

Protocol for ripening avocados on commercial scale

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INTRODUCTION

The availability of ripe avocados changed the consumption pattern dramatically. By introducing the ripe & ready programme in the early 1980s, the consumption of avocados in the USA increased five-fold within three decades. The same trend developed in South Africa from the late 1990s. Convenience for consumer was the key factor for this increase.

This paper addresses procurement, precondition, ripening, packing, cooling and transport relating to ripe & ready. While quality assurance is an integral part of farming, with ripe & ready, it is even more so.

Ripe & ready is not solely the domain for the large players. Smaller growers, with the technical expertise and management skills, can partake in this lucrative, although demanding, value adding business. The author presents some suggestions in this regard.

PROTOCOL

The methods and techniques described are based on the personal experience, mainly learned from my team headed by Terence Mohale, and literature from various sources.

Customer

It is essential to acquire a thorough understanding of the customer's requirements and protocols, these include:

- Variety, fruit size, package, labelling, sell-by-date, volumes, delivery schedule, and fruit firmness & pulp temperature on delivery.
- In the case of non-compliance, e.g. fruit condition, labelling or short order, which procedures will be followed.

The customer quality assurance protocol – It is imperative for you and the customer to talk “the same language”. The main issue with ripe & ready avocados is firmness. The use of a densimeter can assist in addressing differences.

Procurement

Local sources of the avocados are preferable. Long distance transport can be detrimental to fruit condition¹ especially if cooling is required where breaks in

the cool chain will have impact on shelf life.

Avocado ripening physiology is more complicated than other fruit due to its extensive flowering period and inability to ripen on the tree. The position of the fruit on the tree, tree age, agricultural practice and the environment contribute to variable ripening. In general, early-season fruit takes longer to ripen while early- and middle-season fruit are more heterogeneous in the ripening pattern compared to late-season fruit. However, when selective picking is practiced, the time to ripen for different fruit sizes can be confusing².

However, some of the variations may be reduced by harvesting from the same orchard, selective picking e.g. western side of tree, and, more or less, fruit of the same size.

A good choice for ripening is 'Hass', 'Maluma' and 'Gwen'TM, followed by 'Fuerte', 'Pinkerton' and 'Rinton'. 'Ryan' can be used if no other fruit is available.

Residues

Confirm that the recommended spray programme was followed and the withholding periods were adhered to. Refer to SAAGA's website for the latest registered chemicals.

Precondition

Failure of avocados to ripen on the tree has been attributed to inhibitory tree factors. The levels of ethylene receptors in avocado mesocarp increase after harvesting in parallel to the production of endogenous ethylene (HershkovitzHaya *et al.*, 2010).

A sufficient number of ethylene receptors are essential prior to the application of ethylene for ripening. The freshly picked avocados should be stored for a day or two at 17 °C for development of receptors. Fruit stored at lower temperature need only be brought up to 17 °C to ensure more even ripening.

Ripening

After recognition of the crucial role of endogenous ethylene in ripening, there followed studies on the influence of exogenous ethylene on ripening initiation (Biale, 1960). From these and many more the following protocol gradually evolved for ripening with ethylene:

¹ A quality defect is permanent. Some examples include sun burn, insect damage, malformation or wind damage. A quality defect never changes, which means you would have the same amount of permanent defect at shipping point that you would have at destination. In contrast, condition defects progress with age, such as decay, bruising and discolouration of your product.

² When fruit was selective picked, early season small fruit ripen slower than large fruit. While the opposite is often experienced late in the season. This may be due to different fruit sets during the growing season.

- Ripening chamber – Reasonable air tight; Temperature control from 15 to 25 °C (optimum 17 °C, Woolf *et al.*, 1997); Humidifier – 85 to 95% relative humidity (optimum 90%, Erickson & Kikuta, 1964); No uneven air movement in the room; Room equipped with instruments to measure (even better control) carbon dioxide, ethylene and humidity.
- Apply ethylene – the optimum concentration is 100 parts per million. The application period vary from two to four days depending on when the fruit was picked, e.g. late or early season.
- Carbon dioxide (Young *et al.*, 1961) – when the carbon dioxide reaches 1%, ventilate the room to remove excess carbon dioxide.
- Check firmness twice a day by the “soft touch” – early morning and late afternoon. “Breaking” fruit does have densimeter reading of ~65. As soon as the fruit reaches the required firmness, cool down rapidly to pulp temperature of 4-5 °C (Fig. 1).



Figure 1

Sorting

A substantial amount of fruit can be sorted by hand. Continue the ripening of hard fruit (no ethylene treatment required) and label the batch.

Packing and labelling

While packing, confirm firmness by hand.

Punnets are usually used and wrapped with cling wrap.

Perform quality assurance on routine basis and record results during packing.

Labelling and date codes – CHECK and CHECK.

Cooling prior to despatch and transport

Ripe fruit is tolerant to low temperatures; ‘Fuerte’ and ‘Hass’ can be stored at 2 °C without any damage.

Despatch the fruit within a day after packing. While loading the fruit, perform the final quality/condition assurance – assure the sell date is correct.

General

Keep in close touch with customer e.g. potential risks is condition, issues with ripening or shortage of fruit.

Ripe & Ready is a year around operation with no place for weekends or public holidays.

Summary

My mentor, Keith Partridge, taught me a profound lesson – “Customer is King”. My take-away message is in the same vane, as depicted in the illustration (Fig. 2).



Figure 2

Opportunities

The volumes of ripe & ready for the likes of Shoprite/Checkers, Pick n Pay and Woolworths are well above the abilities of small and medium enterprises. Therefore exploring potential markets such as Spar franchises, deli shops, sushi restaurants and OK franchises will be worthwhile.

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