



# The essentials of degreening

By John Golding

**DEGREENING is the process of removing the green colour (chlorophyll) from the skin of fruit after harvest using ethylene gas treatment. Only mature fruit are suitable for degreening.**

It is absolutely critical that immature fruit are not harvested and degreened. Immature fruit will have very high acid levels and low sugar levels and will not meet the Australian Citrus Standard (ACS).

Immature dark green fruit will not successfully degreen. Ethylene treatment only helps with the breakdown of the green colour in the skin.

Ethylene does not ripen the fruit, the levels of sugars and acids are not affected by degreening. Therefore when degreening, it is critical to selectively pick mature fruit based on colour.


Colour development of the skin in the orchard is promoted by cool overnight temperatures (<15°C).

In the majority of citrus growing regions with a Mediterranean type climate (such as Riverina, Sunraysia, Riverland), cooler temperatures in late autumn promote good colour development. However, in the warmer subtropical and tropical growing regions (such as Queensland) these cooler temperatures may not occur until much later, well after the

early varieties are internally mature. Therefore it is common practice to use ethylene gas to degreen early season fruit in Queensland, such as Imperial mandarins.

Pre-degreening fungicide is recommended to prevent any postharvest decay. The degreening process provides the ideal growing conditions (high temperature, high humidity) for postharvest diseases. Postharvest fungicide dips are recommended to control postharvest diseases.

However, it is important not to degreen totally wet fruit immediately following fungicide treatment, but degreen the fruit after the fungicide has well drained and allowed to dry.

The success of degreening can vary with variety, the initial colour of the fruit, concentration of ethylene used and the duration of exposure to ethylene. 

## MORE INFORMATION

Contact John Golding on (02) 4348 1926 or john.golding@nsw.dpi.gov.au

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## Best practice tips for degreening

**Whilst many growers and packers have been degreening their fruit for many years, this is a timely reminder of the best practice tips for degreening.**

- Fruit should have some colour development and not be totally green
- Fruit should be colour sorted when picking
- Fruit should be internally mature and unblemished
- Harvest fruit carefully as any rind damage will be exacerbated by the degreening process
- Treat fruit with a postharvest fungicide prior to degreening
- The success of degreening can vary with different varieties and the initial fruit colour. Consider trialling small quantities of fruit to determine ethylene sensitivity rates and duration.
- Good air circulation in the degreening room is critical – ensure air moves through the fruit load, not around it
- An efficient ventilation system is critical to extract the carbon dioxide (CO<sub>2</sub>) generated by the fruit during degreening
- Do not wax fruit prior to degreening as this will inhibit full colour development
- The greener the fruit the longer the degreening process. The longer fruit are exposed to ethylene the shorter the shelf life
- Fruit treated with a late gibberellic acid (GA) spray will take longer to degreen or may not fully colour
- Fruit treated with an oil spray shortly before harvest (within 2-4 weeks) may not achieve full colour
- High ethylene concentrations cause the fruit calyx (button) to dry out and turn brown. Fruit can be dipped in the synthetic auxin 2,4-D to help keep buttons green, but 2,4-D can also delay the degreening process
- High rates of ethylene, long treatment times and high temperatures can induce the development of the postharvest disease, anthracnose, also known as 'degreening burn'



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