

Cheese and wine pairings – combining perception of sensory balance with GC-Olfactometry using VIDEO-Sniff

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Objective

Consuming cheese together with wine is a widely applied type of food pairing. A huge amount of information and a broad range of recommendations which type of wine harmonizes with what type of cheese are available. However, studies investigating the complex sensory interactions of cheese and beverages such as wine under controlled conditions are still limited. (1-4)

The present study examined how intrinsic flavour properties of different Swiss cheeses and Swiss wines interact and influence perception.

Samples

- White wines: Chardonnay, Chasselas, Johannisberg, Müller Thurgau (Riesling x Madeleine Royale)*, Petite Arvine*, Pinot blanc
- Cheeses: Appenzeller®, Emmentaler AOP, L'Étivaz AOP*, Le Gruyère AOP*, Sbrinz AOP, Vacherin Fribourgeois AOP
- All samples were produced in Switzerland

Methods

Sensory analyses

- Trained judges (n=10) rated the balance of 36 cheese/wine combinations. Cheese sample was taken into the mouth, chewed and swallowed, immediately followed by the wine sample. Balance of the pairings was evaluated immediately and 20 seconds after swallowing the wine using a "deviation from ideal" scale (12 cm)
- Trained judges (cheese: n=12, wine: n=14) rated the intensity of selected product specific attributes on a line scale (10 cm).
- Data analysis was performed using the FIZZ software (Biosystèmes, France).

GC-Olfactometry

- Trained judges (n=8; two per run) described the perceived odours and rated the intensity (five-point-scale) of selected cheese/wine combinations.
- Data were recorded and analysed employing the VIDEO-Sniff-method (vocabulary-intensity-duration of elementary odors by sniffing) which takes into account detection frequency and odour intensity as well as the descriptive vocabulary sorted into different odours using the Acquisniff® software (5)

Results (for selected wines* and cheeses*)

Perceived balance cheese/wine

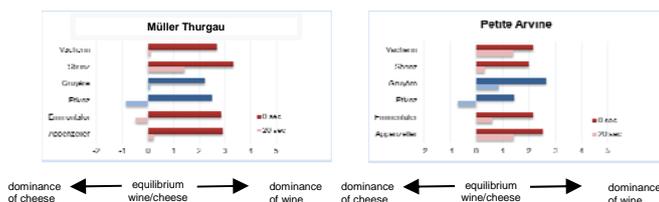


Figure 1: Deviation from equilibrium. Mean values (n=10) for 12 cheese/wine pairings

Sensory profiles

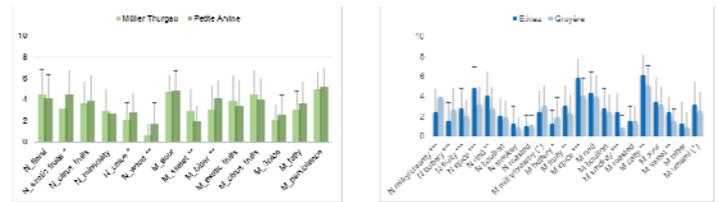


Figure 2: Sensory profile (mean, standard deviation) of the wines Müller Thurgau (Riesling X Madeleine Royale) and Petite Arvine (n=14)
N: Nose; M: Mouth
Means are significantly different: *p=0.05, **p=0.01, ***p=0.001
Data were collected and kindly provided by the Haute Ecole de Changins, Switzerland

Figure 3: Sensory profile (mean, standard deviation) of Gruyère and Etivaz (n=12)
N: Nose; M: Mouth
Means are significantly different: *p=0.05, **p=0.01, ***p=0.001

GC-Olfactometry

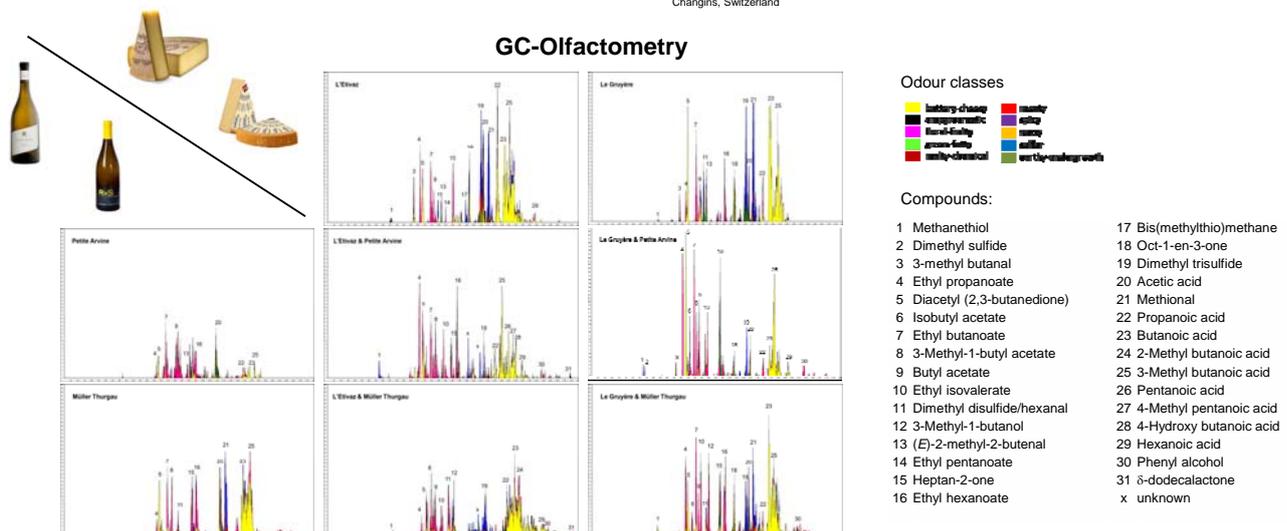


Figure 4: Results of GC Sniffings of the wines Petite Arvine and Müller Thurgau (Riesling x Madeleine Royale), the two cheeses Le Gruyère and L'Étivaz and their combinations

Conclusions

- Good agreement between sensory profile and GC-olfactometry: e.g. buttery note was perceived significantly higher, fruity note significantly lower in Le Gruyère compared to L'Étivaz
- GC-olfactometry: Specific influence of cheese on sniffing results of cheese/wine combinations: Le Gruyère results in an increase of peak areas (intensity) of perceived notes, L'Étivaz results in a broader range of aroma active compounds perceived as fruity
- Sniffing results show a clear change of odor quality depending on amount for certain compounds, e.g. propanoic acid: low amount → fruity; high amount →cheesy, sweaty
- Balance of cheese/wine pairings: broad range of acids of L'Étivaz perceived as cheesy (GC-olfactometry) may be responsible for the "cheesy" dominance of combinations with this cheese variety and wine 20 sec after swallowing compared to other cheeses

References

- M. T. Paulsen G. H. Rognsá, M. Hersleth (2015), International Journal of Gastronomy and Food Science (in press)
- G. Donadini, M.D. Fumi, I.R. Newby-Clark (2015), Food Research International, 67, 367-389
- S. E.P. Bastian, et al. (2010), Food Quality and Preference 21, 668-678
- B. Madrigal-Galan, H. Heymann (2006), American Journal of Enology and Viticulture 57(1), 12-22
- J.-L. Berdagué et al., (2007), J. Chromatogr. A, 1146, 85