Module 24
Wax Application

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Reference
For more information on wax application in the packhouse, please consult the CRI Production Guidelines, volume IV.

Introduction

There are three main reasons for applying wax to citrus fruit. These are to:

- Extend its shelf-life by limiting moisture loss
- Protect the fruit against cold damage
- Improve the appearance of the fruit

Tests have shown that a wax coated fruit will have 20 to 30 percent less moisture loss during transport than an uncoated fruit. This means that, all other things being equal, the shelf-life of wax coated fruit is a lot longer than uncoated fruit.

With the opening of new markets in the Middle and Far East, the cold sterilisation protocol during shipping has become more and more common. A decent wax coating can protect fruit from damage during this process. Waxing also gives the citrus rind a good shine that makes it more attractive.

Another less common reason which has come to the fore in the recent past is that, due to increased resistance of some postharvest pathogens, fungicides can be mixed with the wax in order to control these pathogens and protect the fruit.

When choosing a citrus wax we must always take into consideration the exchange properties of the wax. Older, resin-based waxes tended to give the fruit more of a shine, but blocked the pores in the rind. This prevented respiration of the fruit rind, where carbon dioxide is exchanged for oxygen. This caused the fruit to develop an off flavour, due to an excessively high level of ethanol in the fruit caused by the high levels of carbon dioxide.
Citrus Waxes

There are two different types of citrus waxes. You get your poly-ethylene waxes, which are synthesised waxes, and then you get your natural waxes which are your carnauba waxes. Carnauba waxes are the waxes that actually come from a palm tree, so it is classified as a natural wax.

Certain markets require certain waxes. Poly-ethylene waxes used to be the only waxes in the industry many years ago, so they were acceptable in all markets.

But because they are synthesised and there are certain products in there that certain markets do not want, some markets look more to the natural waxes. A number of markets stipulate the use of only natural waxes and in other markets both waxes can be used.

Wax Application Procedures

Application Volume

Each manufacturer has their own recommendations on how many litres of wax must be applied to a ton of fruit. Those recommendations must be adhered to rigorously.

Over application can lead to wax that does not dry properly, and can interfere with the respiration of the fruit and can end up causing rind defects on the fruit. Over application can also lead to very serious and major losses in the industry and, at the end of the day, in the overseas market.

Monitoring Applications

One can normally see with the naked eye, after the drying of the wax, how well it has been applied, or how well it has not been applied.

If the application is insufficient it has to be rectified, because you cannot export fruit in that condition. If you do you are going to lose the quality of that fruit before it has even reached the overseas market.
Fungicides

Over and above the clean wax being applied to the fruit, we have fungicides that are mixed into the wax as well and applied with the wax. The fungicides that are usually in the wax are normally Thiabendazole, sometimes 2,4-D and also Guazatine.

The mixture of the wax and the fungicides are made up in a separate container. The container must be continually agitated because some of the fungicides applied in the wax, especially Thiabendazole, settle out. If that happens, you may get a patchy application of the fungicide onto your fruit through the wax.

So that container needs to be agitated continuously during application so that you get that uniform application of your wax and that uniform spread of the fungicide.

It is important that the right residue of the fungicide below the wax layer on your rind of your fruit is set to ensure the effectiveness of the fungicide treatment on export fruit.

summary

Wax Application Dos and Don’ts

- When choosing a wax, take into account its exchange properties, and export market requirements.
- Comply with the manufacturer’s instructions on application volume.
- Make sure that fruit is properly dry before wax application.
- Make sure that wax is applied evenly.
- Agitate wax continuously while applying to keep fungicide in suspension.

active learning

Watch the DVD clips, read through the learning material and do workplace research to gather the knowledge and information to complete the assignments below.

Activity 24.1 – Group Discussion

Find out which types of waxes are available for use in your packhouse. As a group, discuss the pros and cons of each type of wax, and why a specific wax will be used for specific fruit types.
Activity 24.2 – Case Study

A packhouse manager notices that the wax on all the fruit coming out of the drying tunnel after waxing is spotty and that there are areas where there is no wax on the fruit at all.

✓ What can cause this?
✓ What can the packhouse manager do to rectify this problem?
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Activity 24.2 – Case Study

Consider the case study below and answer the questions based on it.

A packhouse manager notices that the wax on all the fruit coming out of the drying tunnel after waxing is spotty and that there are areas where there is no wax on the fruit at all.

✓ What can cause this?

✓ What can the packhouse manager do to rectify this problem?