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Session 21 Abstract 3516

Chemical composition, fatty acid profile and sensory properties of cheese from organic and conventional milk

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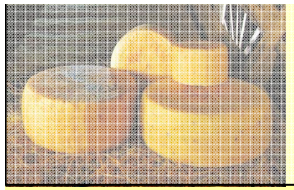
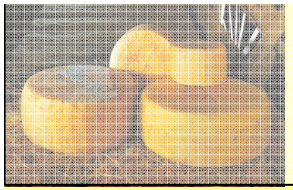


“Biobos” Project

- *“Quality and nutritional characteristics of dairy and beef production from organic and conventional systems in the mountain area”* (Project supported by Veneto Region)

- The preliminary results about milk from organic and conventional farms were presented at the last EAAP meeting in Dublin (Bailoni et al., 2007)

- This presentation is focussed on the results of ripening cheeses

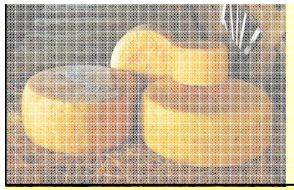


Background

- In Italy about 70-75% of dairy milk is finalised to cheese production

- Organic cheese is a minimal part of cheese industry, but it can represent a way to increase the income of farms localised in marginal areas

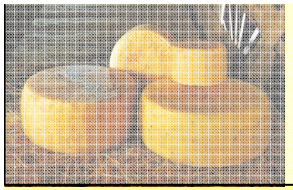
- Absence of results in literature about differences between organic and conventional cheeses



Aim

- To determine possible differences in chemical and fatty acid composition and sensorial properties of cheese from organic and conventional dairies in a mountain area over a whole year

- To distinguish cheeses from different systems (i.e. traceability)

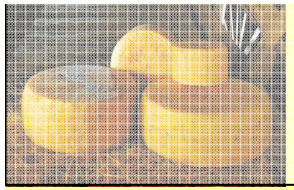


Cheese samples

- 12-mo longitudinal study (March 2007 → February 2008)

- Samples monthly collected in one organic (ORG) and two conventional (CON) small-size dairies located in a mountain area (Veneto Region, NE Italy)

- 3 months of ripening

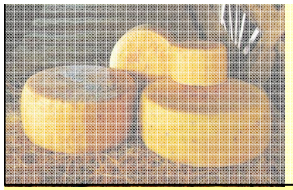


Analysis

- Chemical composition
  (Milkoscan, Foss Electric, Denmark – Chloridemeter, Sherwood, UK)
- Fatty Acids (FA) profile by gas chromatography
  (GC: model 8000 Series Top Thermo Quest Italia – Column HP-88, 100m)
- Sensorial analysis (according to ISO 13299:2003 regulation)

Statistical analysis

- Two way ANOVA (dairy and month effects; SAS,1990)
- Multivariate Data Analysis
  (Software SIMCA-P 11, Umetrics - Sweden)

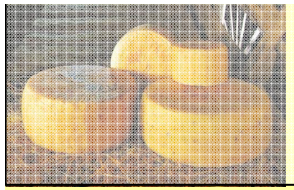


Results

Composition of organic (ORG) and conventional (CON1, CON2) cheeses

Item	LSMEANS			SE	Orthogonal contrasts	
	ORG	CON1	CON2		ORG vs CON	CON1 vs CON2
Fat, %	30.83	29.96	28.84	0.51	*	ns
Protein, %	27.40	27.27	28.02	0.52	ns	ns
Moisture,%	36.52	37.67	37.80	0.42	*	ns
NaCl,%	1.95	1.91	2.14	0.14	ns	ns
Vit. A, µg/g	6.99	8.67	8.97	0.33	***	ns
Vit. E, µg/g	7.23	5.40	4.85	0.45	***	ns

*** = $P<0.001$; * = $P<0.05$

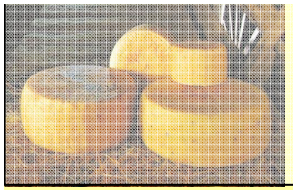


Results

FA profile (% of total FA) of organic (ORG) and conventional (CON1, CON2) cheeses

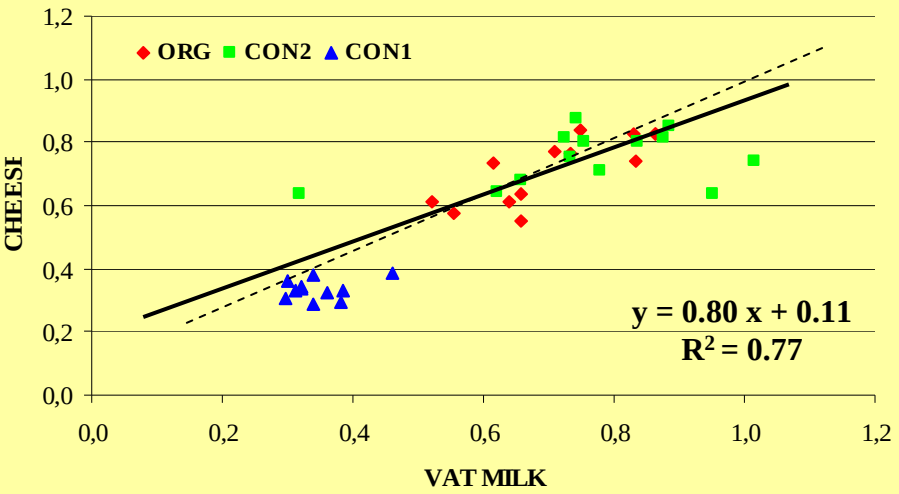
Item	LSMEANS			SE	Orthogonal contrast	
	ORG	CON1	CON2		ORG vs CON	CON1 vs CON2
SFA	66.51	71.12	70.59	0.36	***	ns
MUFA	27.35	24.48	24.06	0.31	***	ns
PUFA	4.51	3.22	3.92	0.78	***	***
IA[1]	2.33	2.95	2.92	0.54	***	ns
IT[2]	2.79	3.47	3.22	0.47	***	**
n3	0.72	0.38	0.75	0.55	***	***
n6/n3	3.81	6.52	3.16	0.23	**	***
CLA	0.91	0.50	0.69	0.36	***	**

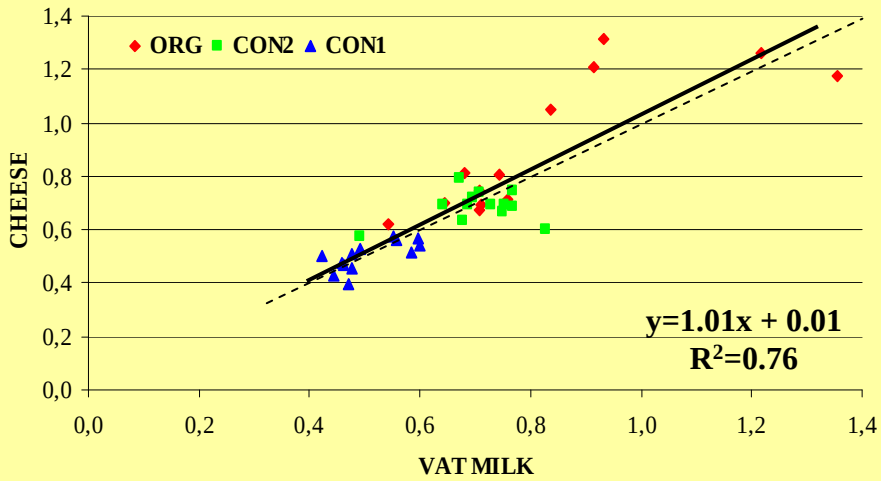
[1] IA= Index of Atherogenicity; [2] IT= Index of Thrombogenicity (*Ulbricht and Southgate,1991*); ***=$P<0.001$;**=$P<0.01$



Results

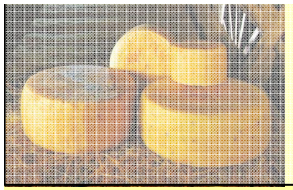
Correlation between n3 FA (% of total FA) content in vat milk and cheese





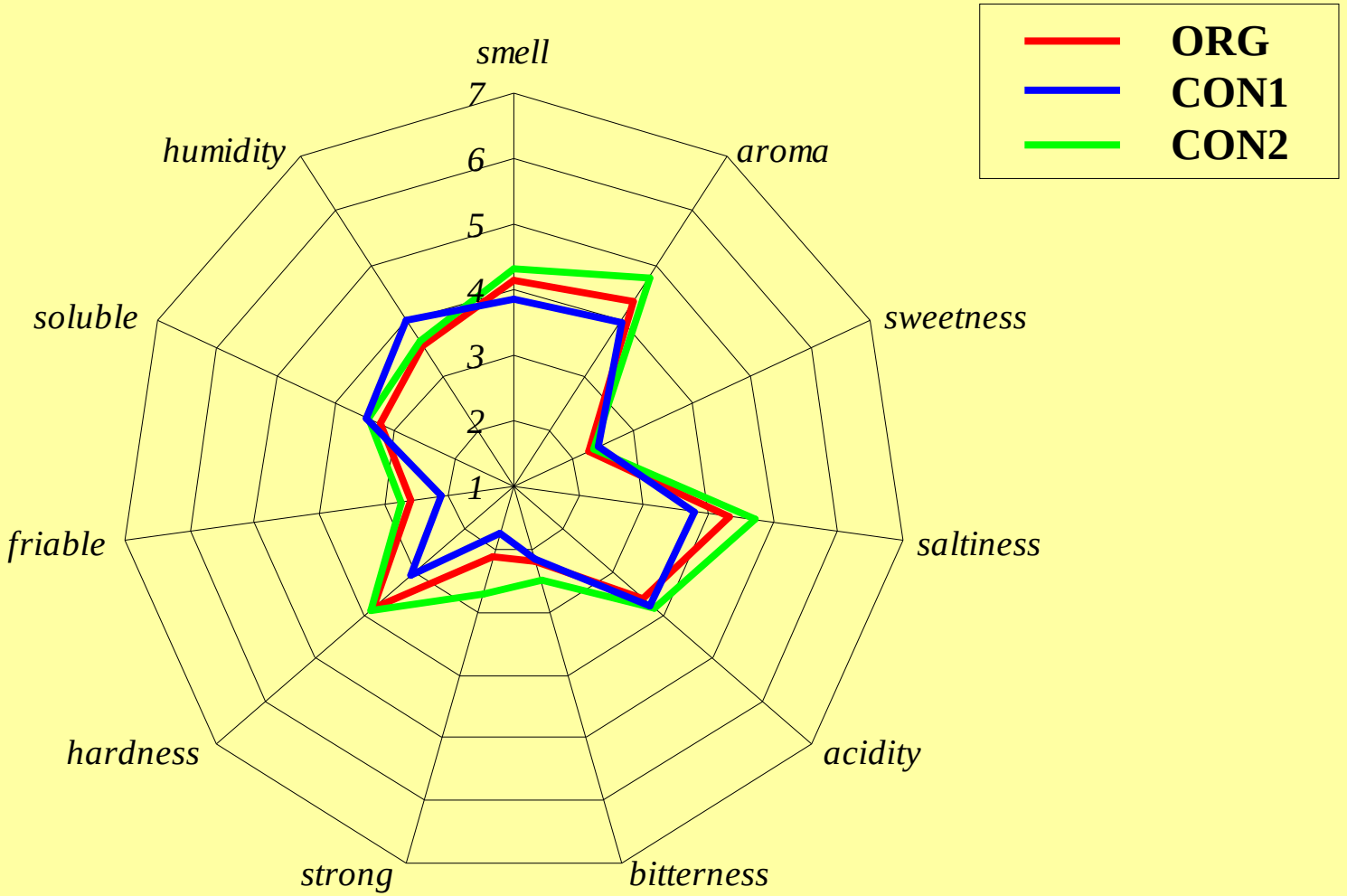
Correlation between CLA (c9 t11 C18:2, % of total FA) content in vat milk and cheese

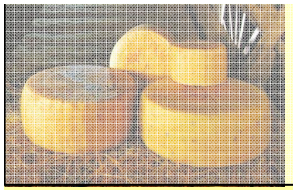
Miotello et al., Chemical composition, fatty acid profile and sensory properties of cheese from organic and conventional milk



Results

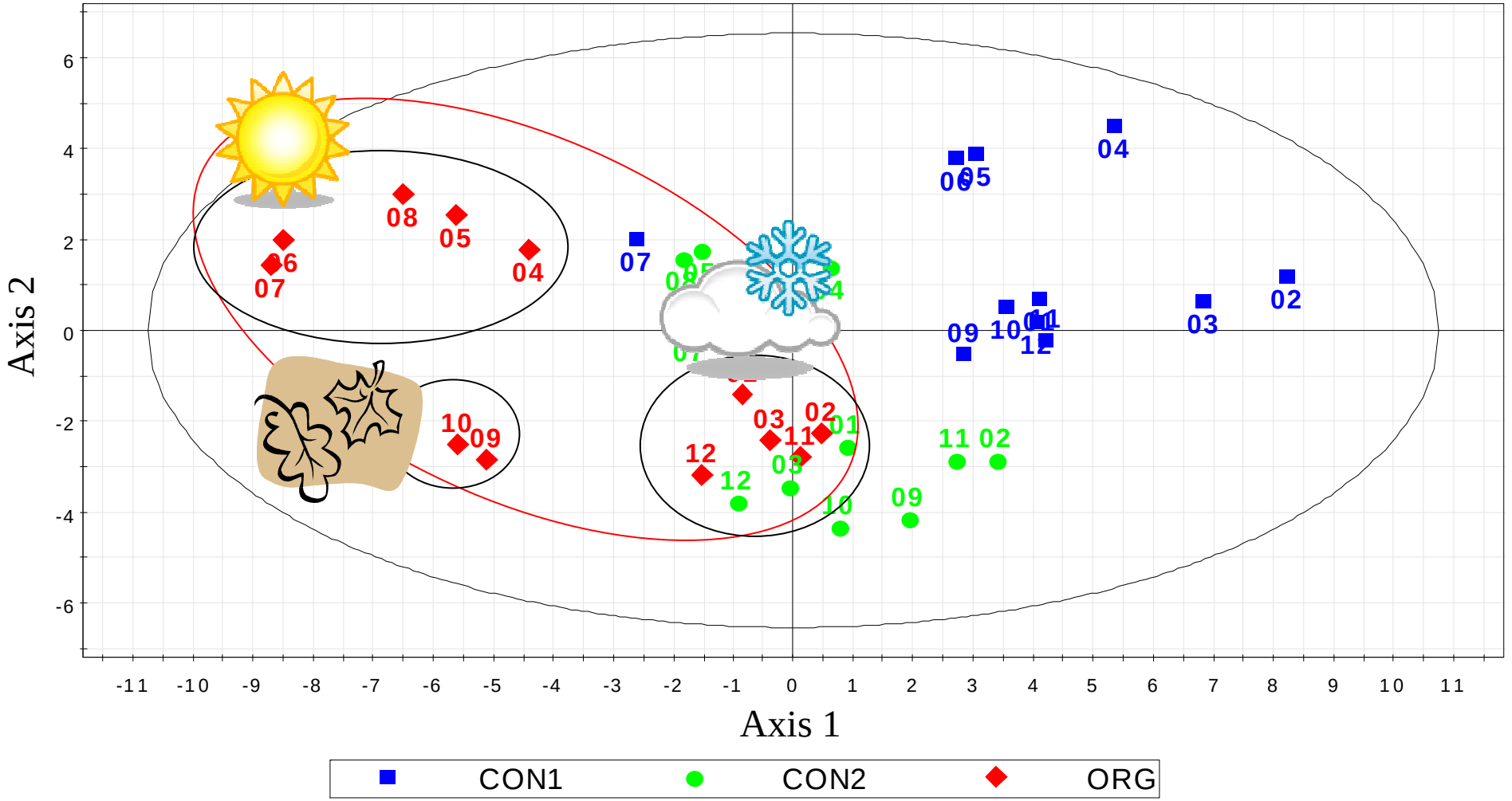
Sensory properties of organic (ORG) and conventional (CON1, CON2) cheeses

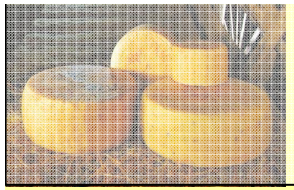




Results

Principal component analysis (PCA) of the FA profile of the cheeses: plot of the principal axes 1(R^2=39.3%) and 2 (R^2=14.5%).





Conclusions

- Differences between organic and conventional cheeses are mainly due to fatty acids profile. From human nutrition point of view the profile of organic cheeses was better than conventional ones.

- Only FA parameters can be used to discriminate the organic and conventional cheeses. In addition, within organic products it is possible to identify cheeses obtained in different seasons.

- Differences between organic and conventional cheeses can not be distinguished by consumers since sensory properties by trained panellists were unaffected by the different production systems.


Thank you for your attention
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