SENSORY PROFILE AND CONSUMER STUDY: PREFERENCES AND DESCRIPTOR TERMS OF LOW-CALORIE AND LACTOSE-FREE CHOCOLATE

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INTRODUCTION

The purposes of this study were 1) to determine the sensory profile of sucrose- and/or lactose-free chocolates and the preferences drivers through the application of external preference mapping and 2) to reveal the relationship between descriptive attributes and hedonic judgments using two multivariate statistic methods: partial least square (PLS) and principal component analysis (PCA).

MATERIAL AND METHODS

- Eight different milk chocolate prototypes were analyzed: four milk chocolates (sweetened with sucrose—MSU, sucralose-MSC, rebaudioside-MRE, and Neotame-MNE) and four soy-based chocolates (soy extract was used instead of Milk: sweetened with sucrose—SSU, sucralose-SSC, rebaudioside-SRE, and Neotame-SNE).
- Descriptive sensory profiles determined by 15 assessors (four repetitions).
- The acceptance test was conducted with 150 chocolate consumers.
- Complete balanced block design (sequential monadic).
- The correlations between the QDA and the consumer test data were determined by PLS regression analysis and PCA to explain the sensory variation among the samples and the preference mapping of consumers .
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RESULTS

Table 1— Means* of descriptor terms sensory profile of chocolate

Descriptor Terms	MSU	MSC	MRE	MNE	SSU	SSC	SER	SNE
Color	2.585^{d}	3.165^{cd}	3.782^{bc}	3.387^{c}	4.287^{b}	5.935^{a}	6.187^{a}	6.515^{a}
Bright	5.695^{a}	3.845^{bc}	4.580^{b}	4.182^{b}	4.120^{bc}	4.052^{bc}	4.747^{bb}	3.115^{c}
Homogeneity	6.730^{a}	5.402^{cod}	6.175^{abc}	$5.67b^{cd}$	6.192^{abc}	6.300^{ab}	6.717^{a}	4.915^{d}
Cocoa Aroma	4.385^{a}	4.225^{a}	4.435^{a}	4.192^{a}	4.930^{a}	5.005^{a}	5.032^{a}	4.977^{a}
Sweet Aroma	5.152^{a}	4.367^{abc}	4.762^{ab}	4.345^{abc}	4.030^{bc}	3.550^{c}	3.505^{c}	3.627^{a}
Milk Aroma	3.917^{a}	4.110^{a}	3.742^{ab}	3.241^{b}	2.637^{c}	2.036^{d}	2.299^{cd}	2.154^{cd}
Buttery Aroma	3.449^{a}	3.716^{a}	3.804^{a}	3.461^{a}	3.419^{a}	3.372^{a}	3.633^{a}	3.404^{a}
Cocoa Flavor	4.086^{d}	4.024^{d}	4.637^{c}	3.893^{d}	3.793^{d}	4.116^{c}	5.564^{a}	5.099^{b}
Sweetness	5.739^{a}	5.896^{a}	5.561^{a}	5.588^{a}	3.105^{c}	3.784^{b}	3.221^{bc}	3.215^{bc}
Bitter	1.069^{a}	0.927^{ab}	2.693^{cd}	2.139^{d}	3.716^{b}	3.259^{bc}	5.304^{a}	5.345^{a}
Milk Flavor	4.806^{a}	4.498^{ab}	4.160^{b}	4.018^{b}	1.141^{c}	0.948^{c}	1.182^{c}	0.966^{c}
Soya Flavor	0.358^{b}	0.501^{b}	0.415^{b}	0.524^{b}	4.178^{a}	4.284^{a}	3.902^{a}	3.730^{a}
Sweet Aftertaste	2.284^{a}	4.095^{ab}	4.127^{ab}	4.504^{a}	0.987^{f}	3.381^{bc}	3.158^{cd}	2.510^{de}
Bitter Aftertaste	0.753^{a}	1.336^{a}	2.619^{c}	2.406^{cd}	1.523^{de}	2.904^{bc}	4.175^{a}	3.692^{ab}
Hardness	2.927^{bc}	2.598^{c}	3.455^{b}	2.830^{c}	5.784^{a}	5.822^{a}	5.843^{a}	6.278^{a}
Melting in Mouth	6.047^{a}	5.3481^{b}	4.9926^{bc}	4.643^{c}	3.2237^{de}	3.0044^{e}	3.7659^{d}	1.4726^{f}
Sandiness	0.225^{c}	0.4593^{bc}	0.3319^{bc}	1.1644^{bc}	0.7822^{bc}	0.6578^{bc}	1.3630^{b}	4.4770^{a}

*Means with same letters in the same column do not differ significantly according Tukey´s test (p<0.05)

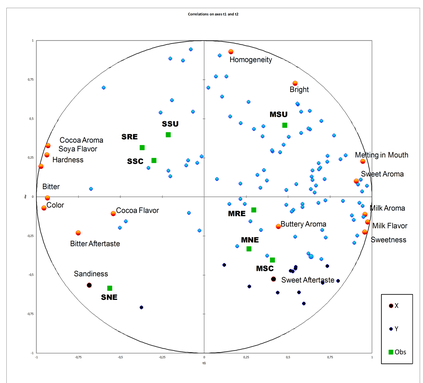

Figure 1— External preference Map of eight prototypes chocolates

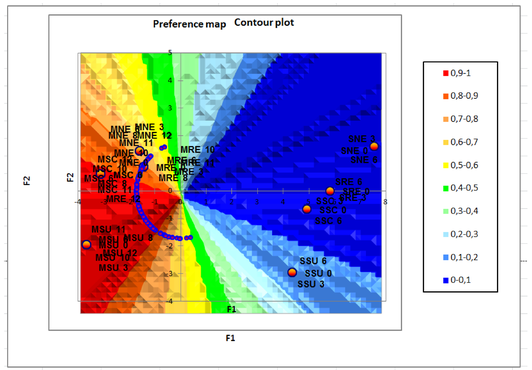

Figure 2— Contour plot of eight prototypes chocolates of preference mapping by PCA

CONCLUSION

- The external preference mapping by PLS and the PCA shown that the descriptor terms ‘bright’, ‘melting’, ‘sweetness’, ‘milk flavor’, and ‘buttery’ contributed positively to the acceptance of chocolate samples. Increases in the intensity of sandiness, hardness, soy flavor, and bitter aftertaste were the main factors responsible for the lower acceptance of the lactose-free samples.
- The contour plot graphic generated through the preference mapping by PCA clearly shows the preferences of consumers toward samples produced with milk, regardless of the sweetener applied to replace sucrose

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