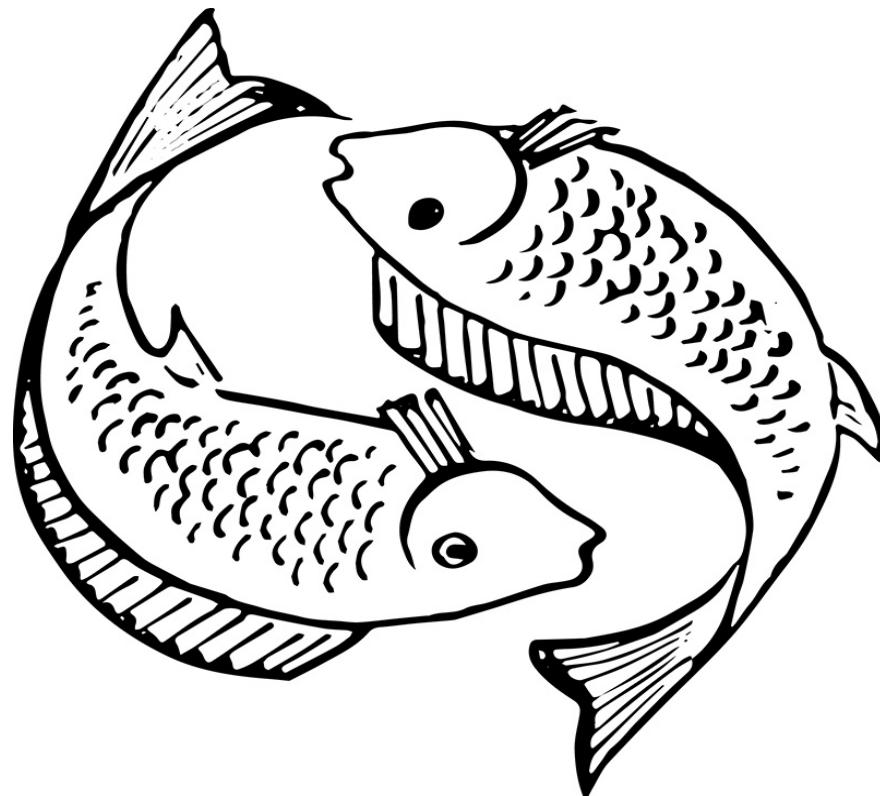


Sensory Analysis of Seafood Products: An FDA Perspective



Disclaimer

All opinions expressed throughout the presentation are those of the presenter and should not be interpreted as the official opinion or policy of the US FDA.



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WHY WE ANALYZE

Federal Food, Drug And Cosmetic Act
Sec. 402(a) (3)

Foods are deemed to be adulterated if they consist in whole or in part of any filthy, putrid or decomposed substance.

Decomposition

The process of breaking down into component parts.

In biological systems this involves two processes:

- Autolysis – breakdown of tissues by the body's own chemicals and enzymes.
- Putrefaction - breakdown of tissues by bacteria.

Why Do Sensory?

- Legally, decomposition of seafood products can be determined by sensory evaluation.
- Sensory analysis is fast and efficient with trained sensory analysts.

Sensory Evaluation

The scientific discipline used to evoke, measure, analyze and interpret those reactions to characteristics of foods and materials as perceived through the senses of sight, smell, taste and touch.

Sensory Analysis in Other Industries

- Perfume/ Fragrance
- Breweries/ Distilleries/ Wineries
- Soft Drinks and Other Beverages
- Snacks
- Ice Cream
- Chocolate
- Candy
- Other Food/ Beverage Products

Types of Sensory Evaluation

Subjective/Affective vs. Objective/Analytical

• Acceptance	Difference
• Preference	Descriptive
• Biases, Feelings	Qualitative and
• Likes, Dislikes	Quantitative
• Untrained Personnel	Product Experts

Types of Sensory Evaluation

In *subjective* assessment, a person's natural feelings of liking, pleasure, acceptance and of valuation are freely expressed, as in the following statements:

- I don't like the taste of this fish.
- I prefer product A to product B.
- This fish is delicious.
- I would buy this product.

Types of Sensory Evaluation

In *objective* sensory assessment, effects of personal influence are minimized by avoiding, as much as possible, bias and feelings of liking or disliking. An objective assessment should be a dispassionate and, as far as possible, accurate description of some particular aspect of quality.

Examples of Objective Terms

- This fish smells like seaweed.
- This fillet is opaque.
- This fillet is very soft.
- This fish has pink colored flesh.

Expert Sensory Analysts

- Product Specific
- Extensive Product And Process Knowledge
- Assess Against Remembered Standards
(Odor Memory)
- Experience, Experience, Experience!



Sensory Evaluation

As seafood ages, it undergoes sensory changes that can be accurately identified and described by trained sensory analysts.

Seafood Product Categories

FDA divides seafood products into six product categories:

1. Fresh/frozen invertebrates: shrimp, crab, lobster, etc.
2. Fresh/frozen raw finfish: grouper, snapper, flounder, etc.
3. Fresh/frozen raw scombotoxic fish: tuna, mahi mahi, escolar, etc.
4. Processed scombotoxic fish (other than canned tuna): CO treated tuna, CO treated mahi, canned anchovies, etc.
5. Processed Seafood (other than scombotoxic): cooked shrimp, breaded shrimp, pasteurized crabmeat, etc.
6. Canned and pouched tuna

Rejection Levels

Currently CFSAN's Division of Seafood Safety is supporting rejections based on 2 subsamples, each with 20% or more of the subsample decomposed:

- 2 of 12 subs decomposed
- 2 of 18 subs decomposed
- 2 of 24 subs decomposed

Pass/ Fail system is used for all sensory analyses.

Other Sensory Issues

Contamination:

- Petroleum
- Chlorine
- Ammonia

Conducting Sensory Analysis

Seafood Associated Sensory Properties:

- Appearance
- Texture
- Odor
- Taste
- Flavor

Appearance

All of the visible characteristics of a product.

Examples:

- Color of Gills
- Presence of Additives
- Processing

Appearance

High Quality - Fillets

- Translucent
- Moist, Glossy
- White Or Bright Color
- Color Is Uniform

Low Quality - Fillets

- Opaque
- Dry, Dull
- Yellow, Gray, Brown, Dark

Appearance

High Quality – Whole Fish

- Eyes With Black Pupil
- Eyes Protrude
- Gills Bright Red, Little Mucus
- Scales Adhere Tightly

Low Quality – Whole Fish

- Pupils Are Cloudy
- Eyes Sunken
- Gills Brown, Heavy Mucus
- Areas Of Skin Missing Scales or Scales Easily Removed

Texture

Texture refers to the properties held and sensations caused by the external surface of objects received through the sense of touch. This includes the feel of food on the tongue and against the teeth.

Texture

Examples of Texture Characteristics:

- Firmness
- Tooth Tack
- Grainy
- Mushy
- Moistness
- Dryness



Texture

High Quality

- Firm
- Moist

Low Quality

- Soft/ Mushy
- Dry



Odor

Sensation due to stimulation of the olfactory receptors in the nasal cavity by volatile material.



Odor

Smelling Techniques:

- “Bunny” Sniff
- Long Slow Inhalation
- Sharp Inhalation

Odor

Aids for odor measurement:

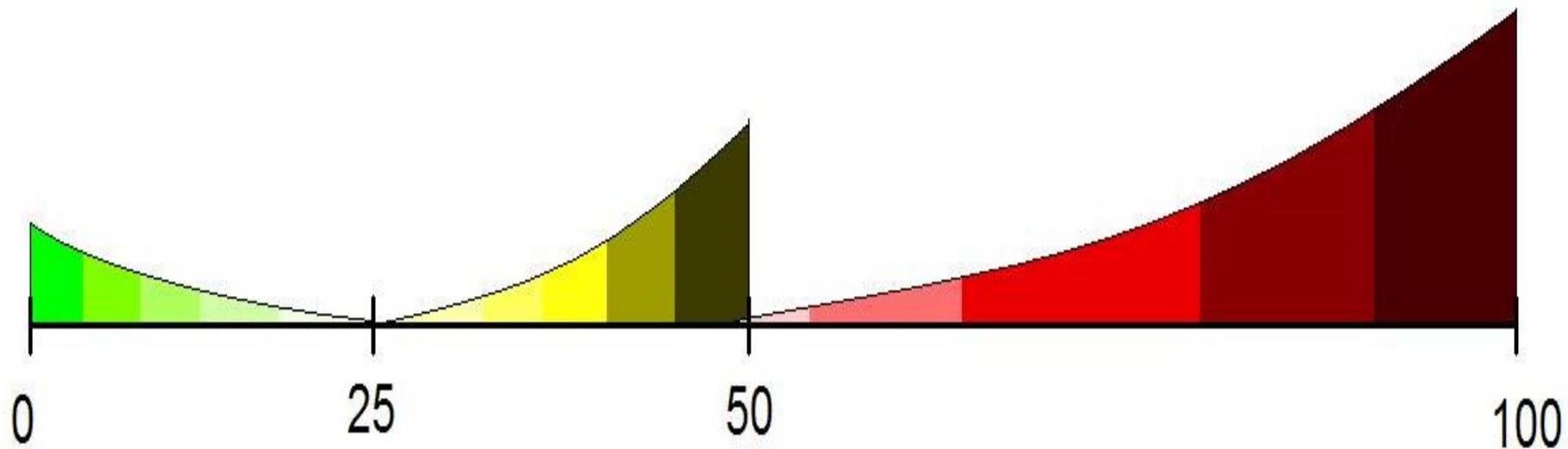
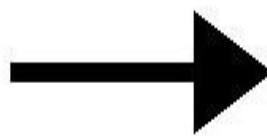
- Confine briefly to allow odor molecules to build up in the headspace
- Increase the surface area of the product: pulverize, slice, etc.
- Raise the temperature of the product

Sensory Analysis of Seafood

Terminology

- High Quality Odors: sweet, briny, grassy, melon, seaweed, corn, meaty
- Lower Quality Passable Odors: stale, oxidized, cardboard, musty, wet dog
- Decomposition Odors: sour, fermented, ammonia, yeasty, cheesy, rancid, putrid, sickly sweet, fecal, garbage

Progress of decomposition



High quality odors:
Briny
Metallic
Corn-like
Melon
etc.

Neutral

Low quality odors:
Stale
Oxidized
Fishy
Also:
"fleeting" odors

Early odors of
decomposition:
Sour
Cheesy
Rancid
Yeasty
etc.

Advanced decomposition:
Strong sour
Fecal
Sickly-sweet
Putrid
"garbage"

Taste

The direct detection of chemical composition through contact with chemoreceptor cells in the mouth.

- Chemical sense
- Taste buds are receptors
- Detect substances dissolved in water, oil or saliva

Basic Tastes

- Sweet
- Salty
- Sour
- Bitter

Accept: Sweet, Salty

Reject: Sour, Bitter

Flavor

Three Components:

- **Basic Tastes:** sweet, salty, sour, bitter
- **Aromatics/Odors:** odor perceptions caused by volatile substances released from the product in the mouth
- **Chemical Feeling Factors:** astringency, spice heat, cooling, bite, metallic, umami

Terminology

- Verbal descriptors can greatly increase sensory memory
- Allows precise communication:
 - of test results
 - within and between groups
 - of quality requirements

Training

Basic preconditions for potential sensory analysts:

- Ability to perceive and distinguish between basic odors and tastes.
- Ability to describe sensory findings in a consistent manner.

