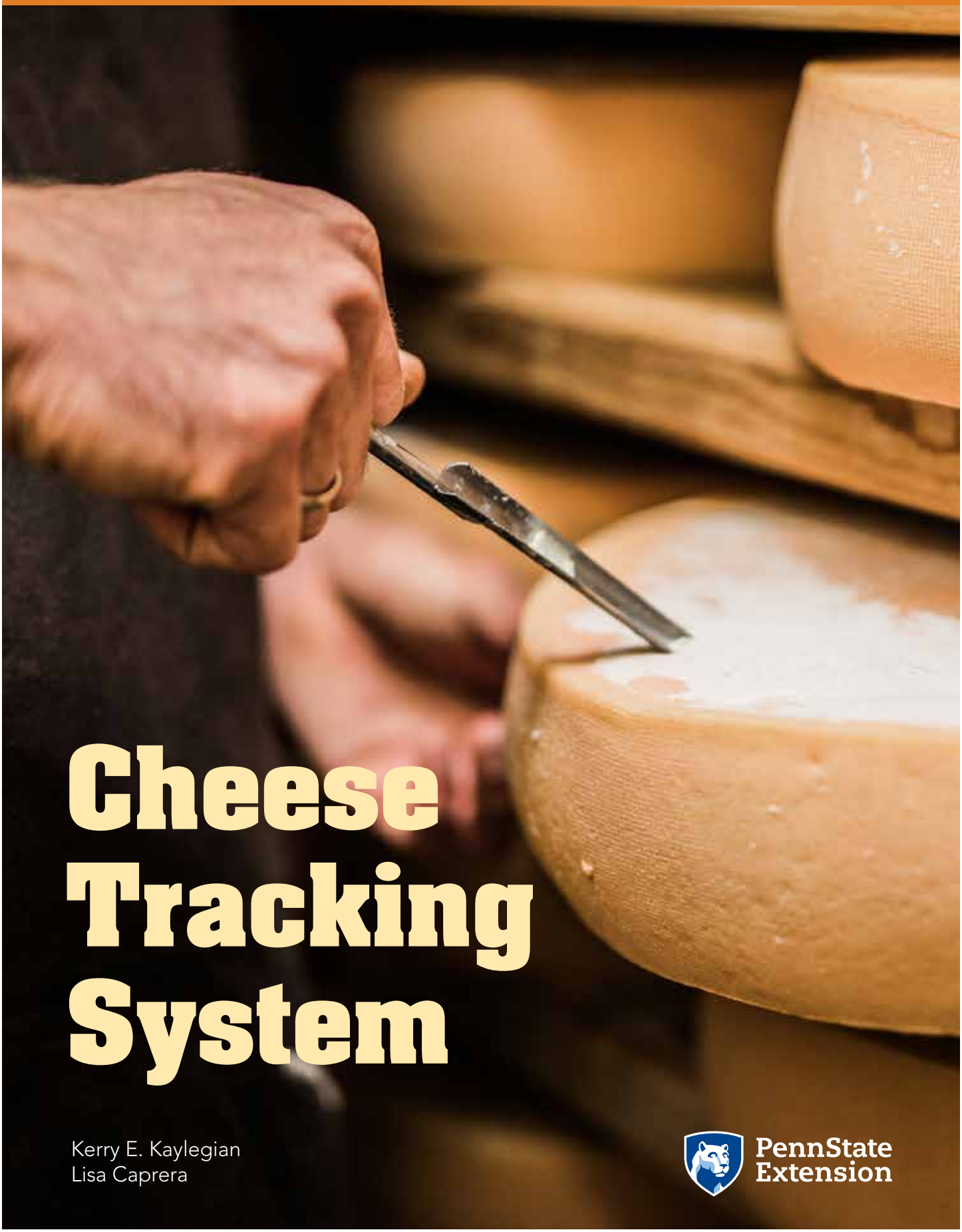
SENSORY EVALUATION GUIDE



Cheese Tracking System

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Introduction

Sensory evaluation is something that everyone does, all the time. Consumers make unconscious decisions at home, grocery stores, and restaurants about what they want to eat, if the food looks, smells, and tastes appealing and meets their expectations, and if they want to eat or purchase that food again. Food manufacturers consciously use sensory evaluation to:

- Develop new products
- Improve existing products
- Monitor production quality
- Assist in troubleshooting problems

A primary goal of manufacturers is to make consistently appealing products to generate repeat business.

Sensory evaluation can be a powerful tool in a cheese, or any food, business. Sensory evaluation can be done subjectively or objectively. Subjective evaluation brings along a person's likes, dislikes, and biases, which is useful when doing product development or improvement—because you want to make and sell what *you like*. Using sensory evaluation from an objective viewpoint is useful when you are monitoring quality and troubleshooting—because you are comparing to a *known benchmark*.

Large-scale food manufacturers take advantage of the powerful sensory evaluation tools that are available, including multiple test formats, the use of trained panels, panels using a large number of people, and statistical analysis. Information gathered from this approach can be anything from how much people like a product, to how different products are, to a detailed description of selected attributes.

Smaller-scale food manufacturers may be at a disadvantage from using such a formal approach due to the costs and ability to conduct large panels and evaluate statistical data. Fortunately, basic tools are available for use by any manufacturer to obtain valuable sensory information. Even having one or two people regularly evaluating products is beneficial and can help improve the product line and the business.

This guide is designed to help smaller-scale cheesemakers set up a sensory evaluation program that will meet their needs to understand their products and document the data in order to monitor product quality, develop and improve products, and assist in troubleshooting when problems occur.

Setting up a sensory evaluation program is not complicated. The minimum you need is a ballot to record your observations, samples of your cheese, a good space to do the evaluations, and a commitment to making the highest-quality cheese possible. Investing time up front to develop a robust ballot and standardized protocol for evaluating your cheese will provide consistency in being able to compare observations on a cheese during its aging process and from batch to batch.

A word of caution before you proceed—enthusiasm is good, but it can be overwhelming! Keep in mind as you develop your sensory evaluation program that it needs to be something you can manage regularly. You will get more information by evaluating four to six attributes consistently than you will by evaluating many attributes sporadically. Be flexible! You can always change the program as you go to meet your needs. ***Make it work for you!***

Describing Your Cheese

The most important aspect to a sensory evaluation program is understanding what you want your cheese to be. If your cheese was perfect, what would it look like? How would it smell and taste? What type of texture would it have? Think hard. Close your eyes and picture the cheese in your mind, thinking how it looks and tastes, and that wonderful flavor that lingers in your mouth after you swallow. Now, open your eyes and get to work!

The sensory evaluation system discussed here is from a defect-based perspective. This means you need to know the optimal cheese characteristics and define that *known benchmark* so you can monitor what is ***NOT*** right about the cheese. Always saying your cheese is "good" is nice, but what does mean when it is "not so good" and how do you fix it? Monitoring the key attributes that define your cheese and determining when they are not optimal allows you to troubleshoot where the problems are occurring and figure out how to bring the cheese back to that high-quality standard.

Choosing Attributes

Choosing attributes can be a daunting task because there are many ways to describe what you taste and what you see. To be most effective, attributes should be:

- Well-defined
- Clear in meaning to everyone involved in the program
- Have references when possible

Making sure the evaluation team understands what is meant by an attribute term is critically important to the success of your program. Some attributes are easy to define, while others have more nuanced meanings. For example, if you think your cheese has a "sulfur" characteristic, are you thinking of a burnt-match type of sulfur while the other tasters are thinking of rotten eggs? Understand that people have different points of reference based on their sensory experiences. For example, the term "green" may make some people think of freshly cut grass, while others may think of cooked asparagus.

The way to resolve these issues is to be as clear and concise as possible when you choose attributes, develop the ballots, and train your tasting team. Using known references is a good way to ensure everyone is describing the same thing. Having pictures of your cheese to highlight the good and bad attributes can be helpful. The Appendix contains a comprehensive list of attributes for describing cheese characteristics. This is not an exclusive list, and there are other books and online sources available to help you define attributes. Use the attributes that make the most sense to you and your team, and for your cheese.

Brainstorming a broad vocabulary, or lexicon, of attributes during the initial description of your cheese will provide options to refine your sensory ballot and determine which attributes are the most important for monitoring the quality of *your* cheese.

It is important to remember that each cheese has its own selection of attributes. You may have several cheeses in your product line that share similar attributes, but not all attributes are appropriate for all cheeses. You may find that different attributes are more important at different ages of the cheese, and decide to have multiple ballots or use different attributes on the same ballot as the cheese ages.

Visual Characteristics

Visual characteristics are usually the first things that are evaluated for a cheese. There are several aspects included in a visual assessment—some apply to the whole cheese before it is cut, some apply to the inside appearance and ripening characteristics, and some aspects apply to both the outside and inside appearance. See the Appendix for a listing of visual attributes.

Appearance and Makeup

Appearance attributes have to do with the overall appearance of the whole cheese, such as evenness of the shape or unwanted mold. For mold-ripened cheeses, attributes relating to the mold development may be addressed under the appearance and makeup section or in a separate section that focuses on rind development.

Makeup attributes usually have to do with issues that occur during packaging, such as wrinkled packaging or the presence of foreign material, like dirt or hair, on the cheese.

When evaluating a cheese for appearance and makeup characteristics, questions to ask might be:

- Is this the correct shape?
    - Is it lopsided?
    - If it is supposed to be a square block, are the edges rounded?
    - If it is a log, is it uniformly cylindrical?
    - Are there dings or depressions in the sides?
- Are there uneven spots on the piece that indicate the cheese might have not been turned regularly or dropped?
- Is the surface smooth and uniform?
- Is there unwanted mold on the surface?
- Are there unwanted crystals on the surface?
- Is there foreign material on the surface? Hair? Specks of dirt? Unknown particles?
- Is there free moisture on the surface of the cheese or in the creases of the packaging?
- Is the wrapping loose from loss of vacuum?
- Is the wax or paracoat smooth and even? Are there visible drips and the appearance of sloppy waxing practices?
- Are chunks of wax or paracoat missing from the cheese surface?

Color

The color attributes refer to the appearance of the whole, uncut cheese and to the inside of the cheese. The cheese color will depend on the milk and the presence of additives. Milk color may range from bright white for goat milk cheeses to a pale cream color for Holstein milk cheese to a deeper yellow for Jersey or Guernsey milk cheeses. Color imparted by additives can be wanted, such as the use of annatto for making a yellow Cheddar, or unwanted, such as when a flavoring condiment bleeds color from the fruit or vegetable piece into the cheese paste. Usually, a uniform color of the curds is desired throughout the cheese.

When evaluating cheese for color characteristics, questions to ask might be:

- Is the color typical of the cheese?
- Is the coloring uniform through the cheese?
- Can I see the individual curd particles in a pressed cheese?
- Are there unusual areas of a different color (acid bleached spots, pink defect from annatto, color bleed from condiments)?

Rind Development

The development of rind in cheese is highly dependent on the type of cheese. For example, the rind characteristics of a natural-rind Cheddar are very different from a washed-rind cheese or a bloomy mold-ripened cheese. Rinded cheeses should be evaluated first as the whole cheese, and then when the cheese is cut.

When observing the whole cheese, regardless of the type, the rind coverage should be uniform around the cheese. There should be no bare patches indicating lack of rind development or pieces of rind that have fallen off the cheese. Observations of soft spots and rind rot are done on the whole cheese. Within reasonable expectations, the color should be uniform—a natural-rind cheese will have patches of different-colored molds. A washed-rind cheese will have a moist rind, but should not be too tacky and stick to your fingers. A bloomy-rind cheese should adhere to the paste, and not slip or separate away from the paste mass.

An initial evaluations of rind thickness can be done on the whole cheese, but is best confirmed in a cut piece of cheese. By cutting the cheese in half or a wedge shape, the uniformity of rind thickness can easily be observed on the top, bottom, and sides of the cheese.

When evaluating a cheese for rind development, questions to ask might be:

- Is the cheese rind uniformly distributed?
- Is the rind too thick? Too thin?
- Is the rind of uniform thickness around the block of cheese?
- Are chunks of rind missing?
- Is the rind too dry and cracked?
- Is the rind too moist and tacky?
- Is the rind the correct color?
- Is the rind color unusual?
- Are there unwanted molds on the rind?
- Does the rind have soft spots?

- Is the rind rotted?
- Has the rind slipped off the paste?
- Has the rind begun to deteriorate?

Mold Development

Mold development in this section is referring to bloomy and blue-mold-ripened cheeses, where the mold is integral to the type of cheese. Mold development can be incorporated into the rind evaluation or addressed separately. The comments above for rind development are applicable to evaluating the mold development in bloomy and blue mold cheese.

In addition to the questions above, questions to ask when evaluating a *blue mold* cheese include:

- Is there mold on the surface of the cheese or just inside?
    - Some blue mold cheeses are made to have mold on the outside surface, others want the outside to be free from mold, except for the mold visible at the pierce points.
- Is the mold distribution uniform inside the cheese?
- Is the mold the correct color?
- Is the mold dead? (Is it gray?)

Questions to ask when evaluating a *bloomy rind* cheese include:

- Is the mold growth uniform on the cheese?
- Are there bare spots or spots where secondary growth is apparent?
- Is the mold uniformly white?
- Are there unwanted, colored molds visible?

Eye Development

Eye development refers to the holes, or eyes, that are developed during the manufacture of Swiss type, Dutch type, and other cheeses. The desired size and number of the eyes will depend on the cheese type or the manufacturer's preference. Well-formed eyes from gas production of the cheese cultures will be round and shiny inside and well distributed throughout the cheese paste. A cheese that is supposed to have eyes but does not is called "blind."

Eye development is evaluated on a cut piece of cheese. It is best to cut the cheese in half, rather than a wedge or a trier plug, in order to get a good observation of the size, number, and distribution of the eyes throughout the whole cheese.

When evaluating the eye development in a cheese, questions to ask might be:

- Are the eyes uniform in size?
- Are the eyes the correct size for the type of cheese?
- Are there enough eyes for the type of cheese? Too many?
- Are the eyes a uniform circle shape, or are they irregularly shaped?
- Are the eyes uniformly distributed in the cheese ?

Aroma and Flavor Characteristics

The desired aroma and flavor characteristics of a cheese are highly dependent on the type of cheeses, the desires of the cheesemaker, and the age of the cheese. Because of the many attributes available to describe aroma and flavor, this category of characteristics does not lend itself to outlining a few questions to guide you through the evaluation of the cheese for the purpose of choosing attributes. However, guidance with the act of assessing aroma and flavor and a general discussion of attributes can be helpful.

The tongue has different types of taste buds distributed on its surface that perceive the basic tastes of sweet, sour, salty, bitter, umami (a meaty, mushroomy, brothy taste), and fat. Most of what we think of as "flavor" is a combination of the basic tastes perceived on our tongue and the perception of volatile flavor chemicals in the nasal cavities. Aroma and taste are intimately linked in our perception of flavor. When we are sick, things don't "taste" right because there is mucus in the nasal cavity blocking access to these receptors. There is also a contribution of the feeling in the mouth, such as the burn of hot pepper or a prickling sensation, to our overall perception of flavor.

When assessing the aroma of a cheese, you want to get the first impression when the aroma is strongest. This means that if the cheese is wrapped, don't unwrap it prior to being ready to do the evaluation—it is not like wine that should breathe. This first impression is a good place to identify off-notes such as musty and ammonia aromas, which can dissipate quickly. Sniff the whole block immediately after unwrapping, then do the visual evaluation. When you are ready to cut into or take a plug of the cheese, be ready to sniff the cheese as the first thing you do after the cut is made or the plug is drawn.

When assessing the flavor of a cheese, realize that the flavor is perceived in stages:

- At the beginning. These are the first impressions you notice when you put the cheese in your mouth and begin to chew.
- In the middle. As you chew the cheese, different flavors may become noticeable while others from that first impression may fade.
- At the end. At the end of chewing, different flavors may become noticeable.
- The aftertaste. After you swallow or spit, pay attention to the flavors that linger in your mouth. Note if the flavor cleans up and leaves a pleasant flavor in your mouth, or if an off-flavor lingers and leaves an unpleasant flavor.

A good practice when tasting food for evaluation is to chew, swallow, or spit (depending on personal preference), and then breathe in through the mouth and out through the nose to move these volatile flavor compounds to the receptors. Take time to focus and think about the different flavors and aromas you are perceiving from the beginning to the aftertaste.

When it is time to choose the attributes for the flavor and aroma of your cheese, it may be helpful to familiarize yourself with the terms that are available for describing cheese flavor and aroma before you start tasting. Keep in mind that you are trying to identify the attributes of your optimal benchmark, the gold standard cheese, as well as for the suboptimal characteristics that you may observe for your cheese.

The Appendix contains a list of aroma and flavor attributes for your use. These terms were compiled from judging scorecards used in cheese contests and the scientific literature. Many other resources for cheese attributes are available in dairy books and online. There is no right or wrong way to describe the attributes of your cheese; use what works for your team and your cheese. Just be sure that your evaluation team clearly understands what is meant by the attribute terms.

Aroma and flavor attributes are often placed into broad categories to make them easier to describe and discuss, such as dairy notes, floral, vegetal, and brown. There is no standardized list of categories, and these broader categories will vary based on the group or author. Different people may assign the same attribute into difference categories based on their personal preferences. The attributes in the Appendix are listed alphabetically for ease of general use, and some have a descriptive category. This flavor wheel shows how some of the attributes in the Appendix may be divided into broad categories:

- Fundamental Taste
- Dairy
- Brown
- Earthy
- Chemical
- Fermented
- Animal
- Green
- Mouthfeel

Body and Texture Characteristics

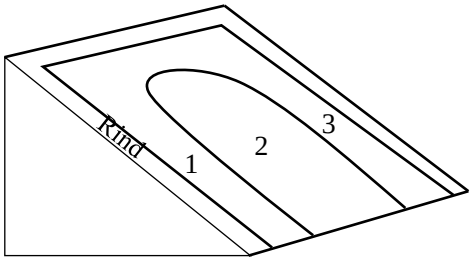
The body and texture assessment refers to the paste of the cheese, and is evaluated visually, with the fingers, and in the mouth. Some attributes are measured by the feeling in the hand combined with the feeling in the mouth. The techniques used to evaluate the body and texture attributes depend on the specific cheese. A list of body and texture attributes is provided in the Appendix.

Visual Attributes

The visual evaluation of body and texture characteristics include the cohesiveness of the paste, evidence of unwanted microorganisms (gas), and evenness of ripening in surface-ripened cheeses.

The assessment of the paste is done by looking at the appearance of openings in the curd and asking questions such as:

- Should the paste be completely void of openings?
- Are the openings irregularly shaped (mechanical) from poor knitting of the curd?
- Are the openings small pinholes or slits, which indicates the presence of unwanted gas-producing microorganisms?



To assess the evenness of ripening, the cheese should be cut in half or in a wedge. This diagram helps to define the outer rind area and zones related to the firm paste (2) and softer paste (1 and 3) that have undergone proteolysis during ripening. If zones 1 and 3 are different widths, then the cheese is not ripening uniformly, which may be due to infrequent turning of the cheese. One way to track the ripening of cheese is to measure, with a ruler, the thickness of zones 1 and 3. This may help you assess the ripeness of cheeses at the same age from batch to batch, or give you an indication of the optimal age of a surface-ripened cheese.

Texture Attributes in the Hand

The texture attributes “short” and “weak” are typically evaluated for semi-soft or semi-hard cheeses. This is often done using a cheese plug obtained with a trier, which provides a long piece of cheese, or using a stick of cut cheese (approx. ½ inch by ½inch by 4 inches). Hold the plug or stick between the thumb and forefinger of each hand and bend the cheese into an arch, like you are making a rainbow from a straight line. If the cheese breaks quickly, then it is considered “short”; and if it makes a full rainbow, then it may be considered “weak.” This type of assessment is common for the texture evaluation of Cheddar and Monterey Jack type cheeses.

Some textural attributes, such as “curdy” and “pasty,” may be assessed by kneading a small piece of cheese between the thumb and fingers to evaluate the breakdown of the cheese body. The cheese should be compressed five or six times to evaluate texture. Too much kneading can cause your fingers to warm the cheese, making it softer than it really is and giving an inaccurate assessment of texture.

When evaluating texture in the hand, questions to ask might be:

- Does the cheese resist breakdown and feel like a wine cork?
- Does the cheese break down very quickly?
- How much force is required to squish the cheese?
- Does the cheese break into pieces along curd lines?
- Is the cheese sticky or pasty?
- Does the cheese crumbly into small, mealy pieces?

Texture Attributes in the Mouth

All cheeses are assessed for texture in the mouth, referred to as "mouthfeel." As you chew the cheese, pay attention to how the cheese breaks down. Many of the attributes used to describe cheese texture in the hand are used to describe cheese texture in the mouth.

When evaluating texture in the mouth, questions to ask might be:

- Is the cheese sticky, pasty, or slimy?
- Does the cheese clear out of my mouth easily?
- Does the cheese break smoothly into pieces that are easy to chew?
- Does the cheese crumbly into small, hard pieces that feel like cornmeal?

The Texture of Spreadable Cheeses

Cheeses that are spreadable should be evaluated using a smooth spatula or knife to spread the cheese on a piece of paper towel, plate, or a sturdy cracker. A spreadable cheese should spread easily and not require too much force or stick excessively to the knife. A visual assessment of the smoothness, graininess, and chunkiness can be made once the cheese is spread across the paper towel or cracker surface.

Creating a Sensory Ballot

The sensory ballot is the paper used to record the observations when evaluating cheese. The specific format of a ballot is flexible and should be tailored to your needs. Different situations use different ballots. For example, if you have sent your cheese to a contest, the ballots returned to you may have a score for a general category, such as flavor, and then different attributes may only be checked to indicate which were detected by the judge. However, when you are tracking the attributes of your cheese for monitoring quality and improvement, it is important to use well-defined attributes with measurable scales that allow you to make comparisons over time.

Developing a Customized Ballot

The ballots you use should be customized to your cheeses and situations. You may find that you use different attributes to describe your cheese while monitoring the aging process than for the final assessment at the time of sale. You may choose to have one ballot with all the attributes and only use some at a given tasting session, or you may have different ballots. Use what works best for you. There is no right or wrong number of attributes or ballots that can be used. *Be careful to keep your system manageable.*

The ballot can be relatively easy to design; it does not have to be fancy. At the very least it should contain the cheese information, name of the attribute, and the attribute scoring scale. A complete ballot should have these elements:

- Header information
    - Cheese name
    - Cheese lot # and/or other identification
    - Cheese age
    - Name of person doing the evaluation
    - Date of the evaluation
- Visual evaluation section, which may be separated into:
    - Appearance and makeup
    - Color
    - Rind development
    - Mold development
    - Eye development
- Flavor and aroma section
- Body and texture section
- Overall quality section (optional)
- Comments area

The Penn State Extension Cheese Tracking System contains a ballot template that can be customized (5-2-SensoryBallotPSU.docx). This document has all the basic elements that should be on a sensory ballot as identified above. In each section there are several spaces for attributes with the Just About Right scale as a placeholder. The different scales are described in the following section. Directions for modifying this template are provided in the Penn State Extension Cheese Tracking System Instructions document.

Choosing Attributes

The attributes used on a sensory ballot will depend on the characteristics of the specific cheese. When you brainstormed attributes while describing your cheese (above), you likely generated a sizable list of attributes to describe the different aspects of your cheese. These attributes should be narrowed to down to several key attributes that can evaluated regularly. It is easy to want to measure many attributes because they all seem important. However, it is much more difficult to find the time to evaluate all of these attributes on a regular basis. *You will get more information by evaluating four to six key attributes consistently than you will by evaluating many attributes sporadically.*

Choosing which attributes to use on the ballot may take some trial and error. Sometimes an attribute may seem to be an important descriptor of your cheese, but after time it turns out that it is not a good indicator of cheese quality or does not provide sufficient information to help troubleshoot when something goes wrong. The more you understand about the microbiology and chemistry of your cheesemaking process, the more you can link the sensory evaluation results back to raw material and process variation to help you produce a consistent, high-quality product and troubleshoot problems. There are no rules for choosing which attributes you should monitor

regularly. *You can always change the program as you go to meet your needs. Be flexible and make it work for you!*

Choosing Attribute Scales

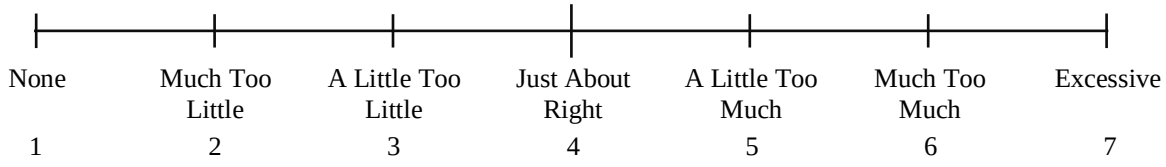
An essential part of using a sensory evaluation program is to be able to know when there is a problem with your cheese. The easiest way to accomplish this is to make your sensory program "measurable," meaning that you assign a number to each attribute so that it can be tracked and graphed to determine trends and unusual occurrences.

There are different measurable scales that can be used on a sensory ballot. Some scales have tick marks with numbers already assigned, and others use blank lines that need to be measured with a ruler to determine the number score. The use of an unmarked line may allow the evaluator to feel less bias and more free to use the entire scale, whereas others find the markings to be more helpful.

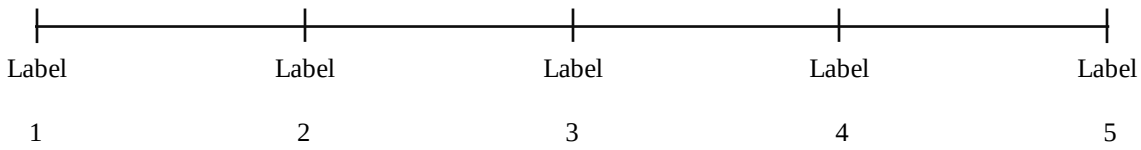
The Penn State Extension Cheese Tracking System contains examples of sensory scales in different formats to provide options for the cheesemaker to use something they are most comfortable with. These scales are summarized in one document (5-3-SensoryAttributeScalePSU.docx) and can be copied and pasted into the ballot template. The scales are:

- Just about right
- Five-Point
- Attribute Half-scale
- Intensity
- Overall Quality
- Absent/Present Check Box
- Category Scale
- Difference from Control
- Overall Difference Rating
- Defect

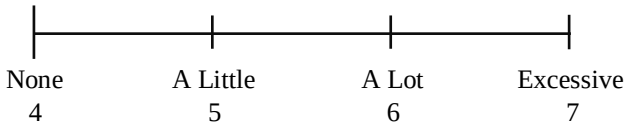
The Just About Right scale is a seven-point scale that ranges from None (1) to Excessive (7), with Just About Right (4) falling in the middle.



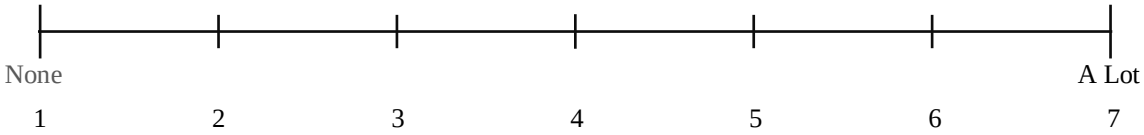
The Five-Point scale is a generic open scale that allows the cheesemaker to use any label they wish, going from 1 to 5. This could also be expanded to a seven- or nine-point scale.



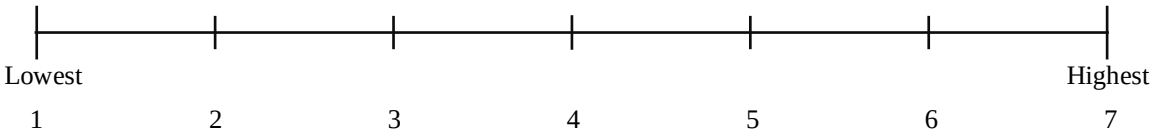
The Attribute Half-Scale is a modified Just About Right Scale that goes from None (4) to Excessive (7). It can be used when evaluating an attribute you don't want to see in your product and your ideal level is "None," such as rancidity in a Cheddar.



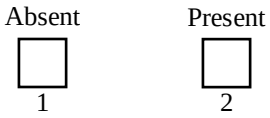
The Intensity Scale goes from None (1) to A Lot (7), and could be expanded to a nine-point scale. This is sometimes used instead of a Just About Right scale to gauge the intensity of an attribute.



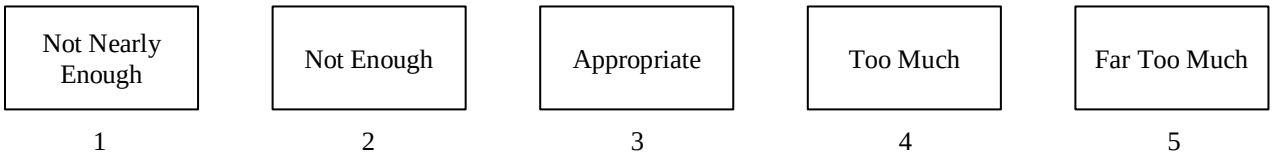
The Overall Quality scale is a way to monitor the overall quality of a characteristics, such as appearance or even the total impression of the cheese. The scale goes from Lowest (1) to Highest (7).



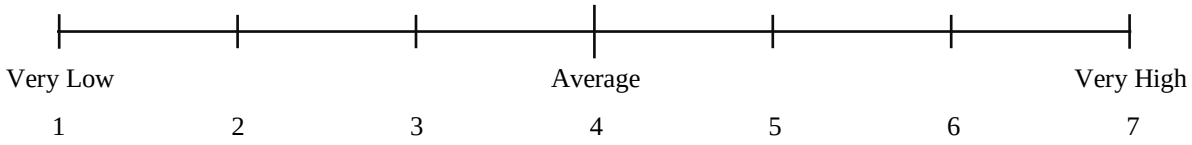
The Absent/Present Check Box is a quick way to indicate whether an attribute is absent or present, without giving it an intensity score.



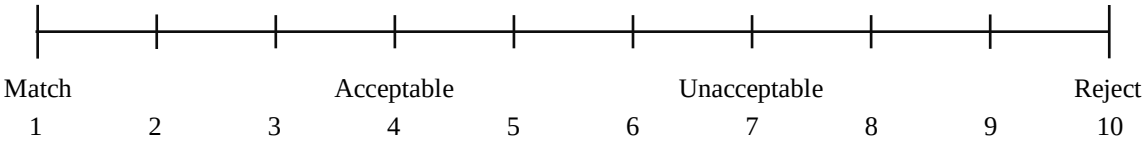
The Category Scale is a five-point scale that uses boxes instead of a line. This scale goes from Not Nearly Enough (1) to Far Too Much (5).



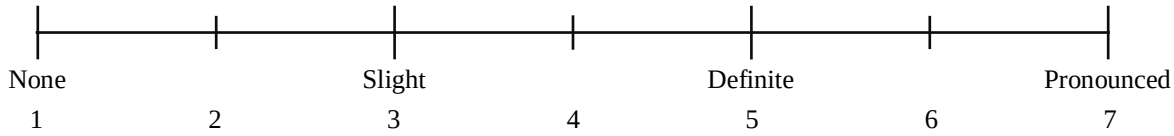
The Difference from Control scale is a seven-point scale that is used when directly comparing a cheese with a target, or control, cheese. The scale goes from Very Low (1) to Very High (7).



The Overall Difference Rating is a 10-point scale that can be used when comparing a cheese with a different target, or control, cheese. This scale ranges from Match (1) to Reject (10). This scale includes marks for Acceptable (4) and Unacceptable (7) scores that may help the cheesemaker make decisions about product quality.



The Defect scale is a seven-point scale used to evaluate the intensity of an attribute from None (1) to Pronounced (7).



Cheesemakers should feel free to modify these scales to meet their needs.

Good Sensory Practices

As with all aspects of cheesemaking, a little attention to detail can go a long way in making a high-quality product. Being properly prepared and adhering to good practices will help you get good data from your cheese evaluations.

The Sensory Evaluation Space

Sensory evaluation can be done almost anywhere you can find some table space, but a few considerations will reduce interference and enable you to focus on the job at hand. Ideally, the space should be:

- Spacious enough
  - ✓ For all people to sit or stand comfortably for the entire session
  - ✓ To have the cheese and sampling tools easily accessible
  - ✓ To comfortably record observations on the ballots
- Well lit
  - ✓ To see all aspects of the cheese (rind texture, paste color, etc.)

- Odor free
  - ✓ To avoid interference with your ability to smell and taste only the cheese being evaluated
- Quiet and free from distractions
  - ✓ To allow the evaluators to focus on the session

Performing the evaluations in the same place under the same conditions will help you to be as consistent as possible from session to session. Using the cheese room do evaluations is fine, as long as you aren't making cheese that day—because making cheese brings distractions and odors that disrupt the focus of the sensory session.

Cheese Sample Preparation

The amount and type of sample used to evaluate your cheese will depend on the purpose of the evaluation session:

- If you are doing the initial brainstorming session to describe your cheese and choose attributes, then you want to use several whole pieces that include cheese that is your gold standard, cheeses that represent different points in aging, and ones that include defects that are typical for your cheeses.
- If you are doing an evaluation during the aging process, you may want to get the whole piece out for a visual evaluation, and then cut a small slice or take a few plugs for the aroma, flavor, body, and texture evaluations.
- If you are doing an evaluation at the time of sale, you will want to assess the cheese as a whole and as cut pieces for a full evaluation.

Cheese samples for evaluation may be a whole wheel, block or piece, a slice, a wedge, or a plug pulled with a cheese trier. The format of a cheese may influence the way the sample is taken. For example, a small bloomy-rind cheese may be used in entirety and cut with a knife, whereas it may be more practical to take a slice from a large block, a wedge from a wheel of cheese, or use a trier. Blocks and wheels of blue-mold cheeses and cheeses with eyes may be cut in half to observe the mold and eye distribution throughout the whole cheese.

Cheeses are usually evaluated when they have warmed up to 50–60°F to allow for better release of the volatile flavor and aroma compounds. Typically, this involves taking the cheese out of the refrigerator for 30–60 minutes or longer prior to evaluation, depending on the size of the cheese. It may take some trial and error to determine how long cheese should be tempered for the best evaluation. Try to be consistent with your tempering times, adjusting as needed for the current temperature of the evaluation room.

Good practices when sampling cheese for sensory evaluation:

- Use clean hands when handling cheese!
- Use clean boards and tools for cutting samples.
  - If you are making multiple cuts or plugs, clean or thoroughly wipe down the knife or trier between each use to get a clean cut or plug for each sample.

- Keep track of any cheese lot or piece identification. Moving cheeses around the table when doing evaluations can quickly separate a piece of cheese from its wrapping or ID tag. This is particularly important if you need to put the cheese back into a specific location in the aging room after evaluation.
- Make notes of how a particular cheese should be sampled and tempered so that you can be consistent with the handling of the cheese from session to session. These can be incorporated into the written evaluation procedures.

It is obvious that taking a sample of a cheese may compromise its integrity and interfere with your ability to sell that piece. Make sure to properly repackage cheese that may be vacuum packaged, or to seal any plug holes to prevent unwanted mold from growing on or in the remaining cheese. Some cheesemakers will use one block or wheel for sampling throughout the aging process to maximize the number of whole blocks and wheels that go to market. If the cheese is a large block or wheel, the area used for evaluation can be cut out of the block when the cheese is cut for market. You will need to find a balance of how to best sample your cheese for ongoing evaluation without compromising your inventory and affecting cheese sales.

Preparing for the Sensory Session

A little planning goes a long way to making each sensory session successful.

- Set aside sufficient, uninterrupted time to do the evaluations.
    - Rushing is never good!
    - Plan enough time to get set up, evaluate all cheese samples, and clean up.
- Plan time to review and analyze the ballot data.
    - Review ballots within a meaningful period of time for what you need.
    - Plan time to enter the ballot data into a tracking system for long-term review of the data to identify trends and anomalies.
- Prepare in advance of the tasting session:
    - Determine the cheeses you will be tasting.
    - Allow the cheeses to warm up (temper) to evaluation temperature.
    - Clean and organize your evaluation space.
    - Assemble samples and supplies before starting the evaluations.
        - ✓ The cheeses
        - ✓ Ballots or means of recording observations and scores
        - ✓ Sampling tools (cutting board, knives, wires, triers)
        - ✓ Paper towels and water for cleaning cheese tools
        - ✓ Napkins or paper towels for cleaning fingers
        - ✓ Paper plates, if desired
        - ✓ Drinking water (unflavored still or carbonated) and cups
        - ✓ Palette cleansers (apples, grapes, bread, unsalted crackers)
        - ✓ Opaque cups or a clean trash can to spit into, if you choose to do so

The Evaluation Process

The evaluation process is essentially the same for all cheeses—look, smell, feel, and taste. However, each cheese will have its own nuances in the evaluation process. It is helpful to have a written step-by-step procedure on how to evaluate your cheeses so it can serve as a training document and each person on the team is consistent with the process.

You will need to decide how you want to conduct your sessions—as individuals or in a group. Formal sensory evaluation techniques involve putting people in separate booths and conducting the evaluations individually and quietly. For informal programs, it can be beneficial for each person do to their own evaluation so they are not biased by others. However, there is benefit from a group discussion of the samples because people have different perspectives that may be useful to the evaluations. Use whichever process or combination works best for your group. *Be willing to change the process if it does not work as you would like it to, or if one person regularly dominates the discussion.*

You will need to determine the number of samples you want to taste in your sessions. Sessions can be done on only one or two cheeses. Typically, up to six or eight samples are reasonable before evaluators experience palate fatigue. Techniques to prevent fatigue include:

- Time—wait a few minutes between samples for your palate to clear.
- Spitting after each sample rather than swallowing. If you choose to spit:
    - Have a clean trash can or an opaque cup or container to spit into. Bad aromas from the trash can interfere with your ability to taste objectively. A clear spit container is not pleasant to look at for you or your fellow tasters.
    - Make sure that your spit cup and water cup are very different in appearance. Accidentally mixing them up can be very unpleasant.
- Rinse your mouth with water between samples.
- Use palate cleansers.
    - Neutral foods such as plain, unsalted crackers (table water crackers, unsalted-top saltines), apples, and grapes are common. Some people find that pineapple, cucumbers, and bell peppers are good cleansers, while other people find these foods too strong and interfere with their ability to taste objectively.

If you get a particularly bad cheese with a flavor that won't clear out of your mouth, use water, palate cleansers, and time to help clear the flavor. Another option is to go back to a good piece of cheese and use that to "rinse" the bad flavor out of your mouth.

This is a typical evaluation process, which can be customized for your written procedure:

1. Prepare the evaluation space and gather the necessary tools and supplies for sampling and tasting the cheese (see above sections).
2. Print enough ballots so that each person has a ballot for each cheese, or have a means of recording the scores for each attribute.
3. Collect and temper the cheese samples.
4. Unwrap the cheese and immediately assess the aroma of the cheese. Record your scores on the ballot.
5. Inspect the cheese visually for appearance and makeup, color, rind development, and mold development attributes. Record your scores on the ballot.

6. Cut a small sample of the cheese as desired (in half, slice, wedge, or plug with a trier).
7. Immediately assess the aroma of the cut piece. Record or adjust your scores on the ballot as appropriate.
8. Visually assess the inside of the cheese for appearance and makeup, color, rind development, mold development, and eye development attributes. Record or adjust your scores on the ballot as appropriate.
9. If you are evaluating a semi-soft or semi-hard cheese, test the cheese for short and weak attributes by bending the plug or stick.
10. Take a small piece of cheese in your fingers and knead it five or six times to evaluate body and texture attributes. Record your scores on the ballot.
11. Taste the cheese. Note how the flavors appear and change through the different stages of chewing (beginning, middle, and end). Swallow or spit the cheese and note the aftertaste and how the cheese flavor clears from your mouth. Record your scores on the ballot.

The choice of how many times to taste the cheese is personal preference. People will often take several tastes before they finalize their observations and determine the scores.

Eating the rind of the cheese may be personal preference or necessary for the evaluation of your cheese. If the rind is an integral part of the cheese, such as on a bloomy- or washed-rind cheese, the evaluation of the rind should be specified in the procedures and on the ballot. If a cheese has a distinctive rind or different textures between the rind area and the paste center, such as for surface-ripened cheeses, it is good practice to taste the center of the paste and the paste near the rind, as they are often very different.

Training Your Team

Sensory analysis by nature is subjective, but when used as a quality monitoring tool, the goal is to be more objective and to make sure that everyone on the team is evaluating the cheese in the same way, for the same attributes, with the same scoring.

Most people learn how to evaluate cheese by doing it with a coach, group leader, or someone who knows and explains the characteristics of the cheese. This apprenticeship-style approach is often the best way to train people to evaluate cheese.

Training your team isn’t complicated, but requires some dedicated time and preparation. Good practices for preparing the evaluation space, sampling, and the evaluation process should all be followed for training. Developing a list of attribute descriptions and references that are used on the sensory ballots is a good thing to have for your own use and makes a great training document. You can use the Appendix as a starting point for this information, and add your own notes as needed.

Training sessions involve familiarizing the team with the cheese and the sensory ballots. Samples of the gold standard cheese, cheese with defects, references, and pictures are all helpful for training sessions.

Training is best done in a group, to encourage discussion and questions as people with different perspectives learn how to evaluate as one instrument. The team needs to understand that for this

purpose they are "instruments" and their personal preferences are not part of the evaluation, unless you are specifically looking for preference. The goal for training should be to make sure that everyone clearly understands the meaning of all the attributes on the ballot and how to score the ballots consistently.

It is important to recognize that people have different sensitivities to flavor attributes. These may be due to personal preference, dietary habits, and genetics. Some people are used to eating a lot of sweet or hot food and may not perceive something as intensely sweet or hot/spicy as others who do not typically eat these foods. There is a known genetic link with the perception of bitter flavors—some people are very sensitive to all bitter foods, some people may find some foods and beverages bitter like coffee but not broccoli, and some people don't perceive the sensation of bitter at all. There is also a range of people's ability to discern flavors; some people are more perceptive to tasting flavors at lower intensity. As the team leader, you may need to work with some people a little more to make sure they adjust their own internal scales to match the group.

There is no set amount of training that needs to be done before real evaluations can begin. It's all about your team knowing what they need to evaluate and being comfortable doing so. The more you practice, or conduct evaluations, the more knowledgeable people become and the more comfortable they are doing the evaluations. If you team is available to participate when you define the initial attributes and scales for the ballots, that might be all the training they need. If someone new joins the team, it might be helpful to have a dedicated training session, or it might be fine to have them taste with the group during routine evaluations to learn, but not count their scores as part of your quality tracking.

Implementing a Sensory Evaluation Program

Implementing a sensory evaluation program involves a commitment to collecting the data and using the data to monitor quality, improve your cheese and cheesemaking process, and assist with troubleshooting. The rewards of the program are a direct result of the effort put into developing the program, consistently conducting sensory evaluations assessments, improving the process when necessary, and following through with the data evaluation.

Developing the system was discussed above by first describing the ideal and not-so-ideal attributes of your cheese, then developing a ballot to record attribute scores and other observations, preparing the evaluation space and cheese samples, writing a step-by-step procedures for your evaluation process, and training your sensory team.

Collecting Sensory Data—The Sensory Evaluation Sessions

The quality of the data you get out of your program depends on the quality of the data collected. You have developed written procedures above for sample preparation, evaluation steps, and ballots, so use them! Modify them as needed. It is uncommon for a program to work perfectly when it is first implemented.

There is a tendency for people to be enthusiastic at the beginning of a new program and then lose interest because it takes time, there are other, more important things to do, etc.. Try to avoid losing sight of what this program is about—it's about constantly monitoring your cheese to make

the best product possible. It's also about having back data to consult when there's a problem you'd like fix. Constant monitoring is a serious commitment. *Make the system work for you!*

Conducting sensory sessions should be incorporated into your regular cheesemaking routine. The number of sessions per week or month will depend on your production and other activities. Keep track of the dates of your sessions, the cheese evaluated, and the ballots used. This will be helpful when you need to go back six months to see what you did, particularly when you are still refining your program.

The timing of evaluation for a particular type of cheese will depend on that cheese. Try to pick several times during aging to monitor the progress of the cheese. All cheeses should be evaluated when they are ready for sale. Some cheeses, such as Cheddar, are ready for an initial evaluation on day one or two after unhooping, and other cheeses take weeks or months for mold or eyes to develop before they are first evaluated. A cheese that ages for six weeks will have a different evaluation schedule than a cheese that ages for three months or one year.

It is good practice to write a master list of all the cheeses you make, the age at which they are sold, and then pick several times during the aging process to evaluate the cheese. When you make a new batch of cheese, consult the master list to determine the dates for evaluation, and put them on the calendar. Don't forget to watch the calendar and make time to do the evaluations!

If you find that you are not able to do all the evaluations you would like to do, then scale back your program to something that works for you. Sometimes it can be a matter of evaluating one or two attributes during aging and then the full ballot at time of sale. Sometimes the whole program is too unmanageable and all the ballots need to be shortened. *Be flexible!* Don't be afraid to adjust the system so that you are not overwhelmed and can collect good data on a regular basis. *You will get more useful information by evaluating four to six attributes consistently than you will by evaluating many attributes sporadically.*

Using Sensory Data

The concept of a sensory evaluation program is to use the data to monitor quality, improve your cheese and cheesemaking process, and assist with troubleshooting. This means you need to regularly review and track the data.

One way to use the data is to do a quick review of the ballots after each sensory session, scan for unusual scores, make some overall notes in a book, and file the ballots. A more powerful use of the data is to record attribute scores in a spreadsheet that allows you to track the data over time to easily spot anomalies and evaluate trends.

The Penn State Extension Cheese Tracking System has a spreadsheet for evaluating sensory data that can be customized to match your ballot attributes (5-4-SensoryEvaluationWorkbook PSU.xlsx, CheeseTrackingSystemInstructionsPSU.pdf). There is a worksheet for evaluating individual sensory attributes and another worksheet for evaluating multiple attributes at one time.

The Individual Attribute worksheet allows for a single sensory variable to be tracked by cheese age or compared with a variable such as pH or moisture content. This worksheet automatically

generates a graph of the data as the table is populated, and allows for an easy visual representation of the data. This worksheet was designed for a single variable over time because it can be difficult to interpret several attributes on one graph.

The Multiple Attribute worksheet is in tabular form to allow for simultaneous comparisons of several attributes of cheese from different lots and different ages. There are no limits on how many attributes (columns) can be added to the data table.

Be timely with data entry to avoid a backlog of data and so that you are regularly monitoring the characteristics of your cheese. If you see a spike in an attribute, it will cue you to look at other aspects of your process that may be causing the problem. For instance, were the micro counts on the raw milk high for that batch, or was there a problem with production that day? If you start to see trends in the data, good or bad, you can look into what might be causing the shift in quality.

The Penn State Extension Cheese Tracking System provides a means to link sensory data with milk composition, cheesemaking, post-cheesemaking-day processes, and cheese composition to allow the cheesemaker to monitor their materials and processes to make the highest-quality cheese possible.

Appendix: Sensory Attributes

Visual Attributes

Attribute	Definition	Reference/Comments
APPEARANCE AND MAKEUP		
Blistered	Thin, loose wax	
Bruised (wax)	Slightly depressed areas over which paraffin is broken	
Damaged coverings, torn bandage	Torn or punctured wrappers or bandages	
Defective coating	Wax coating is cracked or missing in spots	
Foreign material	Visible dirt or other material	
Free moisture	Moisture on the cheese surface, in eyes or openings	
Huffed, bloated	Cheese or packaging is puffed due to unwanted gas formation	
Irregular bandaging	Bandage is overlapping or excessively wrinkled	
Loose wrap	Wrapping is loose due to lost vacuum, or poor wrapping	
Lopsided	Shape is not uniform due to poor filling of mold or uneven turning during aging	
Mites	Presence of cheese mites; appears as a fine brown dust; mites will move if still alive	
Rounded edges	Edges of a square block are rounded	
Rough surface	Surface not smooth, uncharacteristically rough appearance	
Soft spots	Spots on the cheese are softer than the rest of the cheese, may be faded in color	
Soiled surface	Visible dirt or other material on cheese surface or wrapper	
Surface crystals	Visible white specks from crystal formation	

Attribute	Definition	Reference/Comments
Uneven or high edges	Cheese lacks square or symmetrical edges	
Uneven ripening	Ripening is not even throughout cheese; proteolysis zone or cream line is not even around the cheese	
COLOR		
Bleached	Dull color in patches, associated with spots of high moisture or high acid	
Brightness	Color purity ranging from dull to bright color	
Color range	Use desired range of color for the cheese (example: light yellow to dark yellow)	Use photographs or paint chips
Dull	Cheese lacks luster	
Intensity	The strength of the color from light to dark	
Light spots	Irregular areas of lighter color	
Mottled	Irregular areas of light and dark color; marbled appearance	
Opacity	Range of opaqueness to translucency	
Pink ring	Pink or brownish red color band near cheese surface, disappears when exposed to air (in Swiss style cheeses aged more than 4 months)	
Pinking	The presence of a pink color (due to annatto discoloration from light exposure or incorrect pH)	
Seamy	Light or dark lines around curds particles	
Translucence	Appearance of being translucent	
Uneven color	Uneven distribution of color	
Unnatural or atypical color	Color not typical of the cheese	
Wavy	Wide bands of discoloration	

Attribute	Definition	Reference/Comments
RIND DEVELOPMENT		
Ammoniated	Rind smells of ammonia from protein breakdown	
Cracked rind	Rind is cracked or broken off in areas	
Dry	Rind appears and feels too dry	
Greasy	Rind feels greasy	
Rind rot	Rotted, damp, soft, slimy, velvety, and sticky spots	
Rind thickness	The width of the rind	Measure with a ruler
Slipped rind	Rind is not attached to paste of cheese	
Soft spots	Soft spots on rind	
Sticky rind	Surface of cheese sticks to fingers; excessively moist rind	
Surface roughness	Rind looks uncharacteristically rough or uneven	
Thick rind	Rind too thick	
Thin rind	Rind too thin	
Uneven or high edges	Cheese lacks square or symmetrical edges or edges are raised or uneven	
Uneven rind	Rind thickness is not even around cheese	
Uneven rind color	Rind color is not uniform	
Unnatural or atypical color	Rind color not typical	
Weak rind	Rind thin and not well adhered to paste	
Wet rind	Rind is too wet	
MOLD DEVELOPMENT		
Atypical color	Mold color is not characteristic	
Dead mold	Mold is dead due to lack of oxygen in the interior of blue-mold cheese	
Dull	Mold appears dull in color	
Excessive mold	Too much mold(usually for the interior of blue-mold cheeses)	

Attribute	Definition	Reference/Comments
Lack of mold	Not enough mold (usually for the interior of blue-mold cheeses)	
Uneven mold distribution	Uneven distribution of mold on the cheese surface or throughout the paste	
Unwanted mold	Unwanted mold growth on the cheese surface or in the paste	
EYE DEVELOPMENT		
Blind	No eyes	
Dull eyes	Dull (not shiny) eyes	
Cabbage	Cluster of eyes separated by thin layer of cheese	
Collapsed	Eyes are flattened	
Frog mouth	Eyes are lentil or spindle shaped	
Irregular eyes	Non-uniform shape	
Large eyes	Eyes are too large	
Nesty	Too many eyes in a small area	
Overset	Too many eyes	
Rough	Eyes do not have smooth, even walls	
Small eyes	Eyes are too small	
Streuble	Too many small eyes near one surface of the cheese due to uneven turning	
Underset	Too few eyes	
Uneven eye development	Eyes are not evenly distributed in the cheese	

Aroma and Flavor Attributes

Attribute	Definition	Reference/Comments	Category
Alcohol	Distilled spirit or wine aroma		Chemical, Mouthfeel
Ammonia	Ammonia aroma	Ammonia solution (0.25% in water)	Chemical, Mouthfeel
Animal	Aromatics reminiscent of farm animals and barnyards		Animal
Ashy	Campfire ashes	Hickory smoked salt	Brown
Astringent	A drying, puckering, or tingling sensation in the mouth	Alum solution	Mouthfeel

Attribute	Definition	Reference/Comments	Category
Atypical flavor	Atypical or unexpected flavor		
Balanced	Flavor profile blends together		
Bell pepper	Freshly cut green bell pepper	Freshly cut green bell pepper	Green, Vegetal
Biting	A slight burning or prickling sensation in the mouth	White vinegar, horseradish	Mouthfeel
Bitter	Basic taste associated with caffeine or quinine	Caffeine in solution, tonic water	Fundamental Taste
Black walnut	Woody, pungent aroma associated with black walnut	Black walnuts	Brown, Nutty
Blue cheese	Pungent aroma associated with blue-veined cheeses, from methyl ketones		Fungal
Briney	Salty aroma	Brine, salt water	
Buttery	Aroma associated with butter	Butter (salted or unsalted)	Dairy
Caramel	Aroma associated with caramels and brown sugar	Caramels, caramelized sugar	Brown, Sweet
Catty	Aroma associated with tom-cat urine		Animal
Chemical	Aromas associated with cleaning chemicals, sanitizers, band aids	Sanitizer, band aids	Chemical
Citrus	Sour flavor associated with citrus fruits (lemons, limes, oranges, grapefruits)	Lemon juice, orange juice	Fruity, Green
Cooked	Aroma of cooked milk	Skim milk heated to 185°F or boiled	Dairy, Brown
Cowy, barny	Aromas of barns and stock trailers		Animal
Dairy sour	Flavor associated with cultured dairy products	Yogurt, buttermilk, lactic acid	Dairy
Dairy sweet	Flavor associated with fresh milk	Whole milk, lactose	Dairy
Diacetyl	Buttery aroma	Movie theater popcorn, cultured butter	Dairy
Earthy	Aroma associated with freshly turned soil	Potting soil, raw potato skins	Earthy, Fungal
Fat	Fundamental taste of fat	Crisco, butter	Fundamental Taste

Attribute	Definition	Reference/Comments	Category
Feed, hay	Aroma of animal feed, hay, alfalfa	Hay, dried grass	Green, Vegetal, Earthy
Fermented, fruity	Aroma associated with wine, pineapple	Red wine, pineapple juice	Fermented
Fermented, vinegar	Aroma and flavor of vinegar	Vinegar	Fermented
Fishy	Aroma of fresh fish or fish oil	Tuna packed in oil	Chemical, Animal
Flat	Lacks characteristic cheese flavor, low salt	A young version of the cheese	
Floral	Aroma associated with flowers	Fresh or dried flowers, roses	Fruity, Green
Fruity	Aromas associated with fruits, pineapple, apple	Fresh or canned pineapple	Fruity, Green
Garlic	Aroma and flavor of garlic	Garlic powder	Green
Goaty	Pungent aroma associated with goats		Animal
Grainy	Aroma associate with flour, oats	All-purpose flour, oatmeal	Brown
Grassy, green	Aroma associated with freshly cut grass, herbs or green vegetables	Freshly cut grass, parsley, green bell pepper	Green, Vegetal
Honey	Sweet, slightly spicy aroma of honey	Clover honey	Brown, Sweet
Horse blanket	Earthy, unclean aroma associated with a horse blanket	Horse blanket	
Lanolin	Aroma lanolin, sheep fat	Lanolin soap, sheepskin	Animal, Fat
Lacks flavor, low flavor	Lacking characteristic cheese flavor	A young version of the cheese	
Lipase	Strong aroma associated with feta cheese, baby vomit, rancid notes	Feta, Romano cheese	Fatty Acid
Malty	Slightly sweet, nutty flavor associated with malt	Grape Nuts® cereal, vanilla malted milk	Brown, Sweet, Nutty
Meaty, brothy	Aroma associated with boiled meat or mushroom broth	Beef or mushroom broth	Brown, Cooked
Metallic	Flavor and tingling feeling associated with metal	A clean copper penny, aluminum foil	Chemical, Mouthfeel
Milkfat	Flavor associated with milkfat	Heavy cream	Dairy
Milky	Flavor and aroma of fresh milk	Whole milk	Dairy

Attribute	Definition	Reference/Comments	Category
Mineral	Aroma associated with wet rocks or stones, intense flavor of salt	Sea salt	Chemical
Moldy	Aroma of mold	Bread mold	Earthy, Fungal
Mushroom	Aroma of raw or cooked mushrooms	Raw or cooked mushrooms	Earthy, Fungal
Musty	Aroma associated with closed, damp attics and basements		Earthy
Nutty	Aroma and flavor of nuts	Lightly toasted unsalted hazelnuts or walnuts, unsalted wheat thins	Nutty, Brown
Onion	Aroma and flavor of dried or fresh onions	Onion powder	Green, Vegetal
Oxidized, light	Aroma and flavor associated with oxidized fat; cardboardy or fishy taste	Wet cardboard, dried shiitake mushrooms	Chemical
Oxidized, metallic	Aroma and flavor associated with oxidized fat, has a metallic tang	A clean copper penny, aluminum foil	Chemical
Pepper	Spicy, pungent aroma and flavor of black or white pepper	Ground black or white pepper	
Piney	Aroma associated with pine trees	Pine needles	Green
Prickle, bite	Prickly or burning sensation in the mouth	Soda water	Mouthfeel
Pungent, hot, burning	Burning sensation in the mouth from hot pepper	Cayenne pepper in water, hot sauce, horseradish	Mouthfeel
Pungent, strong	Strong, unpleasant flavor		
Rancid	Strong aroma associated with feta cheese, baby vomit	Feta, Romano cheese	Dairy, Chemical, Fat
Rennet	The aromatics associated with natural rennet	Natural rennet (33% salt)	Animal
Salty	Basic taste of table salt	Salt solution	Fundamental Taste
Scorched, burnt	Aroma associated with burnt milk	Burnt milk, hot iron	Dairy
Sharp	Strong flavor and aroma associated with aged cheeses or other strong foods	Horseradish, aged Cheddar	Mouthfeel

Attribute	Definition	Reference/Comments	Category
Smoky	Aroma associated with smoked foods, or a campfire	Liquid smoke flavoring	Brown, Cooked
Soapy	Aroma of bar soap	Bar of soap (unscented)	Chemical
Sour	Fundamental taste sour taste	Lemon juice, citric acid solution	Fundamental Taste
Sulfide	Aromas associated with sulfurous compounds; subcategories include eggy, skunky, burnt matchstick, cooked cabbage	Boiled mashed eggs, burnt match, boiled cabbage	Chemical
Sweet	Fundamental taste of sugar	Sugar solution	Fundamental Taste
Toasted	Aroma and flavor of toasted bread	Toasted break	Brown, Cooked
Umami	Fundamental taste of meaty, brothy	Beef or mushroom broth, MSG in solution	Fundamental Taste
Unclean	Used to describe a general dirty aroma and flavor	Dirty dishwater, dirty gym socks	
Waxy	Aroma associated with wax candles	Wax candles	Fatty acid
Whey	Aromatics associated with cheese whey	Fresh whey	Dairy
Yeasty	Aroma of bread yeast	Raw bread dough, yeast in warm water solution	Fermented, Fungal, Earthy

Body and Texture Attributes

Attribute	Definition	Reference/Comments
Adhesiveness	How the cheese sticks to the fingers and inside of the mouth	Peanut butter
Brittleness	How a cheese fractures	Parmesan
Chalky	Gritty, chalky feeling in the mouth	Chalk
Chewiness	How much chewing is required to break down cheese in the mouth	String cheese
Closed	Cheese is well knit and no openings (mechanical or gas)	
Cohesiveness	How the cheese mass holds together after several chews	
Corky	When kneaded between finder the piece does not break down easily	Wine cork

Attribute	Definition	Reference/Comments
Cracks	Cracks in the cheese body due to excessively dry cheese or gas production	
Crumbly	Cheese crumbles into small, dry pieces when kneaded with fingers or in the mouth	
Curdy	Cheese crumbles into pieces along curd line when kneaded with fingers	
Crystals	Presence of white crystals in the interior or on the surface of the cheese	Aged Parmesan
Dry	Cheese is too dry	
Elastic	Springiness of cheese when kneaded with fingers	
Firmness, hardness	The range of firmness of the cheese	
Free fat	Free fat visible on the cheese surface	
Gassy	Presence of small pin holes or slits due to unwanted gas production	
Grainy	Breakdown of cheese in the mouth into particles that feel like corn meal; grainy feeling from spreadable cheeses that are not well blended	Corn meal
Greasy	Greasy feeling on the surface or in the mouth	
Mealy	Breakdown of cheese in the mouth into particles that feel like corn meal	Corn meal
Mouthcoating	How the cheese coats the mouth and teeth during chewing	
Open, mechanical	Irregular shaped openings in the cheese due to inadequate pressing or knitting of curd particles	
Pasty	Cheese breaks down easily into a pasty mass that sticks to the fingers and in the mouth	Paste, peanut butter
Pin holes	Very small holes like pin pricks, due to production of unwanted gas	
Short	Cheese plug or stick break easily when bent	
Slimy	Slimy, wet, sticky feeling in the mouth or on the fingers	

Attribute	Definition	Reference/Comments
Slits	Narrow slits due produced by unwanted gas or yeast	
Smooth	Cheese body is smooth and cohesive	
Spongy	Cheese has excessive gas or mechanical openings, is spongy or springy when compressed	
Squeaky	Cheese makes a squeaking sound when chewed	
Stickiness	How the cheese sticks to the fingers and inside of the mouth	Peanut butter
Stretch	Used to evaluate melted cheeses. How much the melted cheese stretched when pulled from a flat surface with a fork.	
Sweet holes	Small spherical gas holes	
Waxy body	Smooth, firm body, similar to candle wax	Swiss cheese
Weak	A soft body, deforms easily in the fingers and mouth, does not break easily when a cheese plug or stick is bent	

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