

Data Analysis Workshop

Consumer Segmentation & Key Drivers Analysis

7th Sensometrics Meeting

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USA

Acknowledgment

- The data were provided by Pascal Schlich and represent the results of a research collaboration between the Centre Technique des Fruits et Légumes (CFIFL) and the Institut National de la Recherche Agronomique (INRA).

Study Description

	Study Parameters
Tomato Varieties	17
Sensory Panel	14 panelists
Sensory Attributes	11
Physical/Chemical Analyses	15
Consumers	N=379 tasted 10 of 17 varieties
Hedonic Rating	Overall liking
Reason for Preference	Preference between most & least liked, with reason for preference checklist
Appearance Liking	7 varieties ranked for appearance liking
Usage and Attitudes	17 questions

Sensory Attributes

Ext. Color
Firm
Firm Inside
Juicy
Melly
Mealy
Skin Width
Sweet
Acidity
Tomato Odor
Tomato Flavor

Physical/Chemical Attributes

E Color Code CBT
E Average weight (g)
E IR (%Brix)
M IR (%Brix)
G IR (%Brix)
E Total Acidity (mEq/100g)
M Total Acidity (mEq/100g)
G Total Acidity (mEq/100g)
 $\% \text{ gel} = [G/(C+G)] * 100$
E Sum of Sugars
M Sum of Sugars
G Sum of Sugars
E Sum of Acids
M Sum of Acids
G Sum of Acids

Key Questions

- Are there consumer segments that differ in their liking of the tomato varieties?
- How can the differences among segments be characterized:
 - sensory drivers of liking
 - physical/chemical drivers of liking
 - attitude/usage characteristics

Method Comparisons

- **Segmentation technique**
 - liking alone
 - use external variables (e.g. sensory)
- **Treatment of missing values**
 - accept missing values
 - impute missing values
- **Data pre-treatment**
 - liking data normalized
 - data reduction technique for sensory
- **Selection of number of clusters**
 - judgment
 - statistical criterion
- **Type of selection of drivers?**
 - linear only
 - quadratic drivers included

Poster Summary

- **Meullenet**
 - jackknife clustering on demographics & A/U
- **Schlich**
 - individual level quadratic models
 - clustering on sensory optima
- **Tang**
 - latent class regression, with sensory PC's as predictors
- **Zalila**
 - fuzzy clustering

Method Comparisons

	Ledauphin	Lengard	Lundahl	Cleaver	Meullenet	Schlich	Tang	Zalila
Segmentation based on								
Liking alone		✓	✓					Yes
Liking w respect to external variables	✓			✓		✓	✓	
Impute missing values?	No	Yes	Yes	No		No	No	No
Liking data pre-treatment	No	Yes	Yes	Yes		No	Yes	Yes
Selection of number of clusters								
Judgment	✓	✓						
Statistical criterion			✓	✓		✓	✓	✓
Include quadratic drivers?	No	No	No	No		Yes	No	N/A

Liking -- Total Sample

	Liking			
Product	Mean	N	Std. Dev.	
A	7.1	222	2.6	
B	5.5	223	2.5	
C	6.6	224	2.8	
D	4.0	224	3.3	
E	3.2	221	2.7	
F	4.9	221	2.7	
G	3.9	225	2.5	
H	5.5	225	2.5	
I	5.7	224	2.4	
J	5.3	226	2.7	
K	4.2	223	2.6	
L	5.7	221	2.6	
M	4.8	225	2.8	
N	5.0	222	2.6	
O	6.8	222	2.7	
P	3.2	221	2.7	
Q	5.4	221	2.7	
Total	5.1	3790	2.9	

Summary -- V.Lengard

	Segment 1 -44%		Segment 2 - 29%		Segment 3 - 27%		
most liked	A, C, O		E, M, A		G, A, K		
least liked	E, P, G		P, D, K		E, D, P		
pos. drivers	juicy, tomato flavor		external color		firm inside		
	sweet, external color		juicy, tomato flavor		juicy, acidity		
			sweet		tomato flavour		
neg drivers	mealy and firm inside		firm inside		external color		
			mealy, acidity		mealy		
					melty		
who?	prefer cocktail		prefer oval type		firm and fresh important		
	younger						

Summary -- D.Lundahl

	Segment 1 -44%		Segment 2 -37%		Segment 3 -19%		
most liked	A, C, O		A, C, O		B, J, K, L		
least liked	D, E, P		G, K, P		C, O		
pos. drivers	juicy, tomato flavor		Ecolor		firm inside		
neg drivers	firm inside		firm inside		sweet		
					tomato flavor		
who?	vine-attached		never use butter		no tomatoes for entertaining		

Summary -- G.Cleaver

	Segment 1 - 49%		Segment 2 31%		Segment 3 - 20%		
most liked	A, C, O, L, H, M		random		C, A, O, D, Q		
least liked	B, E		random		E, J, K, P, G		
pos. drivers	juicy, tomato flavor				sweet, external color		
	sweet, external color				juicy, melty, tom flavor		
neg drivers	mealy				firmness inside		
who?	younger		older				

Summary -- C.Tang

	Segment 1 -42%		Segment 2 -30%		Segment 3 - 7%		Segment 4 - 21%	
most liked	A, C, O		A, C, O, D		B, J, K, L, Q			
								no preference
least liked	D, E, P		G, K, P		A, O, D			
pos. drivers	juicy, tomato flavor		external color		firm inside			
	sweet		juicy, tomato flavor		juicy, acidity			
			sweet					
neg drivers	mealy		firm inside		external color			
					mealy			
					sweet			
who?	younger							older group

Number of Segments

	Number of Segments
Ledauphin	3
Lengard	3
Lundahl	3
Cleaver	2 (+1)
Meullenet	0
Schlich	4
Tang	4
Zalila	4

