Post-harvest Management, Research and Development

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Goals of PH R&D: Consumers’ certainty

- Visual appearance & sensory experience
- Safe, healthy and nutritious products
- Sustainability of production system (environmentally friendly)
Goals of PH R&D:

Fresh produce marketers

- To avoid negative impact of variable quality through production line esp. PH management
Quality management of fresh fruits and vegetables (Shewfelt and Prussia, 2009)

- Maintained in recognizable form
- Variability of response to storage conditions
- Great factor in quality losses come from latent damages
Aim of Post harvest management

To maximize the value of fruit & vegetable after harvest by adding in successive stages up to consumption
Factors affect Post-harvest losses

Internal factors:

1. Transpiration
   - Weight losses
   - Internal quality (e.g. texture)
   - External appearance (e.g. wilting)

2. Respiration
   - Climacteric VS. Non-climacteric
Factors affect Post-harvest losses

Internal factors:

3. Ethylene production

4. Biochemical changes of fresh produce

5. Growth & Development of fresh produce
Factors affect Post-harvest losses

External factors:

1. Temperature
2. Moisture
3. Atmosphere
4. Light & Gravity
5. Disease and Insects
To control external factors (temp. & moisture)
...to reduce changes of internal factors
...to get appropriate PH technology
General steps of post harvest management

(Sydney Post harvest laboratory)

Understanding produce maturity

- Physiological maturity
- Horticultural maturity

Depends on final uses
General steps of post harvest management

- Harvesting handling
  - Care taken during harvesting to reduce bruises and other injuries lead to less losses and enhanced value of fresh produce after harvest
General steps of post harvest management

- **Pre-cooling**
  - Harvested produce should be promptly transferred to packing shed to quickly remove field heat which reduces PH life of produce (*hydro-cooling, forced air cooling and packing with ice etc.*)
General steps of post harvest management

- Cool storage
  - The most important tool to extend storage life of fresh produce
General steps of post harvest management

Quality control

- To improve consistency of quality and freshness of produce to satisfy consumers
### Modified Atmospheric Packaging (MAP) Research in Rambutan

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Fresh rambutan can be kept for 23 days at</th>
<th>Fresh rambutan can be kept for 26 days at</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10 °C</strong></td>
<td>✧ 500 g- and 1,000 g-L-LDPE bags</td>
<td>✧ 500 g- and 1,000 g-HDPE bags</td>
</tr>
<tr>
<td>✧ OTR rate 2,600 ml m⁻²day⁻¹</td>
<td>✧ OTR rate 5,688 ml m⁻²day⁻¹</td>
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</tr>
<tr>
<td>✧ Water vapor transmission rate 4.56 g m⁻²day⁻¹</td>
<td>✧ Water vapor transmission rate 6.7 g m⁻²day⁻¹</td>
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</tr>
<tr>
<td>✧ Flushed with 5:5 O₂:CO₂</td>
<td>✧ Flushed with 5:5 O₂:CO₂</td>
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</tbody>
</table>
Fresh rambutan was kept in refrigerated marine container with AFAM+
at 12 °C, 96% RH, 12% CO₂, 9% O₂ and 15 m³/hr ventilation.

* Outer appearance and eating quality of rambutan at 15 to 18 days after keeping in AFAM+ reefer were commercial acceptance.
Outer appearance
3 days after transporting by air

Outer appearance
8 days after transporting by sea with AFAM+ reefer
Post-harvest management: Rambutan

- Harvest with care

- Appropriate harvesting index
  (green and yellow skin
  with red blush, red hair
  with green end)
Post-harvest management: Rambutan

- Clean with chlorine solution and dried before packing
- LLDPE (Linear Low Density Polyethylene) bag, 20 micron thick with specific value of OTR, CTR and WVTR
- Store in 14-15 °C
Outer appearance and eating quality at 21 days after storing in refrigerated marine container at 15 °C were marketable acceptance
Post harvest management beneficiary

- Increased export earnings
- Extend the availability of fresh produce through the year
- Reduced quality disorders or losses