Value Added Opportunities with Tropical Fruits

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Opportunities

- Convenience to consumers
  - Mango
- Introduce new fruits to consumers
  - May not try otherwise
- Increase profitability
Examples

- Fresh-cut fruits and vegetables
  - Carambola, mango, others
- Juices, purees, smoothies
- Wines
- Other
Concerns

- **Food Safety!**
  - Ready to eat product
  - Sanitation, temperature control, HACCP?

- **Quality**
  - What are the limitations in quality, shelf-life?

- **Markets**

- **Economics**
Fresh-Cut Carambola

- Can “lock-in” optimum quality, maturity
- Outside appearance is not so critical
- Nice, unique appearance as slice
  - May encourage more people to try
- Opportunities in food service, other markets
General Process for Carambola

- Cultivar is important
- Optimum maturity, ripeness
- Washing is critical
- Slicing
- Treatment to limit browning
- Vacuum package
- Maintain refrigerated
Research on Pre-Cut Carambola

- Cultivar is important
- Browning doesn’t start until package is opened, slices exposed to air
- Browning becomes worse with storage
- Ascorbic acid also decreases storage
- Browning can be limited with treatment
- Shelf-life?
  - 2-4 weeks (color, microbial concerns limit)
Browning in Cultivars/Lines

![Bar Chart](chart.png)

- **WA 3-23-1**
- **Fwang Tung**
- **WA 3-22-36**
- **WA 3-22-2**
- **WA 3-22-20**
- **Kary**
- **Demak**
- **WA 3-21-2**
- **Arkin**

4 weeks storage + 6 hour air
Browning of Arkin During Storage

![Graph showing L Value for initial and after 6 hours storage with different time points: 0 weeks, 2 weeks, 4 weeks, and 6 weeks.](image-url)
Changes in Ascorbic Acid of Arkin

![Graph showing changes in ascorbic acid of Arkin over time. The x-axis represents initial and after 6 hours, while the y-axis represents ascorbic acid in mg/100 g. Different colors indicate weeks: blue for 0 weeks, yellow for 2 weeks, red for 4 weeks, and green for 6 weeks.](image-url)
Anti-Browning Treatments of Arkin

![Graph showing L value over time for different treatments including Control, Ascorbic + Citric, 4-Hexylresorcinol, and Blanching (90 sec).]
Anti-Browning Treatments of Arkin

4 weeks storage + 6 hours air exposure
High Pressure Processing of Arkin

![Graph showing L Value over 2 weeks storage + 6 hours air](image-url)

- **Control**
- **600 Mpa - 2 min**
- **600 Mpa - 4 min**
- **600 Mpa - 6 min**
- **800 Mpa - 1 min**
- **800 Mpa - 3 min**
- **800 Mpa - 5 min**
Fresh-Cut Mango

- Can lock in optimum quality, ripeness
- Outside appearance not an issue
- Very convenient for consumers
- Fairly good shelf-life
General Process for Pre-Cut Mango

- Variety?
- Optimum ripeness
- Wash
- Peel (by hand?)
- Sliced from pit (by hand?)
- Package
- Keep refrigerated
Research on Pre-Cut Mango

- Varieties
  - Tommy Atkins, Keitt

- Shelf-life
  - Up to 5 weeks (3C)
    - Microbial problems, fresh mango flavor, off-flavor
    - Color, texture changes not big problems

- High pressure processing
  - Limited microbial growth, but flavor changed
Fresh Mango Flavor Changes

![Graph showing Fresh Mango Flavor Changes for Tommy Atkins and Keitt varieties over time with different colors for initial, 1 week, 3 weeks, 5 weeks, 7 weeks, and 9 weeks.](image-url)
Off-Flavor Changes

![Bar chart showing off-flavor changes for Tommy Atkins and Keitt at different time points: initial, 1 week, 3 weeks, 5 weeks, 7 weeks, and 9 weeks. The chart displays the percentage of off-flavor over time for each variety.]
Changes in Firmness

- Tommy Atkins
- Keitt

- Initial
- 1 week
- 3 weeks
- 5 weeks
- 7 weeks
- 9 weeks

Firmness
<table>
<thead>
<tr>
<th>Juices from Tropical Fruits</th>
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<tbody>
<tr>
<td>• Increasing availability of new, unique juices</td>
</tr>
<tr>
<td>◦ Also purees, “smoothies”</td>
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<tr>
<td>• Health benefits?</td>
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<tr>
<td>• Can you maintain high quality during processing?</td>
</tr>
<tr>
<td>• Extraction and processing ranges from difficult to easy</td>
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<tr>
<td>• Juices typically heat pasteurized</td>
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Wines, Other Products

- At least 3 wineries in Florida that specialize in non-grape wines
  - Many people willing to try new and different wines

- Other possibilities
  - Dried fruit
  - Salsas, fruit pieces
  - Jellies, preserves
  - ??????