



ON-FARM PRE-COOLING OF AVOCADO FRUITS





Introduction

Precooling is a method that swiftly eliminates the field heat from freshly harvested avocado fruits before they are transported to the market or stored. By subjecting them to low temperatures, this process reduces metabolic activities like respiration and transpiration, which can rapidly deteriorate post-harvest fruit quality. Additionally, it hinders the onset of post-harvest diseases by slowing down the ripening process.

Pre-cooling of Avocado Fruits

- Harvested Avocado fruits are pre-cooled immediately after harvesting (less than 1 hour after harvesting).
- The optimum storage temperature range of 12-21°C should be maintained.

Reasons for pre-cooling

- Reduce the respiration rate of fruits.
- Reduce the rate of growth of postharvest rots caused by pests and diseases.
- Reduces water loss (shrivelling, wilting).
- Reduces microbial activity.
- Reduces the metabolic activity.

Cooling methods

These are methods which help reduce field heat from the harvested fruits. Cooling methods include use of:



1. Evaporative coolers

This are coolers which cool air in a room through evaporation of water. These coolers are simple and do not require energy. They include:

i) Charcoal coolers

The charcoal cooler consists of a double brick wall filled with charcoal in between, and, a storage chamber. The charcoal is kept moist with water. The inside chamber is cooled through the water in the charcoal.



Evaporative charcoal cooler for avocado (Source: James Ndambuki, KALRO)

ii) Zero energy cool chamber

The Zero Energy Brick Cooler consists of a double brick wall filled with sand in between and, a storage chamber. The sand is kept moist with water. The inside chamber is cooled through the water in the sand.



Evaporative cooling- Zero energy cool chamber (Source: James Ndambuki, KALRO)

2 Wakati™ technology

Wakati™ is a simple and innovative solution where altered environment in the chamber contributes to shelf life extension - The altered environment is due to high relative humidity and oxidation of ethylene from the storage environment (ozone oxidation). It is a 1 m by 1 m canvas tent with a solar-powered fan in one corner. The fan is placed in a cuplike reservoir. As it rotates, it picks up water into mist droplets, which are distributed in the tent by air currents. When a moisture concentration of 80% is achieved, the surface of the fruit or vegetables remains fresh because there is no loss of water. This low-cost solution helps the produce to last up to 10 times longer without any refrigeration.



Wakati™ technology (Source: James Ndambuki, KALRO)

3. CoolBot™ technology

It is a low-cost postharvest temperature management that improves the shelf life of fruits and vegetables using less power. The Coolbot™ is a small electrical device that uses an off-the-shelf air conditioner to produce cold air, converting a well-insulated room into a cold room at a much lesser cost than that needed to buy a refrigeration unit. It keeps a well-insulated room as cold as 4°C, consistently, while at the same time using about half the electricity of a comparably sized standard compressor.



CoolBot™ Technology (Source: James Ndambuki, KALRO)

4. Shade coolers

These are types of coolers that use covers, umbrellas, booths, tents and also transport vehicles covered with light colour tarpaulins to prevent heat.



Transport of Avocado with a Lorry Covered with Tarpaulin (Source: Francis Wayua, KALRO)

5. Covering with wet clothing

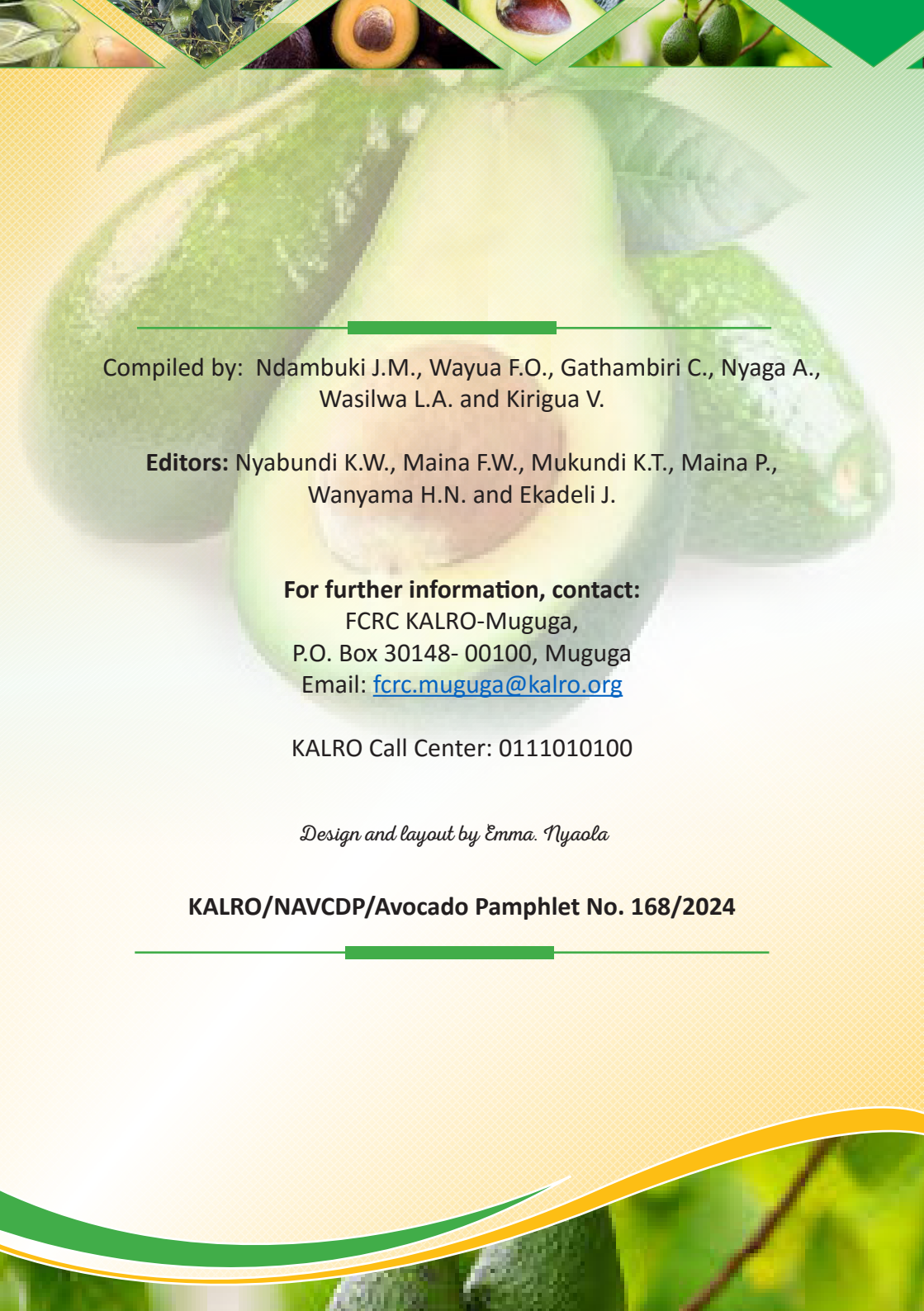
The harvested avocado fruits should be placed in a container and covered at the top with wet clothing. The suitable material for covering should be heavy to help in retaining more water in the fruit container. This eliminates hot air, therefore cooling the produce. To test for complete cooling, remove the cover and place your hand on top. If you experience any hot air, dip the covering material in water and cover it completely.

6. Packhouse

A packhouse is a facility where harvested crops are consolidated and prepared for transportation and distribution to various markets. Various operations take place here which include: cleaning, sorting, grading, pretreatments, packing, **cooling**, storage and dispatch to the market. Cooling is done by use of cold rooms which have controlled temperatures.



Packhouse Cold Room (Source: Francis Wayua, KALRO)



Compiled by: Ndambuki J.M., Wayua F.O., Gathambiri C., Nyaga A.,
Wasilwa L.A. and Kirigua V.

Editors: Nyabundi K.W., Maina F.W., Mukundi K.T., Maina P.,
Wanyama H.N. and Ekadeli J.

For further information, contact:

FCRC KALRO-Muguga,
P.O. Box 30148- 00100, Muguga
Email: fcrc.muguga@kalro.org

KALRO Call Center: 0111010100

Design and layout by Emma. Nyaola

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