Sections in This Document

1. Purpose

The purpose of this document is to outline the general training program for sensory personnel.

2. Scope

Sensory analysis is a critical tool used by FDA to protect consumers from seafood that has become adulterated due to decomposition. To stand up in court, the integrity of the sensory program depends on the credibility of the sensory analysts and the manner in which the analyses are conducted, reported, and interpreted for regulatory purposes.

3. Responsibility

Basic Considerations for Selecting Objective Sensory Analysts

Personality Factors: Personnel who perform sensory tests should be motivated for the job, responsible, dependable, conscientious, and use tact, per ISO 13300-1 Sensory analysis — General guidance for the staff of a sensory evaluation laboratory. Staff Responsibilities: The following is from ISO 13300-2 Sensory analysis — General guidance for the staff of a sensory evaluation laboratory

A. Sensory Analyst

"Sensory analysts should demonstrate that they have the ability to perceive basic odors and tastes and be able to describe their findings in a consistent manner. One area that is important in selection and training is the ability of the analyst to distinguish between the four basic tastes which are bitter, sour, salt, and sweet."

B. Panel Leaders and Trainers

"A panel leader needs basic knowledge in sensory evaluation principles to facilitate his/her job as panel leader...They should be confident, friendly, capable of maintaining authority and control of the group, and command respect. ... The panel leader should be able to inspire the assessors, keep them motivated, and tactfully solve problems within the panel. For the panel to be effective, the panel leader needs to be patient, fair, honest, and non-judgmental."

4. Background

It takes many years of experience, with daily involvement, to properly recognize spoilage odors and flavors in seafood products and, more importantly, to avoid rejecting products due to odors and flavors that may be present but are not caused by decomposition. Incorrect decisions by FDA can be extremely costly to the importer/owner of rejected product and failing to detect adulterated product is costly to consumers.

Newer sensory analysts work side-by-side with more experienced sensory analysts. Analysts participate in sensory analyses to gain exposure and experience in the six sensory product categories.

5. References

Section 402 (a)(3) of the Food, Drug, and Cosmetic Act states that a food is deemed to be adulterated if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food. It is this section of the Act that lends itself to the findings of the sensory analyst.

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6. Procedure

6.1. Taste Exercise

Purpose: To demonstrate basic taste sensations to candidates for later testing purposes.

Equipment Needed

- One gallon spring/filtered water.
- Four 500 mL graduated glass or Nalgene flasks with covers.
- Four 2-ounce plastic cups with lids for each participant.
- Cups for rinsing and spitting.
- Gram scale.
- Compounds [sucrose (sugar), citric acid, NaCl (salt), and caffeine].
- Ballots (see Attachment A: Sensory Scale).

Exercise Set Up

- Prepare the four basic taste solutions one or two days prior to screening.
- Add compound to flask, then fill to 400 mL with filtered water.
    1. Sweet: 20.0 g sucrose.
    2. Sour: 0.2 g citric acid.
    3. Salty: 1.4 g NaCl.
    4. Bitter: 0.2 g caffeine.
- Store bulk solution in cooler/refrigerator.
- Label the side of the cups with the number associated with solution, 1 each per participant: 1= sucrose, 2 = citric acid, 3 = NaCl, and 4 = caffeine.

- Let compound sit overnight (refrigerated) and shake to dissolve. Fill the 2 oz. cups half full and cover. The analyst should have enough solution to make up 15 to 20 cups.
- Make sure solutions are at room temperature when presented.

6.2. Screening Exercise

- Remove cups from cooler one to two hours prior to screening. It is important that the solutions be evaluated at room temperature.
- Present the four basic tastes.
- Pass out ballots and read instructions to participants.
- Have students go through the samples in order and ask them to pay attention to where they are sensing the solutions on their tongue and how long it takes to detect. Ask them to save some for re-tasting.

6.3. Analysis of Authentic Sample Packs

FDA seafood sensory analysts are evaluated for their ability to make correct regulatory decisions in the following six categories of seafood products:

- Category 1: Fresh/Frozen Raw Invertebrates
- Category 2: Fresh/Frozen Raw Finfish (other than scombrotoxin-forming fish species)
- Category 3: Fresh/Frozen Raw Scombrotoxin-Forming Fish Species
- Category 4: Processed Scombrotoxin-Forming Seafood Products Other Than Canned/Pouched (Retort) Tuna
- Category 5: Processed Seafood Products (other than scombrotoxin-forming fish species)
- Category 6: Canned/Pouched (Retort) Tuna

If possible, examples of all six product categories should be used to provide the trainee with a wide range of products to be able to assess their quality using the sessions provided below. The instructor should have significant experience in all six categories as a journeyman sensory analyst. Authentic sample packs should be prepared by the National Expert(s) and sent out to provide consistency in the standard to be applied within the product examples to be covered during the training sessions. This will allow for minimum variability within the sample packs.

6.3.1. Sensory Training Session

6.3.1.1. Purpose

Sensory training sessions are conducted in a structured manner which allows the trainees to gradually increase their product knowledge and skills.

6.3.1.2. Procedure

For each product category being tested, each trainee will examine a set of samples from various quality increments, noting their findings on a specialized ballot. Each sample's quality will be rated on a 100-mm line scale (see Attachment A: Sensory Scale), with a vertical line at 50 mm dividing the scale into two halves. For all samples examined, the trainee will indicate their rating by placing a vertical mark on the 100-mm line. Samples which are rated as passing for decomposition will be marked from the extreme left end of the scale to just before the 50 mm line, and samples which are rated as failing for decomposition will be marked from just after the 50 mm line to the extreme right end of the scale. As the position of the mark moves from the left to the right of the scale, the quality of the sample declines. The vertical line dividing the line scale in half demarcates pass from fail and is not used.

Along with the line scale, the ballot also gives a place for sensory descriptors to be documented for each sample. It is strongly recommended that trainees note sensory descriptors for every sample examined during training, as this is extremely helpful for building odor memory and knowledge of descriptors.

6.3.1.3. Structure of training

For each product in the training session, the trainees will participate in a series of set classroom exams which allow the trainees to build their knowledge base as they proceed through the different exams, and also allow the instructors to see where trainees need extra attention and instruction.

The exams are:

A. Snapshot (Optional)
B. Full Quality Range Demonstration
C. Blind Table Discussion
D. Feedback Calibration (Optional)
E. Practice Test
F. Final Test

A. Snapshot (Optional)

The snapshot is a blind exposure to a randomly organized set of samples from a product at all quality increments. No official scoring is made from this exam, but the instructors will note how the trainees perform to establish a benchmark for potential further improvement. A snapshot is not necessarily needed if most or all of the trainees are experienced analysts.

B. Full Quality Range Demonstration

In the full quality range demonstration, or demo, the trainees are presented a set of samples representing each quality increment of a product, arranged in order from highest quality to lowest quality. The trainees will start with the highest quality sample and examine each in order, noting the sensory characteristics and how they change as the quality declines.

After all trainees have concluded their work, the instructors will go through each sample, determining in aggregate how the class scored the samples and the common sensory characteristics noted for each, as well as the increment which first shows definitive decomposition. If desired, the lead instructor will write down the information for each sample on a sheet of paper which will be posted in the classroom for the trainees to use for assistance during future exams as needed.

C. Blind Table Discussion

The trainees, grouped at tables in the classroom with one instructor at each table, are presented with a set of randomly organized samples from a product at all quality increments. Each table will receive unique samples from the same increments, in the same order. Each tables' samples will be examined by all trainees and the instructor. Once everyone at a table has examined a sample, the instructor will poll the trainees to see who passed or failed the sample, and then give their own pass/fail rating, noting the descriptors they observed and any descriptors from the trainees that differ from theirs. If there is a conflict, the instructor will work to bring those trainee(s) in line with their evaluation of the sample.

After all tables have concluded their examinations, for each sample, the lead instructor will ask the other instructors to give their tables' collective assessment of the sample as well as their own.

The purpose of this exercise is to determine if the trainee can apply the product knowledge acquired from the full quality range demonstration to correctly determine accept/reject levels.

D. Feedback Calibration (Optional)

The feedback calibration, or “flip-flop”, is a means for trainees to quickly verify their odor memory. At least 4 samples of a product are placed roughly evenly around the classroom, with their pass/fail status written on an index card or post-It note which is face down beside the sample. For each sample, a trainee will make a quick pass/fail determination (no more than 3 seconds per sample), and then look at the answer to see if their determination was correct. For this type of learning, neurological evidence demonstrates that response strengthening occurs up to 2-3 seconds following feedback reward, but no later. Feedback timing is critical. Usually, no more than 2 trainees are allowed into the classroom at any given time; as one trainee leaves, another will be allowed in.

Feedback calibration may be done before a practice test, final test, or both as needed, but is optional depending on time concerns and the instructors’ decision to include it.

E. Practice Test

Like the snapshot, the practice test is a blind examination of a randomly organized set of samples from a product at all quality increments. The trainees’ scores will be counted toward their performance in the course. Once all trainees have handed in their ballots, the instructors will inform the class of which samples were passes and fails, and the trainees will be allowed to re-examine the samples as needed.

The purpose of this session is to collect data on the assessments made by the trainees using blind coded samples and to allow the trainees to practice what they have learned during the demonstration and blind discussion sessions.

F. Final Test

The final test is conducted in the same manner as the practice test, but trainees will not be allowed to re-examine samples at the conclusion of the test.

The purpose of this session is to assess the analyst’s retention of the sensory training for each product type examined. The analyst is to assess the blind coded samples without the presentation of the standard reference samples beforehand.

7. Glossary/Definitions

Sensory analysts should be familiar with definitions of some of the terms used in the sensory analysis of seafood, including the following:

7.1. Sensory Product Categories

NOTE: Examples listed in these categories are not exhaustive.

Category 1: Fresh /Frozen Raw Invertebrates.

Examples: Clam, conch, copepod, crab, crayfish, cuttlefish, jellyfish, krill, langostino, limpet, lobster, mussel, octopus, oyster, scallop, sea cucumber, sea squirt, sea urchin, shrimp, snail, squid, frog legs, etc.

Category 2: Fresh/Frozen Raw Finfish (other than scombrotoxin-forming fish species).

All non-processed fish species not listed as possessing histamine as a potential hazard in the current edition of the "Fish and Fishery Products Hazards and Controls Guidance."

Examples: bass, butterfish, cod, croaker, cusk, eel, flounder, grouper, haddock, monkfish, mullet, perch, pollock, porgy or scup, salmon, shark, snapper, sole, spot, tautog, tilefish, trout, whiting, wolfish, etc.

Category 3: Fresh/Frozen Raw Scombrotoxin-Forming Fish Species.

All non-processed fish species listed as possessing histamine as a potential hazard in the current edition of the "Fish and Fishery Products Hazards and Controls Guidance."

Examples: Amberjack or yellowtail, anchovy, bluefish, bonito, escolar or oilfish, gemfish, herring, jack (e.g., bluerunner, crevalle, rainbow runner, rooster fish), kahawai, mackerel (not Atka), mahi-mahi, marlin, pilchard or sardine, sailfish, sardine, saury, shad, spearfish, sprat or bristling, trevally, tuna, wahoo, etc.

Category 4: Processed Scombrotoxin-Forming Seafood Products Other Than Canned/Pouched (Retort) Tuna.

This category contains processed seafood products made from fish species found under 'Category 3'. For the purpose of this document, processed products include those products (other than canned/pouched tuna) that have been canned, cooked, and/or treated with additives including carbon monoxide, breading, sauces, marinade, salt, and smoke.

Category 5: Processed Seafood Products (other than scombrotoxin-forming fish species).

This category contains processed seafood products made from fish species found under either 'Category 1' or 'Category 2'. For the purpose of this document,

processed products include those products that have been canned, cooked, and/or treated with additives including carbon monoxide, breading, sauces, marinades, salt, and smoke.

Category 6: Canned/Pouched (Retort) Tuna.

This category contains tuna in cans, pouches, and retorted plastic containers (such as cups)

7.1. Sensory Odor Definitions

Note – the terms odor and aroma are used interchangeably. This list was originally compiled by NMFS National Sensory Branch, and it has been amended.

Bilgy Aromatic associated with anaerobic bacterial growth, which is illustrated by the rank odor of bilge water (usually a combination of salt water, fuel, and wastewater). Can be used to describe fish of any quality which has been contaminated by bilge water on a vessel.

Bitter One of the four basic tastes; primarily perceived at the back of the tongue; common to caffeine and quinine. There is generally a delay in perception (two-four seconds) and a lingering sensation in the mouth.

Briny The aroma associated with the smell of clean seaweed, a beach and/or ocean air.

Brothy Aromatic associated with boiled meat, usually accompanied by a umami sensation in the mouth.

Burnt Aromatic associated with heated, scorched, or blackened substances**.**

Cardboardy Aromatic associated with slightly oxidized fats or frozen fish that has taken on a “cold storage” off flavor; reminiscent of wet cardboard.

Carry-over A decrease in sensitivity to a given stimulus resulting from exposure to previous samples containing the same stimulus.

Chalky In reference to texture, a product which is composed of small particles which imparts a drying sensation in the mouth. In reference to appearance, a product which has a dry, opaque, chalk-like appearance.

Cheesy Sour aromatic associated with aged cheese and butyric acid. Sometimes found in advanced decomposition of fish.

Chemical A general term associated with many types of aromatic compounds such as solvents, cleaning compounds, and hydrocarbons.

Chickeny Aromatic associated with cooked chicken, especially white meat.

Cucumber The aroma associated with fresh cucumber; similar aromas can be associated with certain species of very fresh raw fish.

Decompose To break down into component parts.

Decomposed Fish that has an offensive or objectionable odor, flavor, color, texture, or substance associated with spoilage.

Distinct Capable of being readily perceived.

Feedy "Feedy" is used to describe the condition of fish that have been feeding heavily. After death, the gastric enzymes first attack the internal organs, then the belly wall, then the muscle tissue. If the enzymes have penetrated into the flesh, they are capable of causing sensory changes characterized by soft, foul smelling, discolored muscle tissue. This odor may be associated with dimethyl sulfoxide (DMS) and may be attributed to certain zooplankton as it passes through the food chain. The odor of "feedy" fish has been described as similar to certain sulfur-containing cooked vegetables, such as broccoli, cauliflower, turnip, or cabbage.

Fecal Aroma associated with feces. Sometimes found in very advanced decomposition of seafood.

Fermented Aromatic associated with fermentation; can take on a yeasty or fruity characteristic depending on the product and/or decomposition process.

Firm A substance that exhibits moderate resistance when force is applied in the mouth or by touch.

Fish Any of the cold-blooded aquatic vertebrate animals commonly known as such. This includes Pisces, Elasmobranchs and Cyclostomes. Aquatic mammals, invertebrate animals, and amphibians are not included.

Fishy Aroma associated with aged fish, as demonstrated by trimethylamine (TMA) or cod liver oil. Seafood exhibiting this characteristic is of poor quality but may or may not indicate decomposition, depending on other aromatics present.

Flavor Sensory perceptions when food is placed in the mouth resulting from the stimulation of basic tastes, aromatics, and feeling factors.

Fleeting	Odor that is not persistent.
Freshness	Concept relating to time, process, or characteristics of seafood as defined by a buyer, processor, user, or regulatory agency.
Fruity	Aroma associated with slightly fermented fruit. Term is used to describe odors resulting from high temperature decomposition in certain species of fish and is often described as cloying. For example, pineapple or propyl butyrate.
Gamey	The aroma and/or flavor associated with the heavy, gamey characteristics of some species such as mackerel. Similar to the relationship of fresh duck meat as compared to fresh chicken meat.
Glossy	A shiny appearance resulting from the tendency of a surface to reflect light.
Grainy	A product in which the assessor is able to perceive moderately hard, distinct particles. Sometimes found in canned seafood or products that have been in frozen storage.
Grassy	Green, slightly sweet aromatic associated with freshly cut grass or very fresh, high-quality finfish. This aromatic is most prevalent in fresh water fish.
Intensity	The perceived magnitude of a sensation.
Iridescent	An array of rainbow-like colors, similar to an opal or an oil sheen on water.
Masking	The phenomenon where one sensation obscures one or several other sensations.
Mealy	Describes a product that imparts a starch-like sensation in the mouth.
Mercaptan	Aromatic associated with sulfur compounds, reminiscent of skunk, brewing coffee, and rubber.
Metallic	Aroma and/or taste associated with ferrous (iron) sulfate, rust, or tin cans.
Moist	The perception of moisture being released from a product. The perception can be from water or oil.
Moldy	Aroma associated with moldy cheese or bread, or a wet moldy basement.
Motor oil	A heavy greasy aroma often oxidized and turpeny.
Mouth	The perception of a film in the mouth.

coating	
Mouth filling	The sensation of a fullness dispersing throughout the mouth. An umami sensation, as stimulated by mono sodium glutamate (MSG).
Mushy	Soft, thick, pulpy consistency. In seafood, little or no muscle structure discernible when force is applied by touch or by mouth.
Musty	The aromatic associated with a moldy, dank cellar or attic.
Nose feel/burn	Chemical “feeling” factor described as a warmth or burning or irritating sensation in the nasal passages when a product is sniffed.
Odor	Sensation due to stimulation of the olfactory receptors in the nasal cavity by volatile material. Same meaning as aroma.
Off odor	Atypical (usually unpleasant) characteristics often associated with deterioration or transformation of a flavor product. Off odors and flavors most often linger in the nose and/or mouth.
Opaque	Describes product which does not allow the passage of light. In raw muscle tissue of fishery products, this is usually due to the proteins losing their light-reflecting properties due to falling pH. Fish flesh becomes more opaque as it deteriorates.
Oxidized	Aromatic associated with aged oil. Leaves a lingering off flavor in the mouth or nasal cavity that is moderately lingering and coating.
Pasty	A product which sticks together like paste in the mouth when mixed with saliva. Forms a cohesive mass which may adhere to the soft tissue surfaces of the mouth or fingers.
Persistent	**Existing without significant change; not fleeting.**
Pungent	An irritating, sharp, or piercing sensation felt in the nose, mouth or throat.
Putrid	Aroma associated with decayed, rotting meat, especially beef and red-fleshed fish such as tuna. Aroma is lingering and often gives a heavy, cloying nose and throat feel.
Quality	A degree of excellence. A collection of characteristics of a product that confers its ability to satisfy stated or implied needs.
Rancid	Odor or flavor associated with rancid (decomposed) oil. Gives a mouth-coating sensation and/or a tingling perceived on the back of the tongue. Sometimes described as “sharp” or “painty”.

Reference	Either a sample designated as the one to which others are compared, or another type of material used to illustrate a characteristic or attribute.
Resinous	Medicinal, woody aromatic, usually with a nose-feel. Pine is an example.
Rotting	Aroma associated with decayed vegetables, in particular the sulfur containing vegetables, such as cooked broccoli, cabbage, or cauliflower.
Rubbery	A resilient material which may be deformed under pressure but returns to its original form once the pressure is released.
Salty	The taste on the tongue associated with salt or sodium.
Sensory	Relating to the use of the sense organs.
Sickly-sweet	Aroma associated with decayed, rotting meat, especially pork and fish with more light-colored flesh such as mahi-mahi. Aroma is lingering and often gives a heavy, cloying nose and throat feel.
Slimy	A fluid substance which is viscous, slick, elastic, gummy, or jelly-like, or the feeling of such a substance.
Solvent	A general term, used to describe many classes of solvents, such as acetone, isopropyl alcohol, turpentine, etc.. May be reminiscent of chemical solvents, plasticizers, and lighter fluid or paint aromas.
Solventy	Odor and/or nose “feel” or flavor associated with solvents such as acetone.
Sour	An odor and/or taste sensation, generally due to the presence of organic acids. Depending on the method of spoilage, fish may take on dairy or acetic sours as decomposition begins.
Stale	Odor associated with wet cardboard or frozen storage.
STP	Sodium tripolyphosphate. Can produce a soapy, alkaline feel and taste in the mouth.
Sulfury	Odor or flavor associated with sulfur-based materials such as matches, old garlic, onions, rotten eggs, broccoli, cabbage, mercaptans, or rubber.
Sweet	The taste on the tongue associated with sugar or sucrose.
Taste	One of the senses, the receptors for which are located in the mouth and activated by compounds in solution. Taste is limited to sweet, salty, sour, bitter and sometimes umami.

Terminology	Terms used to describe the sensory attributes of a product.
Throat burn /Feel	Degree to which an irritating and/or burning sensation is felt in the throat.
Translucent	Describes an object which allows some light to pass, but through which clear images cannot be distinguished (i.e. milk glass). Very fresh, raw fish flesh is very translucent.
Transparent	Describes a clear object, which allows light to pass and through which distinct images appear (i.e. clear glass).
Turpenes	Oily compounds found in citrus peel and resinous plants (pine). Imparts a sharp, lingering, chemical type sensation.
Umami	Taste produced by substances such as monosodium glutamate (MSG) in solution. A meaty, savory, or mouth filling sensation.
Vegetable	(old, fermented, or rotten) Odor associated with cooked or slightly spoiled sulfur-containing vegetables such as cooked broccoli, cabbage, or cauliflower.
Vegetable	(fresh) Green and/or planty odor or flavor associated with fresh cut non-sulfur containing vegetables.
Watermelon	Aroma characteristic of fresh cut watermelon rind. Similar odors are sometimes found in certain species of very fresh raw fish.
Yeasty	Aroma associated with yeast and fermented products such as rising bread or beer.

8. Records

A. See Attachment A: Sensory Scale

9. Supporting Documents

A. Department of Fisheries and Oceans, Canada, Inspection Branch. (1986 to 1995). Sensory methods in fish inspections (Notes from Sensory Training course given by the National Centre for Sensory

Science, Inspection Branch, Department of Fisheries and Oceans, Canada).

B. Reilly, T. I. and York, R. K. (1993). Sensory analysis application to harmonize expert assessors of fish products. In. Sylvia, G., Shriver, A. L., and Morrisey, M. T. (Eds.), Proceedings of Quality Control and Quality Assurance of Seafoods, May 16-18, 1993, Newport, Oregon.

C. Compliance Program Guidance Manual 7303.842, Domestic Fish and Fishery Products Inspection Program and Compliance Program Guidance Manual 7303.844, Import Seafood Products. Retrieved from FDA's Compliance Programs website.

D. Compliance Program Guide Sec. 540.370 Fish and Fishery Products – Decomposition and Sec. 540.525, Decomposition and Histamine Raw, Frozen Tuna and Mahi-Mahi; Canned Tuna; and Related Species. Retrieved from FDA's Compliance Policy Guides website.

E. ISO 13300-1:2006(E) Sensory analysis — General guidance for the staff of a sensory evaluation laboratory — Part 1: Staff responsibilities

F. ISO 13300-2:2006(E) Sensory analysis — General guidance for the staff of a sensory evaluation laboratory — Part 2: Recruitment and training of panel leaders.

G. ISO 8586 Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors

H. ISO 5492 Sensory Analysis – Vocabulary

I. U.S. Food and Drug Administration Fish and Fishery Products Hazards and Control Guidance

J. CODEX Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories CAC-GL 31-1999

K. Code of Practice for Fish and Fishery Products CODEX CAC/RCP 52-2003

L. ASTM Committee E-18 on Sensory Evaluation of Materials and Products, 1981. STP 758 – "Guidelines for the Selection and Training of Sensory Panel Members"

M. "Handbook of Seafood and Seafood Products Analysis", 2009, CRC Press, chapter 26, Sensory Descriptors, by G. Hyldig, pp. 481-497

N. "Sensory Characteristics of Selected Species of Freshwater Fish in Retail Distribution." E.Chambers, IV and A. Robel 1993. *Journal of Food Science*, vol. 58 pp. 508-512

10. Document History

Revision #	I	Date	Author Name and Title	Approving Official Name and Title
1.2	R	02/02/2010	LMEB	LMEB
1.3	R	02/06/2012	LMEB	LMEB
1.4	R	02/14/2013	LMEB	LMEB
02	R	05/27/2020	LMEB	LMEB
03	R	REFER TO QMIS	Sensory Harmonization Team and Program Manager, Heather Hawk	LMEB

* - D: Draft, I: Initial, R: Revision

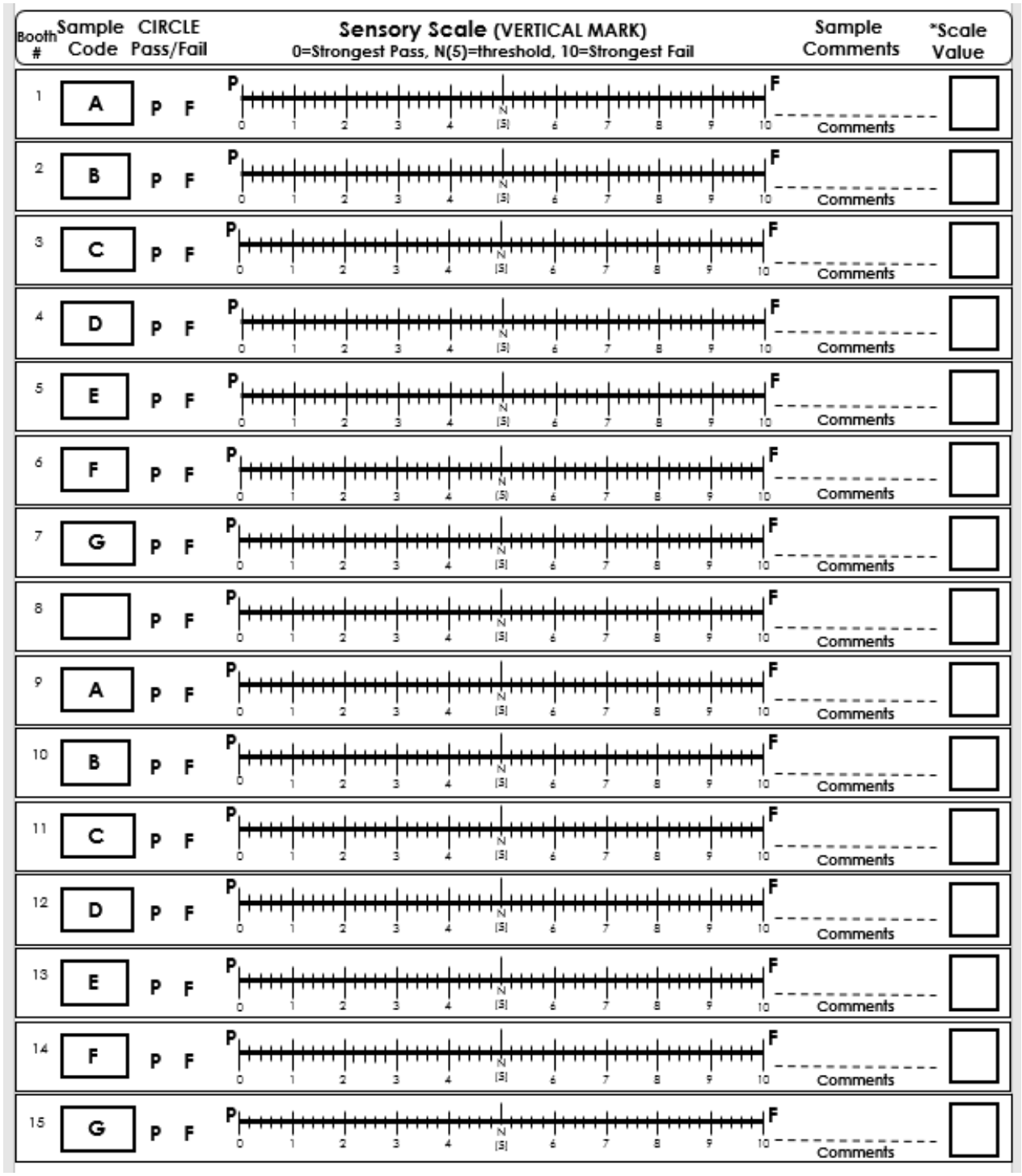
11. Change History

Revision #	Change
1.2	8.4 3. - “canned” changed to “processed 8.6 – Reference 4. and 5. Added 8.8 – section added **Footer – web link updated**
1.3	Appendix 8.6 – form header removed
1.4	Header – Division of Field Science changed to Office of Regulatory Science
02	Added information related to "otherwise unfit for food", updated information related to personality factors and associated references, updated the sensory product categories, and updated references section.
03	Entire section 6.3.1 Sensory Training Session revised, Section 7.1 Few Odor definitions updated, Section 9 Supporting Document updated, Sensory Scale updated/added to Attachment A with explanation of its use in Answer key on Attachment C, plus other minor revisions. All changes are highlighted within document.

12. Attachments

List of Attachments

Attachment A - Sensory Scale



Attachment B - Sensory Analysis Questions

1. What section of the FD&C Act talks about adulteration of seafood products by decomposition?

2. What are the four basic tastes?

3. What are the six seafood product categories?

4. Explain how the 100 mm line scale is used.

Attachment C - Answer Key

1. What section of the FD&C Act talks about adulteration of seafood products by decomposition?

   Answer: Section 402 (a)(3)

2. What are the four basic tastes?

   Answer: Sweet, Salty, Sour, and Bitter

3. What are the six seafood product categories that the sensory analyst is provided training to make classifications on the quality in seafood products?

   Answer:

   (1) Fresh/Frozen Raw Invertebrates

   (2) Fresh/Frozen Finfish other than Scombrotoxic Species

   (3) Fresh/Frozen Raw Scombrotoxic Species

   (4) Processed Scombrotoxic-forming Species other than canned/pouch tuna

   (5) Processed Seafood Products (other than scombrotoxin-forming species)

   (6) Canned/Pouched Tuna

4. Explain how the 100 mm line scale is used.

   Answer:
   Each sample's quality will be rated on a 100-mm line scale (see Attachment A: Sensory Scale), with a vertical line at 50 mm dividing the scale into two halves. For all samples examined, the trainee will indicate their rating by placing a vertical mark on the 100-mm line. Samples which are rated as passing for decomposition will be marked from the extreme left end of the scale to just before the 50 mm line, and samples which are rated as failing for decomposition will be marked from just after the 50 mm line to the extreme right end of the scale. As the position of the mark moves from the left to the right of the scale, the quality of the sample declines. The vertical line dividing the line scale in half demarcates pass from fail and is not used.