Interpreting the Stevia Effect

The critical role of sensory in the development of products containing HPS

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Utilize HPS to produce a non-caloric, natural product

Mouth feel

Temporal profile

Sweetness intensity

Structure functionality

Adaptation behavior

Flavor profile

Maximal response

Textural changes

Ingredient/system interaction

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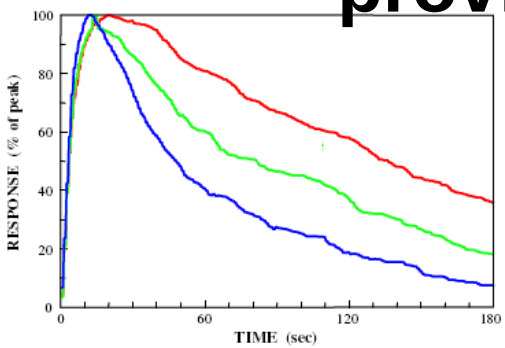
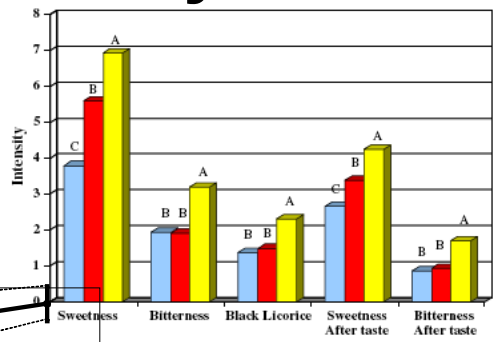
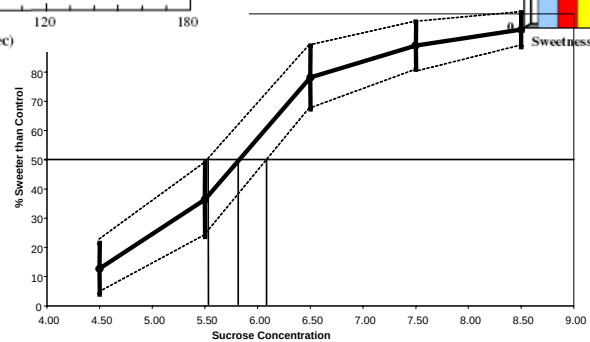
CHALLENGE

Ability to track and understand the effect of each formula modification on each attribute.

Analytical Sensory Tools provide that ability







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Key Analytical Sensory Tools - for sweet system development

- Time Intensity Profiling
  - Ability to track changes in perception over time
    - Intensity based
    - Any critical character
- Descriptive Profiling
  - Characterization and magnitude of sensory attribute
    - Taste and flavor
    - Texture
    - Mouth feel
    - Appearance
- Sweetness Equivalency
  - Modeling of sweetness response to determine concentrations resulting in perceived equivalent sweetness
    - Foundation tool
    - Complexity of system can affect
- Discrimination
  - Determination of overall similarity or difference

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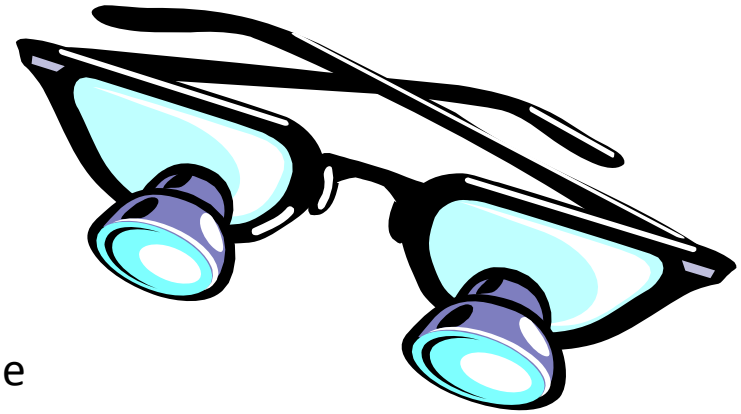
Requirements to Insightful Data & Interpretation

- Experienced, trained evaluators
  - Ability to target attributes
  - Ignore interference factors
  - Ignorant of manipulations, issues of relevance, etc.
- Consistency
  - Methods
  - Panelists
  - Scaling
- Sensory bias control
  - Pallet Cleansing
  - Controlled evaluation time
  - Limited sample exposure



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Requirements to Insightful Data & Interpretation

- Significant data points
  - Number of panelists
    - Time to train, develop competency
  - Replications
  - Blind presentations
- Experienced scientists and data analysts
  - Method and design experience
  - Advanced statistics
- Time for Research
  - Targeted research to objective
  - Incorporate into plan

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Greater Importance in Formulation with HPS

- Sweetness plus….
  - Understanding the associated tastes and flavors
  - Must do through delivery perception -> sensory analysis
- Impact of maskers and modulators
  - Measurement of effect requires sensory analysis

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Driving Sensory Tool Choice

Development Stage/Question is key to tool choice!

- Understanding your target, your system & your product
  - What is the competition, What character motivates category acceptance
    - Consumer preference with Descriptive analysis
  - HPS systems in existing products
    - Descriptive profile comparisons
  - Chosen HPS system
    - Sweetness equivalency
    - Flavor profile

KNOWLEDGE GAIN: Baseline info
Define most probable success path

- Guidance of development
  - What masking agent/texture ingredient is producing desired effect
    How are they specialty ingredients interacting
    - Descriptive analysis
  - What is changing, by how much
    - Descriptive analysis comparison
    - Time Intensity profiling
  - Is consumer perception altered
    - Consumer hedonics

KNOWLEDGE GAIN: Confirmation of approach
Further direction

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Driving Sensory Tool Choice, cont.

- Quantifying and validating product
  - Does alternative supply effect results
    - Discrimination testing
    - Descriptive – for how
  - Which manipulation generates highest acceptance
    - Consumer preference
    - Descriptive analysis of winning product
  - Can it be repeated consistently
    - Descriptive analysis comparison

KNOWLEDGE GAIN: Confidence in product

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Example

❖ Foundation and development consumer evaluation

	Juice/Stevia (946) (A)	Sucrose (773) (B)	Stevia (413) (D)
Overall Liking	**6.2** D	**6.3** D	**4.2**
Overall Flavor Liking	6.1 D	5.9 D	4.1
Mouthfeel Liking	6.3 D	6.6 D	4.9

	Juice/Stevia (946) (A)	Sucrose (773) (B)	Stevia (413) (D)
Thickness – JAR	**78%**	**81%**	**59%**
Too thick	**12**	**12**	**16**
Not thick enough	**9**	**6**	**25**

❖ Recommended Next Steps

- Descriptive profiling to understand consumer texture comments
  - Opportunity to improve further
- Develop plan based on further understanding

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Sensory Evaluation Watch-outs with HPS

- Insufficient screening, training of panelists
  - Sweet sensitivity
  - Elimination of “blindness”
  - Ability to finely discriminate and dissect
  - Foundation of general high potency sweetener characteristics
  - Time for training, confidence
- Too many samples, too little time
  - Palate fatigue
    - Linger
    - Numbing
- Identified evaluations
  - Expectation of character
  - Preconceived results
- Skipping statistical validation at key steps
  - Time related
  - Confidence in direction
    - Repetitive

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Sensory in HPS based Product Development

- Only way to fully understand interactions
  - Flavor
  - Mouth feel
  - Texture
  - Aftertaste
- Varied tools available
  - Use each as appropriate to guide development, to understand
- Sensory Scientists are critical team members, seek them out
  - Guides to tools
  - Provide access to trained panels
- Can't assume same result in different product/system
  - Physiology of taste perception very different
- Short cutting sensory evaluation can lead you astray!

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THANK YOU!

Questions?

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References

Prakash, I., DuBois, G.E., Jella, P., King, G.A., San Miguel, R.I., Sepcic, K.H., Weerasinghe, D.K., White, N.R., 2007c. *Natural high-potency sweetener compositions with improved temporal profile and/or flavor profile, methods for their formulation, and uses*. US patent application 0128311.

Development of rebiana, a natural, non-caloric sweetener
I. Prakash, G.E. DuBois, J.F. Clos, K.L. Wilkens, L.E. Fosdick

Meilgaard, M., Civille, G., Carr, T., *Sensory Evaluation Techniques*. 3rd ed. Boca Raton, FL: CRC Press, 1999

Lindsey, J.R., Wolter, C., Lynch, S., 2010. *Consumer guidance on alternatively sweetened versions of diet lemon lime soda*, Unpublished results. Product Dynamics, a division of RQA, Inc.

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