



Rethinking the Flavor Experience of Walnuts...and Why it Matters!

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Time: 15-30 minutes

Logistics: Requires seated participants with tables for sampling materials

Supportive PowerPoint: CA Walnut-15-30 Minutes Lesson Plan--POWERPOINT UPDATE_3.1.25

Lesson Objective: To guide a group of participants through an engaging 15-30 minute session to explore the multi-dimensional flavor profiles of California walnuts using visual appearance, aroma profile, physical texture, and primary taste.

Lesson Outcomes- Participants will be able to:

1. List the four senses used to evaluate and experience the flavor of walnuts.
2. Select specific attributes they can see, smell, feel, and taste on the CA Walnut Flavor Wheel.
3. Explain how walnuts go through a three-stage evolution of texture: Initial Bite, Chewing/Mastication, and Finishing Mouthfeel.
4. Understand how an ingredient like walnuts goes through a flavorful transformation from ingredients into useful components that can be utilized to create innovative menu items and consumer product goods.

Key terms and definitions:

1. Sensory Attributes: characteristics of a food experienced through visual appearance, aroma profile, physical texture, and primary taste, contributing to a multidimensional understanding of its flavor profile.
2. Umami: known as the fifth taste, a savory flavor associated with compounds like glutamic acid. Walnuts contain significantly higher levels of these umami compounds compared to other nuts.
3. Astringency: the dry, puckering mouthfeel caused by tannins and polyphenols, often present in walnuts with skins.



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4. Mouthfeel: the physical sensations in the mouth, including texture and temperature, experienced while eating food. This is key to understanding the texture evolution of walnuts.
5. Texture Evolution:
 - Initial Bite: The first sensation when biting into a walnut.
 - Mastication (Chewing): The process of breaking down the walnut's texture, releasing additional flavors.
 - Finishing Mouthfeel: The lingering texture and sensations after swallowing.
6. Walnut Flavor Wheel: a tool that categorizes the sensory experiences of walnuts (visual appearance, aroma profile, physical texture, and primary taste) to help participants identify and describe these attributes.
7. Primary Tastes: include sweet, bitter, and umami, which are essential to the flavor experience of walnuts.
8. Aroma Profile: the aromatic attributes of walnuts experienced through two pathways: ortho-nasal perception, which occurs during inhalation through the nose, providing the initial aroma impression; and retro-nasal perception, which occurs during chewing and exhalation, allowing the release of volatile compounds for a fuller flavor experience.
9. Flavor Compounds: chemical compounds contributing to taste and aroma, identified through methods like gas chromatography and explored via literature reviews of walnut-related research.
10. Value Chain: the interconnected elements in the food and beverage industry, from raw ingredients to menu items or consumer-packaged goods (CPGs), emphasizing collaboration in creating walnut-based innovations.



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Lesson Title: Rethinking the 360° Flavor Experience of Walnuts...and Why it Matters!

1. Introduction (2-5 Minutes): Slides 1-3

- Slide 2:
 - Use the slide on "Ingredients, Components, Build" as a way to frame the discussion on how in the F&B industry--directly or tangentially, as suppliers of processing equipment, packaging, distribution, real estate, technology, and other support services--is part of the value chain. All resources are impacted by the results of transforming ingredients, like walnuts, into components that are built up, stacked up, wrapped up, or mixed up into CPG products or menu items.
- Slide 3:
 - Objective of the lesson is to understand the multi-dimensional flavor profiles of California Walnuts including visual appearance, aroma profile, physical texture, and primary taste. These properties shape how food is experienced, including the distinctive attributes of California walnuts.
 - Highlight the objectives and importance of understanding the sensory attributes of ingredients to appreciate the nuances of different produce items, namely nuts. Each has unique flavor experiences that result from their origin, growing conditions, handling, and potential transformation from physical, chemical, and biological processes while preparing food and beverages with them to nourish the minds, bodies, and souls of our family, friends, and customers.

3. Interactive Sensory Evaluation Part 1 (2-5 Minutes):

- Appearance and Aroma Analysis: Slides 4-5
 - Detail Visual Appearance and Aroma Profile.
 - Distribute walnut samples and guide participants through analyzing visual and aroma attributes.

3. Interactive Sensory Evaluation Part 2 (3-7 Minutes):

- Texture and Taste Analysis: Slides 6-7
 - Present slides on Primary Tastes and Texture Evolution (Initial Bite, Mastication, Finishing Mouthfeel).



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- Guide tasting exercises for walnut samples at different stages (consider using one or two versions - raw, roasted, fried, boiled, skinless).
- Emphasize walnut's high levels of umami-related compounds (e.g., glutamic acid) using provided data visuals.

4. Interactive Tasting Analysis and Flavor Wheel Update (5-7 minutes)

- Script to Review of Flavor Experience – Slide 8
 - As you chewed the walnut, you likely experienced all five primary tastes—sweet, sour, salty, bitter, and umami—at different levels and intensities throughout the three stages of tasting. The middle tends to have a subtle sweetness, while bitterness and sourness become more pronounced toward the end. To enhance our ability to detect these tastes, let's first cleanse our palates creatively using water!
 - Now, take another sample walnut half or piece to re-taste, focusing on how you individually perceive each of the five primary tastes.
 - Close your eyes and pay close attention—what tastes do you notice? Are they all present?
 - Highlight those you perceive and rate their intensity on a scale of 1 to 5.
 - If you agree on certain tastes, mark them down, and then identify any additional ones that may be missing from the blank flavor wheel.
 - Let's discuss our observations and see how our perceptions align!

5. Wrap-Up and Q&A (5 Minutes):

- Use slide 9 to elicit "QUESTIONS?" and summarize the session.
- Field participant questions and distribute any takeaway materials.