Evaluating the Quality of Fresh-cut Products

High Quality Raw Material is Necessary to have High Quality Fresh-cut Product

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Evaluation of Fresh-cut Products

- **What is Quality?**
  What parameters describe quality adequately?
- **What is Freshness?**
  Are the same parameters useful?
- **How are objective/subjective evaluations related to sensory quality?**

Evaluating Quality of Fresh-cut Products

Examples

Leafy/stem products - Lettuce salads
- Broccoli florets

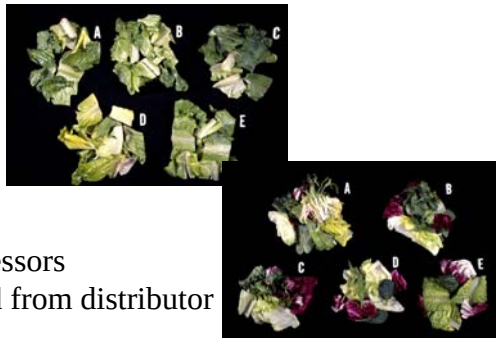
Fruit product - Melon

Root crop - Jicama

Comparative Study of Fresh-cut Salads

- 5 processors
  - Dole, FrExp., FrVal, RdyPk, T&A
- 4 Salad Types
  - Garden Salad, GS-Food Service, Caesar & European Mix
- 4 production dates
- purchased via General Produce, SAC

Packaged Salad Quality Study



- 4 salad products from 5 processors
- 4 production dates, purchased from distributor
- Products stored at 5C (41F)
- Components: Size, Color
- Visual Quality and defects: 0, 10, 15 & 20d
- Composition: Sugar, Vit C, EtOH, Acetald.
- Gas Analyses: O_2, CO_2, C_2H_4,every 5 days
- Microbiological Tests: APC, Coliforms (0, 10, 20d)
- Sensory: 18 panelists, 4 criteria, days 0 & 10

Salad Lettuce Evaluations

- **Overall visual quality,** 9 (exc.) to 1 (not use)
- **Shelf-life** is number of days to reach a score of 6 and/or a defect score of 3
- **Edge browning**, 1 to 5 scale; % pieces affected and calculate index
- **Decay/breakdown/sliminess**, 1 to 5; index
- **Aroma** (immediately after open package and again 30 min later; 5 to 1 scale
- **Texture**: break pieces at midrib, 5 (crisp) to 1 (limp, soft)

SUBJECTIVE EVALUATIONS			
Visual quality	**Decay**	**Aroma**	**Discoloration**
9 Excellent	**1 None**	**1 None**	**1 None**
7 Good	**2 Slight**	**2 Slight**	**2 Slight**
5 Fair	**3 Moderate**	**3 Moderate**	**3 Moderate**
3 Poor	**4 Mod. severe**	**4 Mod. full**	**4 Mod. severe**
1 Unusable	**5 Severe**	**5 Full**	**5 Severe**

Sensory Evaluation

- Consumer preference
- Difference Tests
- Scoring Difference Acceptance Test
- Descriptive Analysis

Room with reduced noise, no odors, booths

Scoring Difference Acceptance Test

Salads & Broccoli
Aroma
Flavor
Texture
OVQ
Buy?

With the red lights ON, evaluate these samples for **AROMA**. Break or cut 3 or 4 florets and smell. Use the scale below to check your rating. Please make comments below.

Rating	**Code**	**Code**	**Code**	**Code**
Excellent, fresh, typical aroma				
Very good				
Good				
Fair, slight aroma				
Poor, no aroma or aroma not typical				
Observations				

With the red lights ON, evaluate these samples for **TEXTURE**. Chew 3 or 4 pieces and use the scale below to check your rating. DO NOT SWALLOW THE PRODUCT. Rinse with water between samples. Please make comments below.

Rating	**Code**	**Code**	**Code**	**Code**
Excellent, succulent, typical				
Very good				
Good				
Fair				
Poor, not good, not typical				
Observations				

With the red lights OFF, evaluate these samples for **OVERALL VISUAL QUALITY**. Use the scale below to check your rating. Please make comments below.

Rating	**Code**	**Code**	**Code**	**Code**
Excellent				
Very good				
Good				
Fair				
Poor				
Observations				

With the red lights OFF, evaluate these samples as a **CONSUMER BUYING THE PRODUCT**. Use the scale below to check your rating. Please make comments below.

Rating	**Code**	**Code**	**Code**	**Code**
Definitely would buy				
Probably would buy				
Perhaps would buy				
Unlikely to buy				
Definitely would not buy				
Observations				

WITHIN EACH SET THERE ARE THREE SAMPLES. THE LEFT ONE IS CODED "**REF**" FOR REFERENCE. TASTE THE REFERENCE TO BECOME FAMILIAR WITH IT, THEN TASTE THE OTHER TWO SAMPLES (FROM LEFT TO RIGHT); DECIDE WHICH SAMPLE IS THE SAME AS THE REFERENCE. INDICATE YOUR CHOICE BY CIRCLING THE NUMBER CORRESPONDING TO THE SAMPLE WHICH IS THE SAME AS THE REFERENCE.

SET 1	**REF**	312	465
SET 2	**REF**		
SET 3	**REF**		
SET 4	**REF**		

Significant Difference 12/17

Comparison of fresh-cut Peppers & Onions for pizzas

General Procedures For Fresh-cut Melons

Preparation

- Evaluate whole fruit for ethylene, firmness, color and soluble solids
- Select melons; equatorial slice
- Scrub wash chlorinated water
- Cut cylinders or pieces
- Treatments
- Store in plastic containers

Evaluation

- Evaluate at 0, 4, 8, 12 days at 5°C (41°F)
- Visual quality, decay, translucency by subjective scoring
- Firmness, juice loss, color, sugars by objective analyses
- In some tests, sensory & microbial testing

1. Overall visual quality (OVQ) is scored on a 9 to 1 scale, where

9 = excellent, 7 = good, 5 = fair, 3 = poor and 1 = unusable. A score of 6 is considered the limit of salability (denotes end of shelf-life). OVQ takes into account decay and other defects.

2. Macroscopic decay and other defects (surface discoloration) are

scored on a 1 to 5 scale, where 1 = none, 3 = moderate and 5 = severe. Samples may be cultured to ID decay-causing organisms.

3. Aroma of the cut fruit will be scored moderately full, and 5= on a 1 to 5 scale, where 1=none, 2=slightly noticeable, 3=moderate

intensity, 4=full, typical. **Pieces are cut in half before asses**

arom **ter m**

Juice loss. Juice in bottom of container is weighed by siphoning out with a transfer pipette and weighing to nearest 0.1g.
Pulp color is determined using a Minolta Chroma Meter CR-200. L*, a*, b* values are recorded and chroma (C) and hue angle (H) values are calculated as (a*2 + b*2)1/2 and tan-1 (b*/a*), respectively. **0 and 8 days only**
Texture (pulp firmness) is determined on a TA-XT Texture Analyzer using a rounded-tip, cylindrical 8 mm diameter probe to a depth of 5 mm to measure force to puncture the pulp. Data are recorded in Newtons (1 N = 9.81 kg-force and 4.45 lb-force).
Composition: Soluble solids, sugars and Vitamin C. Soluble solids will be determined from juice from melons extracted from several chunks or cylinders with a press and tested with a digital temperature-compensated refractometer; need about 10 ml of juice per sample. Other samples for sugars for later analysis by a colorimetric or HPLC method. For vitamin C, 2 ml of juice mixed with 2 ml 2% oxalic acid before freezing at -80C for later analysis by HPLC.

Relative Importance of Temperature and Modified Atmospheres for Fresh-cut melon

Fresh-cut Jicama

- **Intact root is chilling sensitive; temperature for fresh-cut product??**
- **Response to modified atmospheres??**
- **Expected shelf-life??**
- **Quality parameters:**
  - **White, crisp, sweet-starchy pulp**
  - **No decay**
  - **Other quality aspects??**

Subjective Evaluations

• Visual Quality	9 = excellent, 7 = good, 5 = fair, 3 = poor, and 1= unuseable
• Discoloration	
• Surface Drying	1 = none, 2 = slight, 3= moderate, 4 = moderately severe, and 5 = severe
• Macroscopic Decay	
• Aroma & Flavor	5 = full, characteristic, 3 = moderate and 1 = not typical

Objective Measurements:

- **Texture**
  - 5 mm probe
  - 8 mm depth
- **Color**
  - L*, a* and b* values
- **Weight loss**
- **Composition**
  - Dry weight
  - Soluble solids
- **Ethanol & acetaldehyde**
- **Respiration**

Experimental

Cylinders of Jicama (1.8 x 4 cm)

Temperatures: 0, 5, 10, 12.5 & 15 °C
(32, 41, 50, 55, & 59°F)

Controlled Atmospheres at 5 y 10°C:

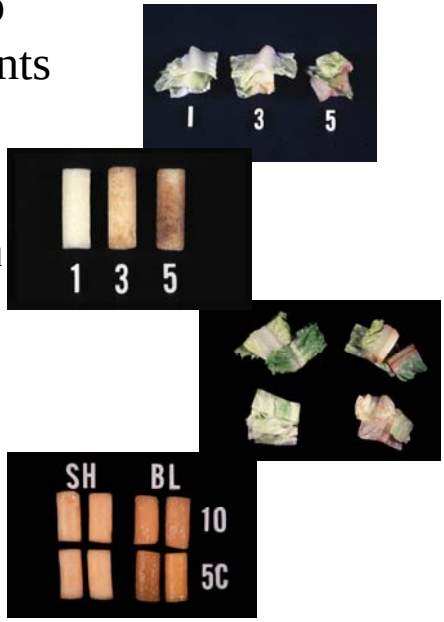
O_2: 21, 3 y 0.3%

CO_2: 0, 5, 10 y 20%

Evaluations: Visual quality, color, firmness, respiration, microbial load

Relate Subjective to Objective Measurements

- **Discoloration in lettuce highly correlated to a* color value**
- **Discoloration in jicama correlated to L* value**
- **Greenness correlated with hue color values or chlorophyll**
- **Translucency score related to decrease in L* value**



Fresh-cut Products

- **What is Quality?**
  What parameters describe quality adequately?
  Beyond visual—texture composition, flavor
- **What is Freshness?**
  Are the same parameters useful?
- **How are objective/subjective evaluations related to sensory quality?**

Better understand raw material quality and factors that cause variability