From Amazake To Acid Blockers: Culinary Strategies for Enhancing Sweetness

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Sweet!

HOW DO WE PERCEIVE SWEETNESS?

Perception of Flavor

- Sense of smell is more sensitive than sense of taste
- 80% of the taste ability is due to smell
- Taste is form of direct chemoreception – the ability to detect the flavor of substances
- Combination of how a food smells, looks, its consistency, texture and other characteristics such as temperature (e.g. celery/crunch; coffee/aroma)
- Genes give a predetermined flavor preference; environment is a factor in learning new tastes

Definitions

- ***Aroma* -** refers to an actual aromatic compound with a specific scent that can be identified by smelling.
- ***Taste* –** the tongue can sense taste and feel texture. Taste is developed through the taste buds on the tongue, and there are 5 basic tastes: sweet, sour, salty, bitter, and umami.
- ***Flavor* -** Flavor is the brain's association between what it smells through the nose, tastes with the tongue and feels in the mouth.

Aroma

"The taste and the sense of smell form but one sense, of which the mouth is the laboratory and the nose the chimney,"

-Jean-Anthelme Brillat-Savarin

- **Retronasal-** olfaction is the perception of odors emanating from the oral cavity during eating **and** drinking, or "breathing out."
- **Orthonasal-** occurs during sniffing, "breathing in".

Chef example: Alinea- Chef Grant Achatz Lavender Pillow

Sound

- Beyond just the texture of foods, which can add dimension.
- Professor Charles Spence, Oxford University experiments
  - Higher frequency sounds can enhance sweetness in foods.
  - Lower frequency sounds can bring out bitterness in foods.

Chef examples:

- Fat Duck- Sounds of the Sea
- Starbucks enlisted composers to create music to accompany coffee

Visual- Beyond Eye Appeal

- Shape of plates
  - Food served on white, round plates boosted the perception of sweetness to the taster.
  - Black/angular plates boosted the savory perception
  - Red plates caused tasters to eat less overall

- Fonts on menus
  - 2015 study at Oxford University
  - A clear distinction between round and angular typefaces
    - Round typefaces liked more, considered as easier to read, and associated with sweet.

Chef Sweeteners

Common Sweeteners Used by Chefs

- Sugar- white, brown, raw, jaggery, piloncillo
- Honey
- Agave
- Fruit Juices
- Dates
- Maple Syrup
- Sorghum
- Molasses
- Monk Fruit
- Stevia

Unique Sweeteners Used by Chefs

- Grain Syrups- rice, oat, barley
- Yacon
- Aronia berry
- Lambic
- Coconut Sugar
- Jerusalem Artichoke
- Lucuma
- Sweet Potato Syrup
- Amazake

Unique Sweeteners Used by Chefs

- Grain Syrups- rice, oat, barley
  - Oat Syrup
    - No chemical additives or chemical processing
    - Creamy mouthfeel
  - Malted Barley Extract
    - Significantly lower glycemic index than table sugar
    - Rich source of soluble fiber
    - Facilitates the growth of probiotic cultures
- Yacon
  - From tuberous roots of *Smallanthus sonchifolius*, a species of daisy found in the Andes
  - Molasses or caramel flavor
  - High concentration of fructooligosaccharides
  - Tastes sweet, but the digestive system can't metabolize it
  - Provides a good source of prebiotics
- Aronia berry
  - Shrub is native to North America
  - Aronia berries also known as chokeberries because of their sharp, mouth-drying effect
  - Many health benefits, linked to high content of polyphenols
  - Not as sweet as sucrose, works well as a blended sweetener

Unique Sweeteners Used by Chefs

- Lambic
  - Lambic beers are in open vats where wild yeast and bacteria cause spontaneous fermentation
  - Fermented with fruits like raspberries, apricots, and muscat grapes
  - Adds a layer complexity, a sweetener alternative that is unique
- Coconut Palm Sugar
  - A granulated sugar that comes from palm trees
  - Not made from the coconuts themselves, but from the flowers
  - Natural and unrefined

- Jerusalem Artichoke
  - A bumpy, fleshy, root vegetable of sunflower family
  - Nutty, flavorful, starch-rich root is eaten much the same way as potato
  - Source of dietary fiber, especially high in oligo-fructose inulin, a soluble non-starch polysaccharide

Unique Sweeteners Used by Chefs

- Lucuma
  - Fruit native to Peru
  - Low-glycemic alternative to sugar, with unique flavor
- Sweet Potato Syrup
  - High Brix, clean label
  - Vegan replacement for other sweeteners, such as honey.
  - Naturally viscous, can reduce the use of thickeners
- Amazake
  - Use of fermentation to convert naturally occurring starches in grains into sugars
  - Traditionally a Japanese drink made of fermented rice
  - Non-alcoholic amazake is made with rice kōji

"Fermentation is controlled chaos and everyone needs a bit of chaos in their life. It is a great excuse to play with food and control your waste."

-Chef Kevin Fink
Emmer & Rye
Austin, TX

Amazake

Amazake- What is it?

Amazake (ah-mah-za-keh)

- All natural, probiotic rice concentrate made from steamed rice, kōji, and water
- Fermentation converts naturally occurring starches in rice into sugars
- Contains no added sugar
- Neutral flavor profile

What is Kōji?

Kōji (**koh**-jee)

- Aspergillus oryzae, a filamentous fungus (mold) domesticated in Asia
- Grains (rice, soybeans, barley) can be inoculated with kōji. Some sugar bound by starch cannot be fermented by yeast, so this specialized fungus is used
- Kōji spores release enzymes that convert starches into sugars
- Used to turn soybeans into miso, rice into sake, rice into vinegar
- It also can make dairy products more stable

Kōji- Uses in Kitchens

Spread beyond Japan with molecular gastronomy boom

- Momofuku (Chef David Chang)
  - Miso with pistachios
  - Soy sauce from other grains beyond soybeans
  - Butabushi- a pork made like katsubushi, a dried, smoked cured bonito traditionally
- Husk (Chef Sean Brock)
  - Scallopbushi- kōji spores and rice flour cured for two days to create scallops that smell like honeysuckle and have a perfectly cured, sweet note.

Kōji- Uses in Kitchens

- Emmer & Rye (Chef Kevin Fink)
  - Kōji ice cream
  - Kōji cookies
  - Kōji tart

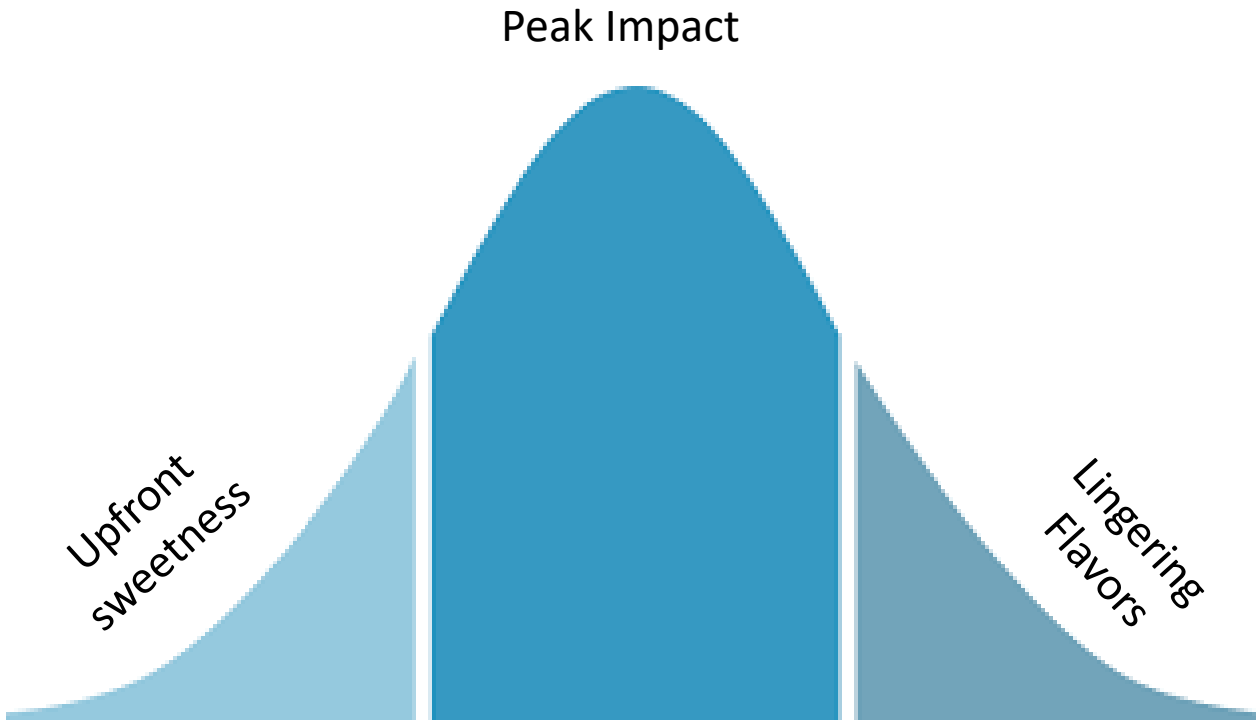
- Duna, Chef Cortney Burns (San Francisco, CA)
  - Mother spores from a Japanese sake producer to sweeten a range of foods from vinegar to ice cream without refined sugar
  - Spent rice from growing kōji becomes sweet, the mold breaks down complex carbohydrates into sugars
  - A base of ‘rice cream’ to set ice cream. It also acts as a stabilizer, allowing her to skip adding refined sugars to make ice cream.

Beyond Amazake

BALANCING THE FLAVOR CURVE

Balancing the Flavor Curve

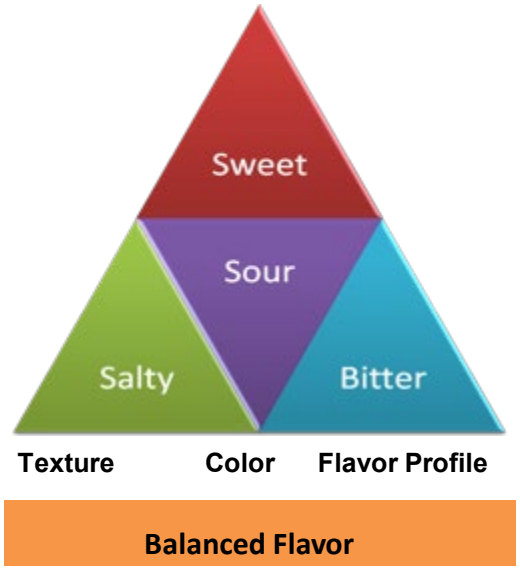
- Flavor Curve:



Roles of Sweeteners

Roles of sweeteners

- Adds sweet flavor
- Enhances other flavors
- Masks bitterness, astringency, acidity



Balancing Flavors

- Flavor Curve- contrast flavors
  - Salt & Straw- Fish Sauce Caramel & Palm Sugar Ice Cream
    - Balancing sweet and salty
  - Strawberries & Balsamic Sauce
    - Balancing sweet and sour
  - Mexican Hot Chocolate
    - Finished with a pinch of cayenne pepper
- Acid blockers
  - Balancing with sweet notes in the kitchen to let sweetness shine through
- Miracle Berries- tropical W. African fruit
  - contains a glycoprotein molecule, called miraculin
  - Miraculin binds to taste buds, causing sour foods to taste sweet
  - At neutral pH, miraculin binds and blocks the sour receptors
  - At low pH, miraculin binds proteins and activates the sweet receptors

Balancing Act

- **Spices that can enhance the perception of sweetness:**
  - *Bay leaves*- eugenol, acts as a supporting flavor
  - *Basil*- eugenol, clove like aroma
  - *Star Anise/Licorice Root/Anise/Fennel*- anethole essential oil
  - *Cinnamon*- helps block bitterness
  - *Vanilla*- aroma enhances perception of sweetness, and also other flavors
  - *Warm Spices*- cinnamon, nutmeg, star anise, clove, allspice

Balancing Act

- **Cooking Techniques**
  - Roasting
    - Caramelization
  - Drying/Reduction
    - Fruit juice reduction
    - Dehydrated ingredients
  - Fermentation
    - Pea or rice protein fermented with shiitake roots
    - Parsnips fermented to obtain vanillin
    - Lactic acid fermentation to lower sugar content (beet juice)
    - Kōji

"Virtual" Tasting- Carrot Cake Muffin

Version 1
-Control with 100% sugar

Version 2
-Amazake version with 50% sugar, 50% amazake

25% overall sugar reduction

Thank you!

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