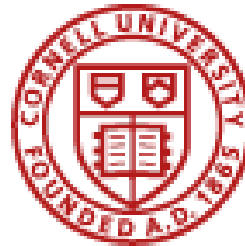


Food Science, Sensory Science & The Tactile Symphony

August 21, 2009
The CIA, Hyde Park, NY

Michael Nestrud, BS, AOS
Cornell University

About me



Cornell University
Department of
Food Science

What is Food Science?

A place for people who are passionate about food

Physics

Chemistry

Food Biology

Human Biology

Genetics

Safety

Nutrition

Psychology

Public Policy

Education

Medicine

Agriculture

Animal Science

Culinary Careers in Food Science

Food Safety

Government Policy

Government Research

Academia

Journalism

Television

Viticulture / Enology

Food Product

Development

Sensory Scientist

Brewing

Cheese Making

Other Culinary Scientists

David Landers, Assistant Culinary Director
Center for Culinary Development

- Strategic New Food Product Development for large food companies
- Link between chefs and food manufacturer



What is Sensory Evaluation?

- Evoke, Measure, Analyze, and Interpret Sensory Phenomena
- Psychology
- Biology
- Culinary



Who uses Sensory Evaluation?

- Food Product Developers
- Government & NGOs
 - NASA, Military, FDA, USDA, FAO (UN)
- Medical Doctors, Elderly
- Culinary Professionals
 - Research Chefs
 - Traditional Chefs
 - Wine Professionals

What is Food Texture?



A combination
of the senses



Consumer Perception of Texture

1) Take it for granted

- Assumptions are violated

 - tolerances: potato chips vs. cottage cheese

- Non-food association

- directly asked

2) Quality Characteristics

- especially freshness

- culinary excellence

Texture Importance to Acceptance

Positive Characteristics

Crisp

Crunchy

Tender

Juicy

Firm

Negative Characteristics

Tough

Soggy

Lumpy

Crumbly

Slimy

Texture importance to identification

% Correctly Identified – Blended vs. Unblended

4% identification of blended cabbage

7% cucumber

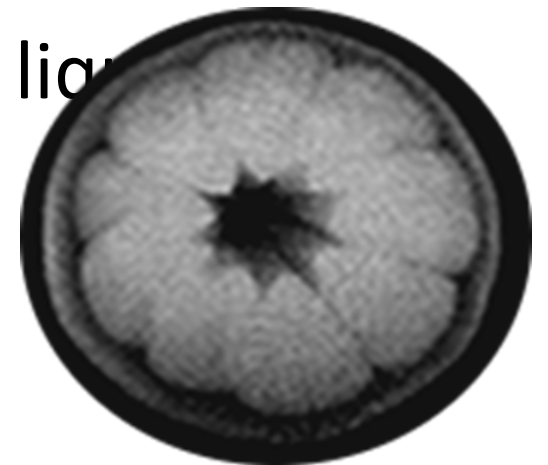
41% beef

63% carrots

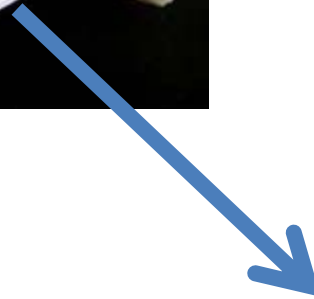
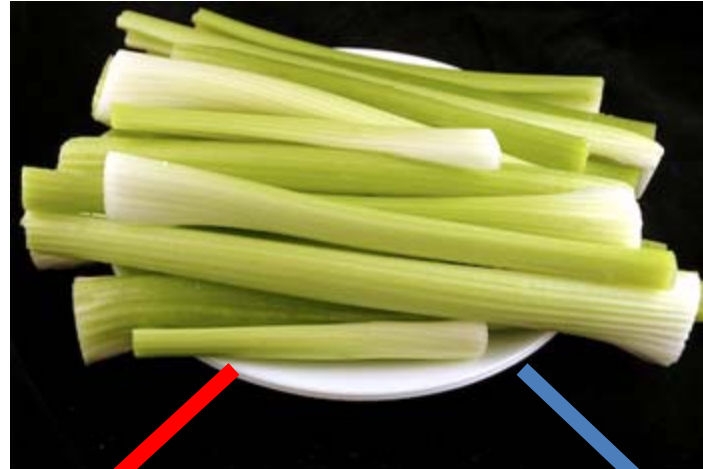
81% apple

What is “juicy”?

1. force with which the juice squirts out of the product
2. rate of juice release
3. total amount released on chewing
4. flow properties of the expressed fluid
5. contrast in consistency between liquid and suspended cell debris; and
6. effect on saliva production



Auditory Texture



Crisp

High frequency sounds

Single “snap”

Crunchy

Low frequency

sounds

Successive “crunches”

Texture Breakdown

Visual Texture

Tactile Texture

Oral

Phase Change

Handfeel

Thermodynamic Texture

Hot and Cold

Chemical Texture

Spicyness

Burning

Tingling

Electric

Pungent

Carbonated

Acidic / Sharp

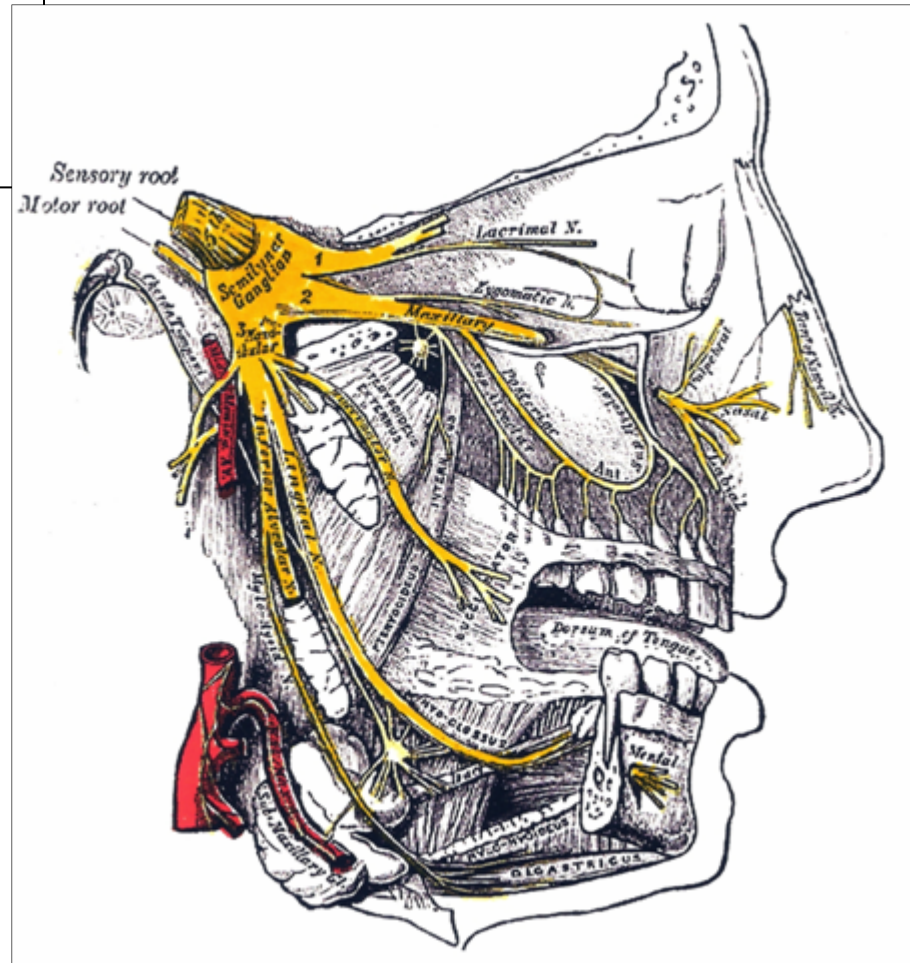
Cooling

Chemesthesis

The sensory mechanisms across the body surface and various orifices that are generally responsive to chemical stimulation, especially to irritation, and found primarily in mucous membranes.

Physiological Effects

- Sweating
- Tearing
- Salivary Flow
- Short Term Adaptation
- Endorphin Release



Theory of Dynamic Contrast “The Tactile Symphony”

Intraoral variety over the course of an ingestion event increases sensory arousal and pleasure

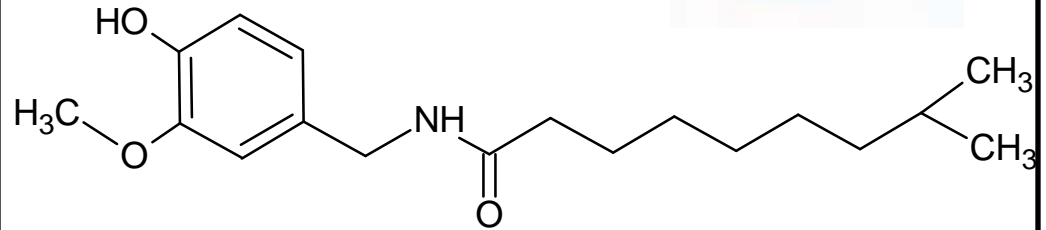


Szechuan Button

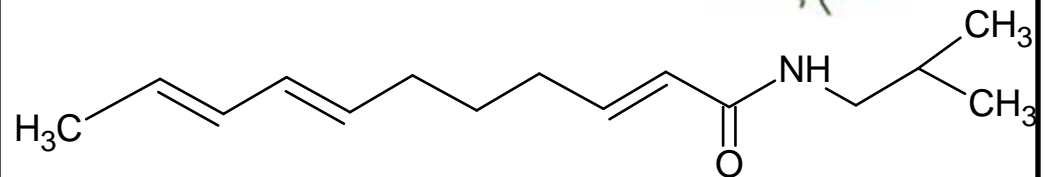
Acmella oleracea



Capsaicin



Spilanthol



Summary

- Food Science is a cross-disciplinary field involved with understanding and improving food.
- Sensory science is the study of how we perceive the world through our senses (sight, sound, touch, taste, smell)
- Texture perception is impacted by visual, tactile, odor, and auditory cues
- Chemesthesis is the perception of texture via chemical stimulation
- Contrast (texture, flavor) increases sensory pleasure

Resources

Books

Sensory Evaluation of Food

Lawless & Heymann

Sensory Evaluation Practices

Stone and Sidel

Sensory Evaluation Techniques

Meilgaard , Civille and Carr

Organizations

Institute of Food Technologists
Sensory Evaluation Division
Society of Sensory Professionals

My Info

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