FDE 418
FOOD QUALITY CONTROL
LESSON-12

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Texture

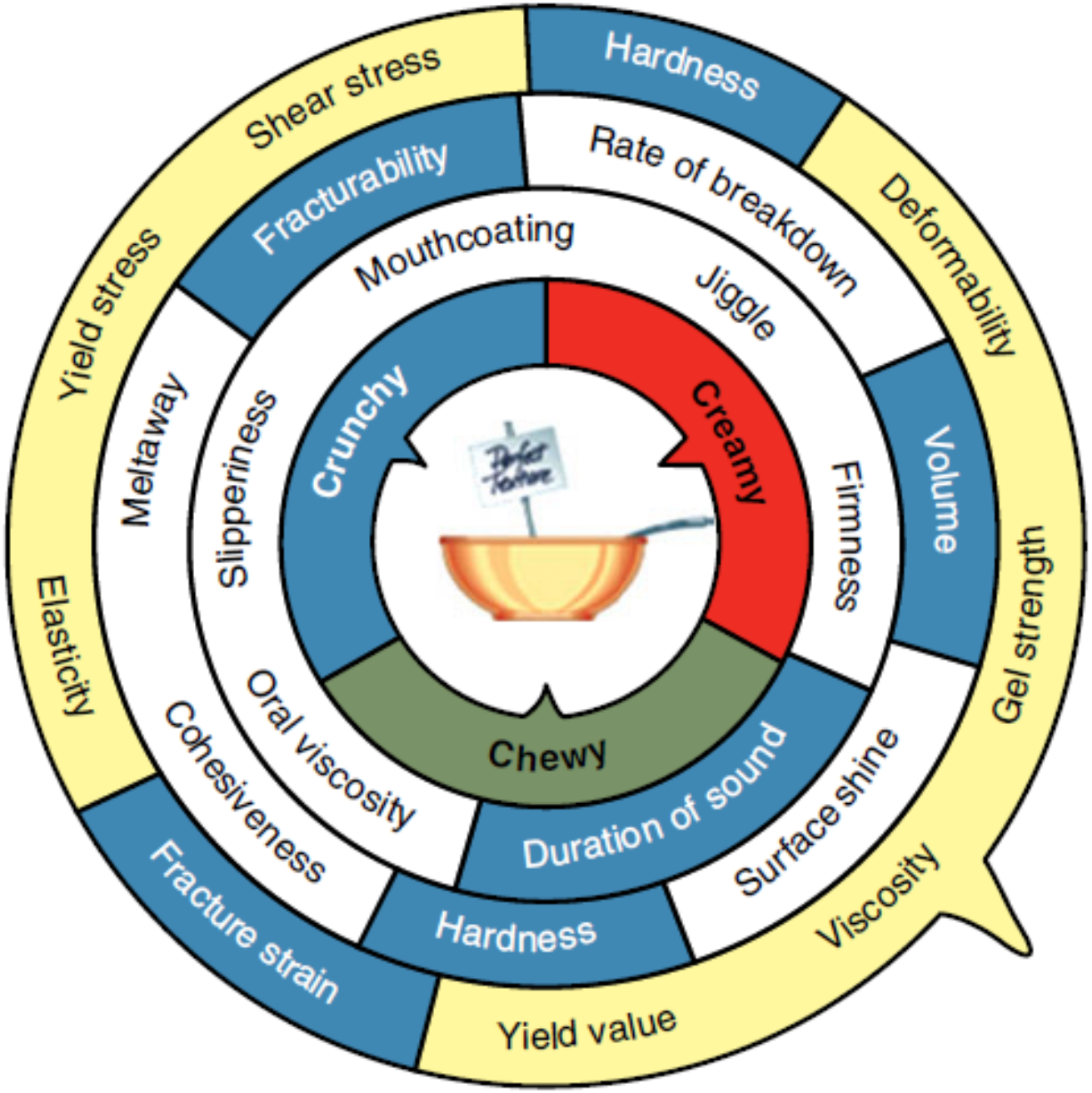
Texture: the response of the tactile senses to physical stimuli

- The tactile sense (touch) is the primary method for sensing texture

- Other characteristics to evaluate texture;

  - Kinesthetics (sense of movement and position)
  - Sight (degree of slump, rate of flow)
  - Sound (associated with crisp, crunchy and crackly textures)

TEXICON: The Texture Lexicon



Textural diversity

- ✓ the chewiness of bread crust and of meat
- ✓ the softness of marshmallows
- ✓ the crispness of celery and potato chips
- ✓ the juiciness of fresh fruits
- ✓ the smoothness and melting sensations of ice cream
- ✓ the crumbliness of cake

Textural diversity

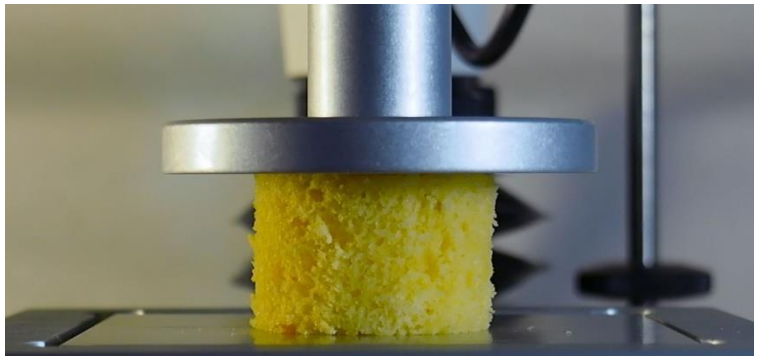
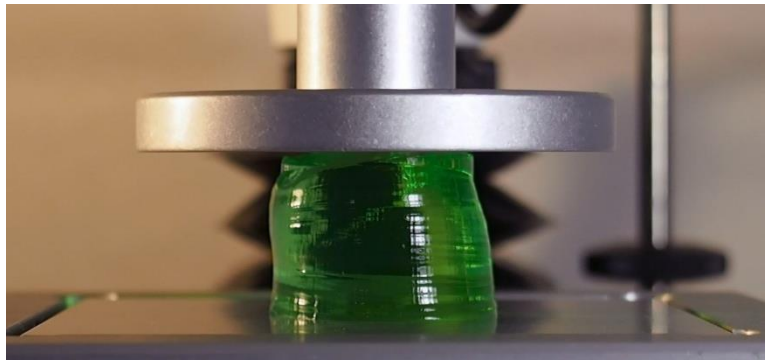
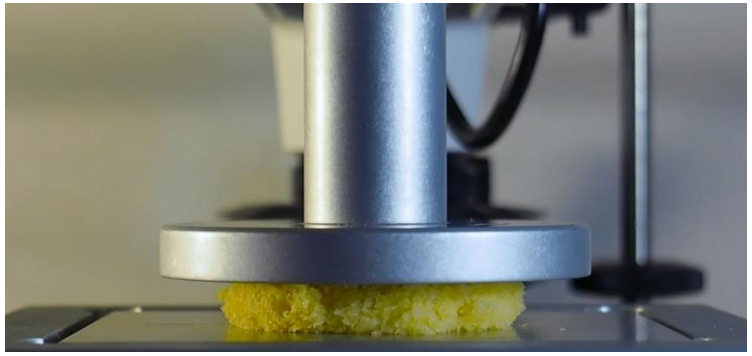
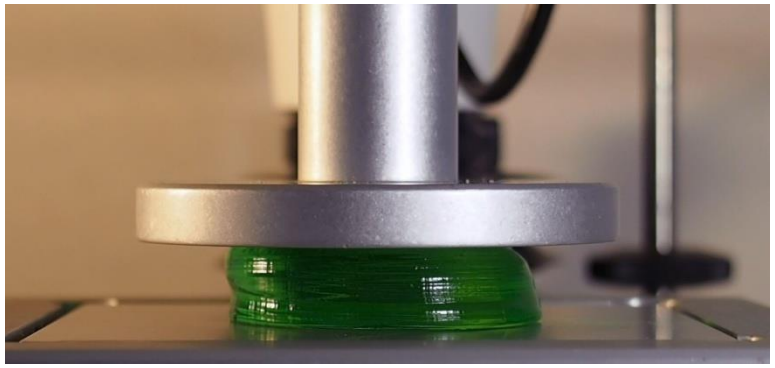
- ✓ the melting of jelly
- ✓ the viscosity of thick soup
- ✓ the fluidity of milk
- ✓ the thick smoothness of yogurt
- ✓ the soft toughness of bread
- ✓ the flakiness of fish
- ✓ the creaminess of pie topping…

Textural properties of foods

- ✓ The textural properties--- related to the deformation, disintegration and flow of the food under a force

- ✓ Objective measurment by functions of mass, time and distance

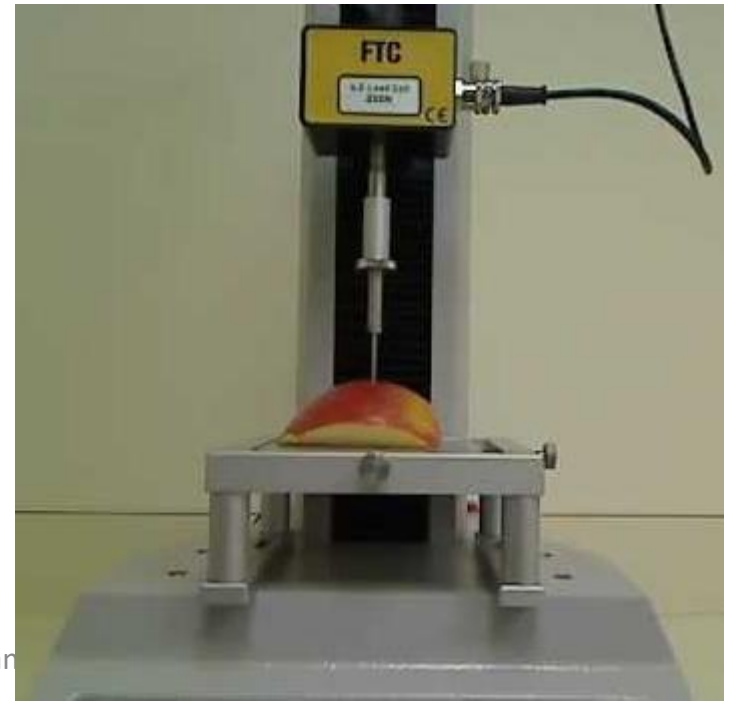
Compression test

✓Compression (deformation) test measures the distance that a food is compressed under a standard compression force or the force required to compress a food within a standard distance

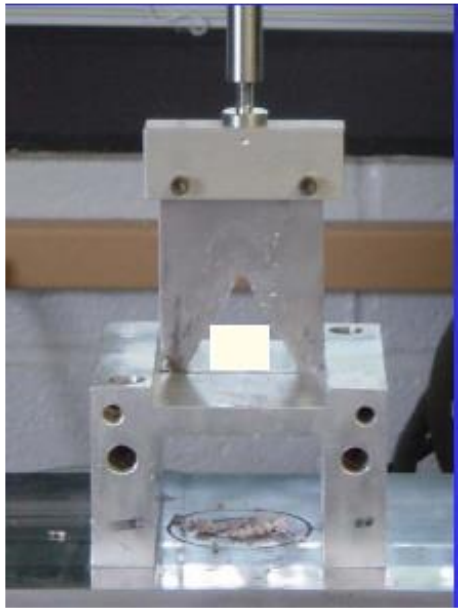
Penetrometers

- ✓ They were originally designed to measure the distance that a cone or a needle sinks into a food such as margarine under the force of gravity for a standard time
- ✓ Margarines, butter, fruits and vegetables



Shear test

- ✓ Force needed to shear a sample is measured over time and correlated to the firmness of the product
  - Tenderometer- pea
  - Warner-Bratzler Shear, Allo-Kramer Shear, Razor Blade Shear: Meat and meat products



Warner-Bratzler Shear

Allo-Kramer Shear

Razor Blade Shear

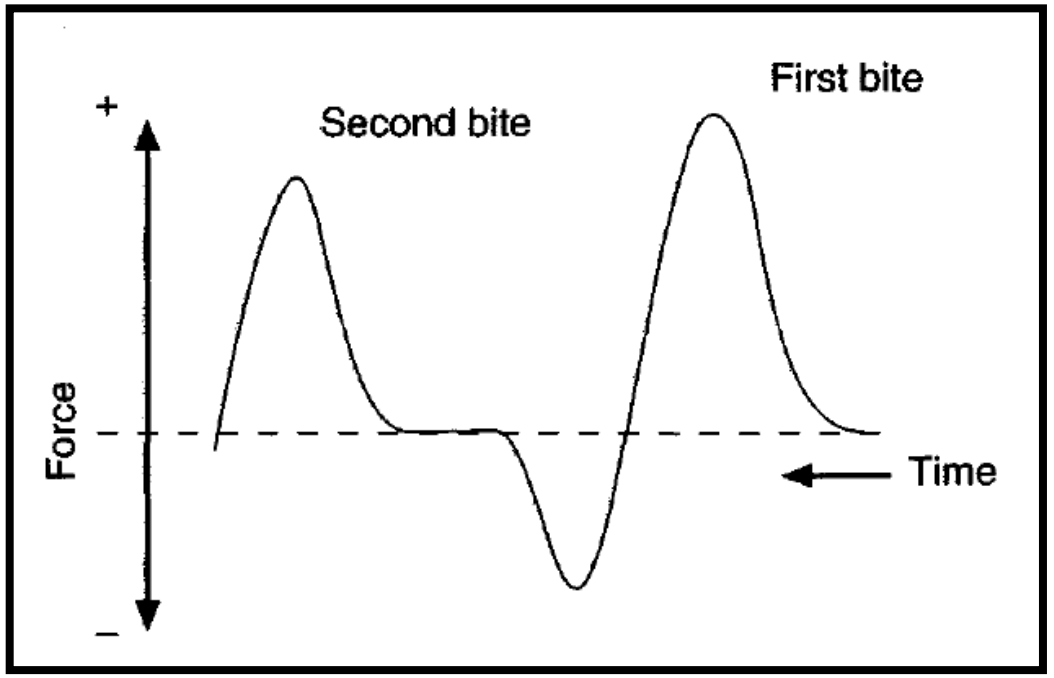
Texture Profile Analysis

✓Texture profile analysis (TPA): The instrument compresses a bite-sized piece of food (usually 1 cm cube) twice to simulate the chewing action of the teeth

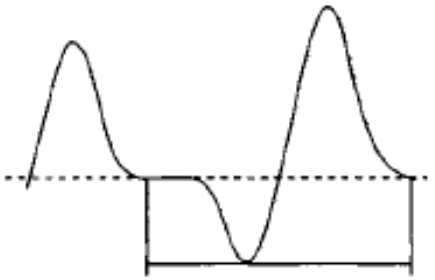
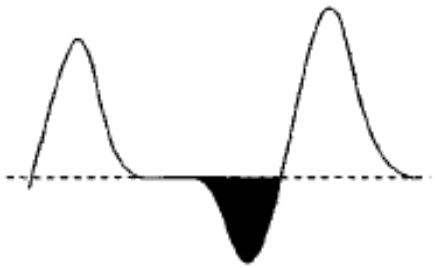
✓Compression is usually 80% of the original length of the sample

✓The instrument compresses the sample twice

✓Peak forces and areas under the curve are used to determine various properties of foods

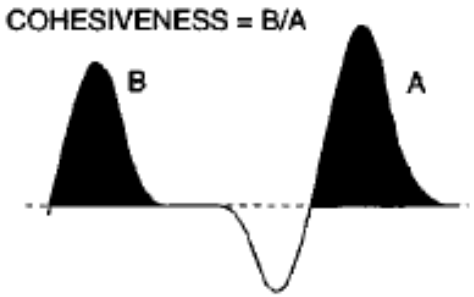
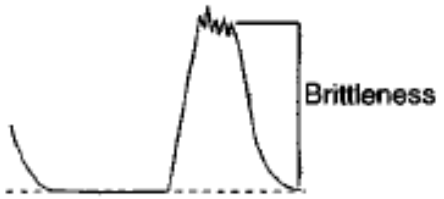


Parameters Measured by Texture Profile Analysis

Parameter	*Sensorial Definition*	*Instrumental Definition*
Hardness	Force required to compress a food between the molars.	
Elasticity	The extent to which a compressed food returns to its original size when the load is removed.	 Cycle = Second contact – First contact Elasticity = Cycle for inelastic material – Cycle for food
Adhesiveness	The work required to pull the food away from a surface.	

Rosenthal, A.J. 1999. Food Texture. Measurement and Perception. Aspen Publishers, Inc.

Parameters Measured by Texture Profile Analysis

Parameter	*Sensorial Definition*	*Instrumental Definition*
Cohesiveness	The strength of the internal bonds making up the food.	
Brittleness	The force at which the material fractures. Brittle foods are never adhesive.	
Chewiness	The energy required to chew a solid food until it is ready for swallowing.	= Hardness × Cohesiveness × Elasticity
Gumminess	The energy required to disintegrate a semisolid food so that it is ready for swallowing.	= Hardness × Cohesiveness

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