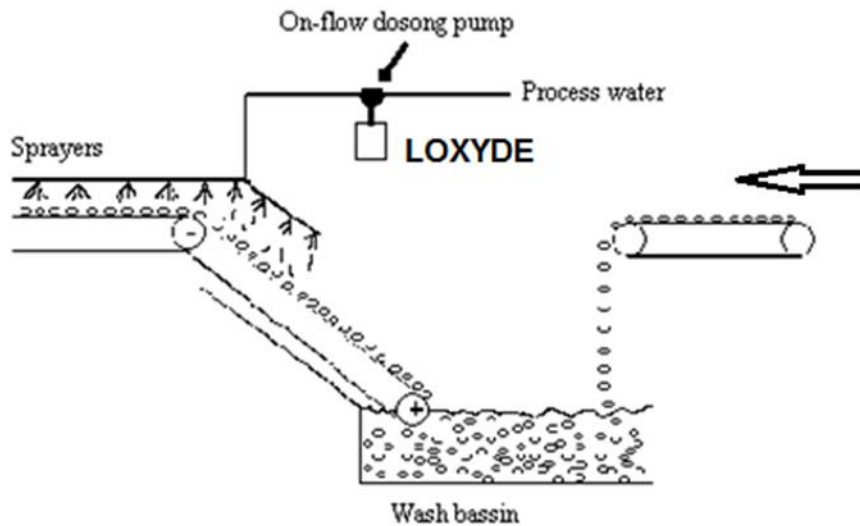


Figure 4 - Simple representation of a fruit washing installation. Normally fruit are simply put through a water basin in order to wash off any dirt and impurities.

In a wash tank, new water has to constantly be added as water is lost through fruit covered in water as well as evaporation. By simply diverging the new water from the main tank to a row of sprayers where the fruit come out of the wash basin it is very simple to make the treatment. Loxyde can be added to the rinse water. Excess water then goes into the main tank where it will help to reduce bacterial pollution levels

CONCLUSION:

Loxyde seems to have excellent properties to control Monilinia and prevent infection by the spores based on the various field tests that have been done on many hectares of fruit trees.

It is certainly a viable alternative to the use of chemical fungicides and from what we have seen so far actually achieves better results at a much lower costs. The other advantage is that unlike chemical fungicides it fully breaks down leaving no residues.