

Sensory characteristics and consumer acceptance of Swiss-type cheese

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Introduction

Data on consumption of Swiss-type cheese in Switzerland indicates a preference towards a sweet and "mild" cheese flavour. Indeed, since consumer buying habits are not driven by intrinsic factors only but also influenced by extrinsic ones, it was decided to perform a study to investigate consumer liking of Swiss-type cheese in Switzerland. The results will help Agroscope Liebefeld-Posieux (ALP) developing bacterial cultures for the production of cheeses better satisfying consumer expectations. For this purpose, four cheese samples produced under different conditions and with selected flavour-building cultures were served to participants of a mountain cheese fair together with two market products (Emmentaler Switzerland Réserve cheese and a Swiss-type cheese from France). Moreover, in order to understand which attributes drive consumer liking, Descriptive Analysis was performed with a trained panel. Hedonic and analytical data were related using Preference Mapping.

Methods

Descriptive test

Descriptive Analysis was carried out with an internal trained panel. The intensities of 10 flavour and 2 texture attributes were rated on a 10-point category scale. The six samples were served monadically in a randomised order and were evaluated twice in 2 separate sessions. The test was performed in sensory booths with normal light condition.

Consumer test

Consumer testing was performed during a mountain cheese fair, with 800 people rating the six cheeses on a 9-point hedonic scale (overall liking, flavour and texture liking) and answering demographic questions on gender, age and consumption habits. Samples were served in a randomised order.

Results and Discussion

Descriptive test

Analysis of variance (ANOVA) showed significant sample effects for all attributes measured except bitter and rancid ($p < 0.05$). Principal Component Analysis (Figure 1) separated the cheeses opposing samples with higher pungent (and hard) notes to those with higher elasticity on the first axis and those with higher sweet, salty, fruity-pineapple and milky notes to those with lower intensity on the second axis.

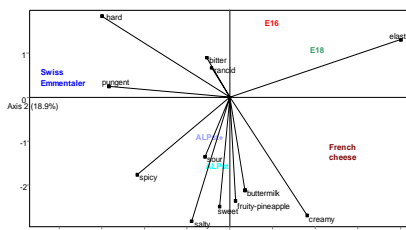


Figure 1: Principal Component Analysis of the Descriptive Analysis Data (covariance matrix)
E16/E18: Swiss-type cheese matured at 16 and 18°C respectively
ALPst/ALPst+: Swiss-type cheese produced with selected flavour building cultures
Swiss Emmentaler: Emmentaler Switzerland Réserve cheese (> 8 months maturing time)
French cheese: Swiss-type cheese from France

Consumer test

Data of 595 consumers (demographics see Table 1) could be retained and was analysed using Friedman test and Internal Preference Mapping. Results showed higher overall liking for 2 cheeses made with the ALP cultures. The market samples were rated second best (Figure 2).

Table 1: Consumers' demographics

gender	women	43.5%
	men	56.5%
age	16 – 25	14.0%
	26 – 39	21.0%
	40 – 59	39.3%
	> 59	25.7%
cheese consumption	daily	50.9%
	+ per week	41.1%
	+ per month	7.2%
	< 1 per month	0.8%

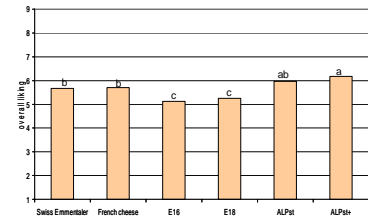


Figure 2: Means of the consumers' hedonic ratings (N=595)
Means sharing the same letter are not significantly different ($p < 0.05$)

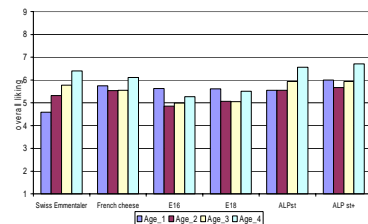


Figure 3: Means of the consumers' hedonic ratings by age groups

Internal Preference Mapping results showed consumer segmentation, with a sub-group preferring cheeses with creamy notes and another sub-group liking more spicy, pungent and salty samples. Further analysis revealed age related preferences (Figures 3-4). The youngest consumers prefer creamy and milky samples whereas the elderly like the more spicy samples better. No gender related preferences could be observed.

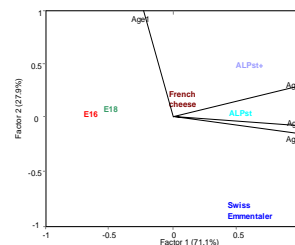


Figure 4: Internal Preference Mapping of mean hedonic ratings per age group

External Preference Mapping (Figure 5) results showed a majority of the consumers' preferences going towards the cheeses manufactured with cultures from ALP and presenting a combination of salty-spicy notes with creamy-fruity-sweet ones.

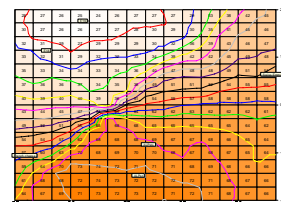


Figure 5: External Preference Mapping of hedonic ratings

Summary

This study investigated consumer liking of Swiss-type cheese produced with different bacterial cultures and under different conditions. Results showed age-related preferences, with the youngest consumer preferring creamy samples and older ones preferring more spicy samples. It was demonstrated that for the development of bacterial cultures for Swiss-type cheese demographic issues such as age need to be taken into account.