Odour-active compounds and sensory profile of commercial European sour cream butters

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Introduction

The flavour of sour cream butter is composed of aroma compounds which also occur in sweet cream butter and those deriving from the metabolic activity of defined bacteria cultures used in the production of sour cream butter (1). For the development of new market products it is important to know which are the main compounds contributing to the flavour of sour cream butter that is appealing to consumers.

Objectives

➤ Identification and comparison of the odour-active compounds of different commercial sour cream butters

➤ sensory evaluation of sour cream butter using two different approaches: quantitative descriptive analysis and Napping®.

Experimental

Samples: Commercially available sour cream butters from Austria (A 1), France (Fr 1, Fr 2, Fr 3), Germany (Ger 1, Ger 2, Ger 3), Ireland (Ir 1) and Switzerland (Sw 1, Sw 2, Sw 3).

Determination of the odour-active compounds: Analysis by gas chromatography-mass spectrometry-olfactometry (GC-MS-O), using HS-SPME (DVB/CAR/PDMS 50/30 µm 2 cm-fibre). Four trained panelists performed the GC-O analyses.

➤Sensory analysis

Quantitative descriptive analysis: a trained panel (n= 12) evaluated the intensities of selected flavour attributes.

Napping®: the panelists (n= 15) grouped the butters according to their differences and similarities. In addition, they described the main characteristics which led to the grouping, using their own list of attributes.

Results

Table 1 Odour-active compounds by HS-SPME-GC-MS-O

Compounds[a]	LRI DB-5MS	Odour GC-O	A1	Fr 1	Fr 2	Fr 3	Ger 1	Ger 2	Ger 3	Ir 1	Sw 1	Sw 2	Sw 3
Diacetyl	581	buttery	+	+++	++	++	+++	++	+	++	+++	++	++
Butyric acid	763	cheesy	+	++	++	+	+	++	++	+	+	++	++
2-Acetylpyrroline	934	popcorn-like	-	++	-	-	-	-	-	-	++	-	-
2-Nonanone	1095	hot milk-like	++	+	+	+	+	++	++	+	++	-	+
Ethyl furaneol	1144	caramel	-	-	+	-	++	+	+	++	-	+	-
(E)-2-Nonenal	1150	green-like	+	+	-	-	-	-	-	-	-	-	-
4-Ethylbenzaldehyde	1203	nutty	-	++	-	-	+	-	-	-	++	-	-
δ-Octalactone	1278	coconut-like	-	++	-	-	+	-	++	++	+	-	+
Dodecanal	1390	oily	+	-	-	-	-	+	+	++	-	+	-
δ-Decalactone	1530	coconut-like	++	+++	+++	+	++	++	++	+	+++	+	+

[a]Selected odour-active compounds, identified by GC-MS-O and by using their pure references. + weak, ++ medium, +++ strong odour intensity perceived by four trained panelists
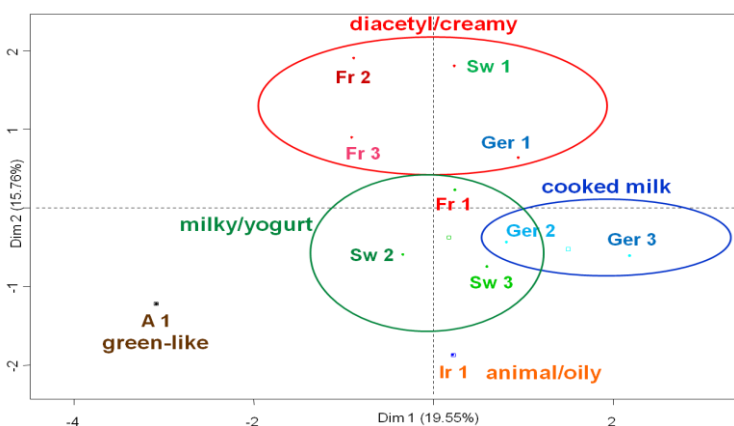

P.C.A. of means Pdt./Att.
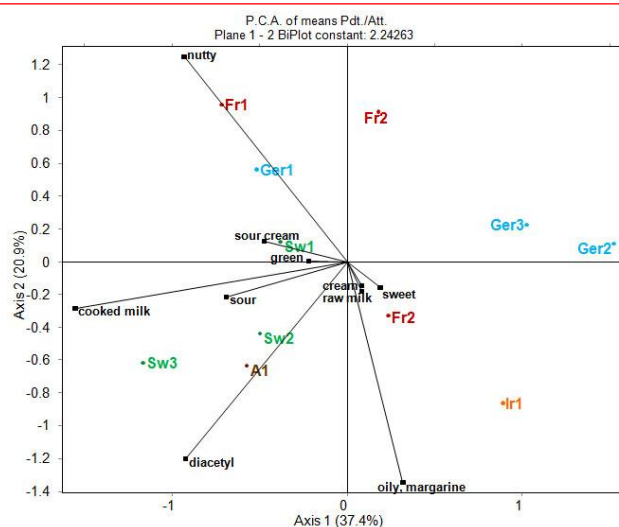Plane 1 - 2 BiPlot constant: 2.24263

Fig 1 Results of the sensory descriptive analysis

GC-MS-O: Austrian butter had intense cooked milk and coconut odour notes; French and Swiss butters were characterised by creamy and nutty odours; German samples had caramel and cooked milk notes; Irish butter was characterised by oily and coconut odour notes.

Descriptive analysis: The eleven samples showed to some extent different profiles. So showed two Swiss samples and the Austrian butter higher cooked milk and diacetyl notes. Two French samples were described as nutty, confirming the GC-O results. The Irish butter presented a higher oily note as well as a diacetyl note. Two German samples were characterised by lower aroma notes intensities.

Napping®: Tree distinctive groups were observed. The French samples were characterised by diacetyl and creamy notes, the Swiss butters by milky/yogurt and the German ones by cooked milk notes. Irish and Austrian samples were described as animal/oily and green-like, respectively.

Fig 2 Results of the Napping® analysis

Conclusion

The odour attributes found by GC-MS-O, as diacetyl, cooked milk, green-like and oily, were mostly confirmed by the Napping® analysis. On the other hand the results of the descriptive analysis were in some cases more difficult to relate to the GC-MS-O results. The partially different outcome of the two sensory methods can be explained by the fact that in the Napping® the panellists grouped the butters according to their own list of attributes, whereas in the descriptive analysis the intensity of a restrictive number of defined attributes was judged.

Literature

1. Badings, H. T., Neeter, R. (1980), *J. Dairy Sci.* 88, 2923-2937
2. J. Pagès, (2005), *Food Qual. Prefer.*16, 642–649.

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