

Cross-Category Market Mapping of Mango-Flavored Products as Inspiration for New Product Development

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Introduction

- Consumer packaged goods companies strive to differentiate their products from the competition.
- A market map is a tool that can be used to better understand current market offerings, product similarities and differences and potential white space opportunities for future development. Market mapping can be conducted for one flavor across multiple product types (e.g. mango across beverage, cereal, yogurt, etc.) and for one flavor across one product type (e.g. mango yogurt).
- This study highlights this unique and rapid approach to flavor differentiation and optimization which involves conducting consensus Descriptive Flavor Profiling on a large set of mango-flavored market products and mapping the resulting data using Principal Components Analysis and Cluster Analysis. The output includes a visual representation of the mango product market from a flavor perspective. Consumer packaged goods companies can leverage this information to pursue optimized and promising mango flavor directions for their new products.

Materials & Methods

Product Selection

- 55 mango-flavored market products across multiple product types: 33 beverages, 6 fruit, cereal and confections and 16 dairy and desserts
- Market leaders, private label and niche products

Descriptive Profiling

- Givaudan expert panel profiled the products
- Quantitative Flavor Profiling (QFP) methodology
- Consensus using Givaudan Sense It™ language (19 attributes)
- 2.5 weeks required for profiling

Analyses

- Included only those attributes relevant to mango flavor (i.e. buchu, citrus, cooked mango, creamy fruity, fruity pineapple, fruity skin, fruity yellow fruity and sulphury tropical) and found in 6+ products (**Table 1**)
- Principal Components Analysis (PCA)
- Agglomerated Hierarchical Clustering (AHC)
- Made key characteristic mean comparisons to make sure each product fit with the others in its calculated cluster; products that fit better somewhere else were moved to the appropriate cluster
- 0.5 weeks required for data analysis

Descriptors	Description
buchu	Sulphury aroma associated with cat urine
citrus	Fruity, sweet aroma associated with orange and lemon peel
cooked mango	Aroma of mango that has been subjected to heat
creamy fruity	Creamy, lactory, fatty, waxy aroma
fruity pineapple	Aroma associated with ripe pineapple
fruity skin	Tropical, sulphury aroma associated with fuzzy peach skin
fruity yellow fruit	Fruity aroma associated with ripe yellow stone fruits
sulphury tropical	Sulphury aroma associated with a burnt match

Table 1. Sense It™ Language Mango Flavor Attributes



Results

- Identified 9 different mango flavor directions, including traditional and non-traditional: authentic, candy-like, different fruit profiles (**Figure 1**).
- PC1 (21%) was intense fruity to the right and sulphury to the left. PC2 (16%) was fruity pineapple at the bottom and buchu at the top. Clusters on the right included complex mango, cooked mango, fruity pineapple, citrus and fruity yellow fruit. Clusters on the left included fruity skin, fruity skin with sulphury tropical, fruity skin with buchu and fruity skin with creamy fruity.
- There is more market saturation on the left side of the map in the fruity skin clusters. There is opportunity to fill some gaps on the right side of the map with more authentic cooked and complex mango profiles, as well as mango with other supporting fruit notes like orange and pineapple.
- Other flavor match and/or white space opportunities can be gleaned from cluster breakouts by product type (**Table 2**). For example, if the desire is to match some top-selling market products, create profiles similar to those in Clusters 4, 5, 8 and/or 9. If the goal is to differentiate, create profiles similar to those in the other 5 clusters or pursue entirely new flavor directions to fill white space. These new flavor directions are most usually identified by looking at trends in the flavor space of interest.

Product Type	Clusters
Top Selling Market Products *	4, 5, 8 and 9
Alcohol	4, 7 and 8
Other Beverage	All 9 Clusters
Yogurt	2, 6, 8 and 9
Cereal	8
Fruit	4, 6, 8 and 9

* Based on IRI Volume Data

Table 2. Mango Cluster Breakouts by Product Type

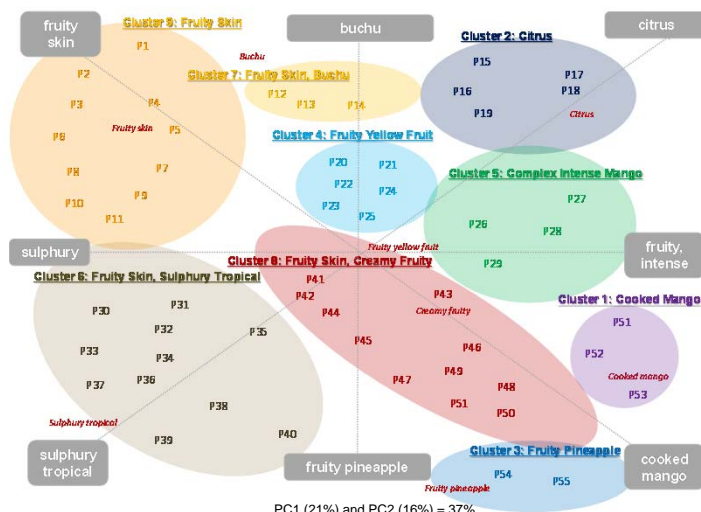


Figure 1. Mango Retail Product Market Map

Conclusions

- The results were used by Givaudan Flavorists to develop well-liked, differentiated mango flavors that can be used in a variety of different product types.
- Select flavors were optimized in a yogurt application and submitted for consumer testing to identify the most promising options to pursue.
- The flavors can be optimized for other product types and validated with consumer testing.