

Milk fatty acids in relation to feeding practices on Dutch organic farms

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- CLA and omega-3: "healthy" fatty acids, possible distinguishing quality parameters for organic milk.
- Variations seem to be high:
 - importance of other factors besides organic production
 - possibilities for improvement.

Product development project of a Dutch cheese factory



Organic cheese with distinct levels of CLA and omega-3



Methodology

- Participatory research at 17 organic farms
- Mainly on sandy soils, main part of the grassland is regularly renewed (<10 years)
- Monitoring fatty acid pattern in bulk milk of farms
- Feeding practices in week before (farmers' estimate)
- From June 2004 until August 2005
- 105 samples of 15 farms analysed

Levels of CLA and omega-3 and feed ration composition per season.

	Summer	Autumn	Winter
CLA (mg / g milk fat)	10,3	11,0	6,5
Omega3 (mg / g milk fat)	11,2	10,6	9,4
	Percentage in ration		
Fresh grass	67	39	2
Red clover fresh	1	5	0
Concentrate	15	17	18
Grass silage	11	28	59
Maize silage	2	3	6
Whole grain silage	1	0	2
Red clover silage	2	7	10
Others	2	0	2
Added oil (g/day/cow)	50	96	100

Factor analysis of CLA

	Explained variance (R ²)	Estimated effect per 10% in the ration (mg per g fat)
Fresh grass	61	0.58
Grass silage	49	- 0.61
Maize silage	41	- 2.39
Concentrate	31	- 2.79
Red clover fresh	26	1.70

Factor analysis of omega-3

	Explained variance (R ²)	Estimated effect per 10% in the ration (mg per g fat)
Fresh grass	62	0.31
Concentrate	53	- 1.65
Maize silage	52	- 0.79
Grass silage	58	- 0.32
Red clover fresh	48	0.49

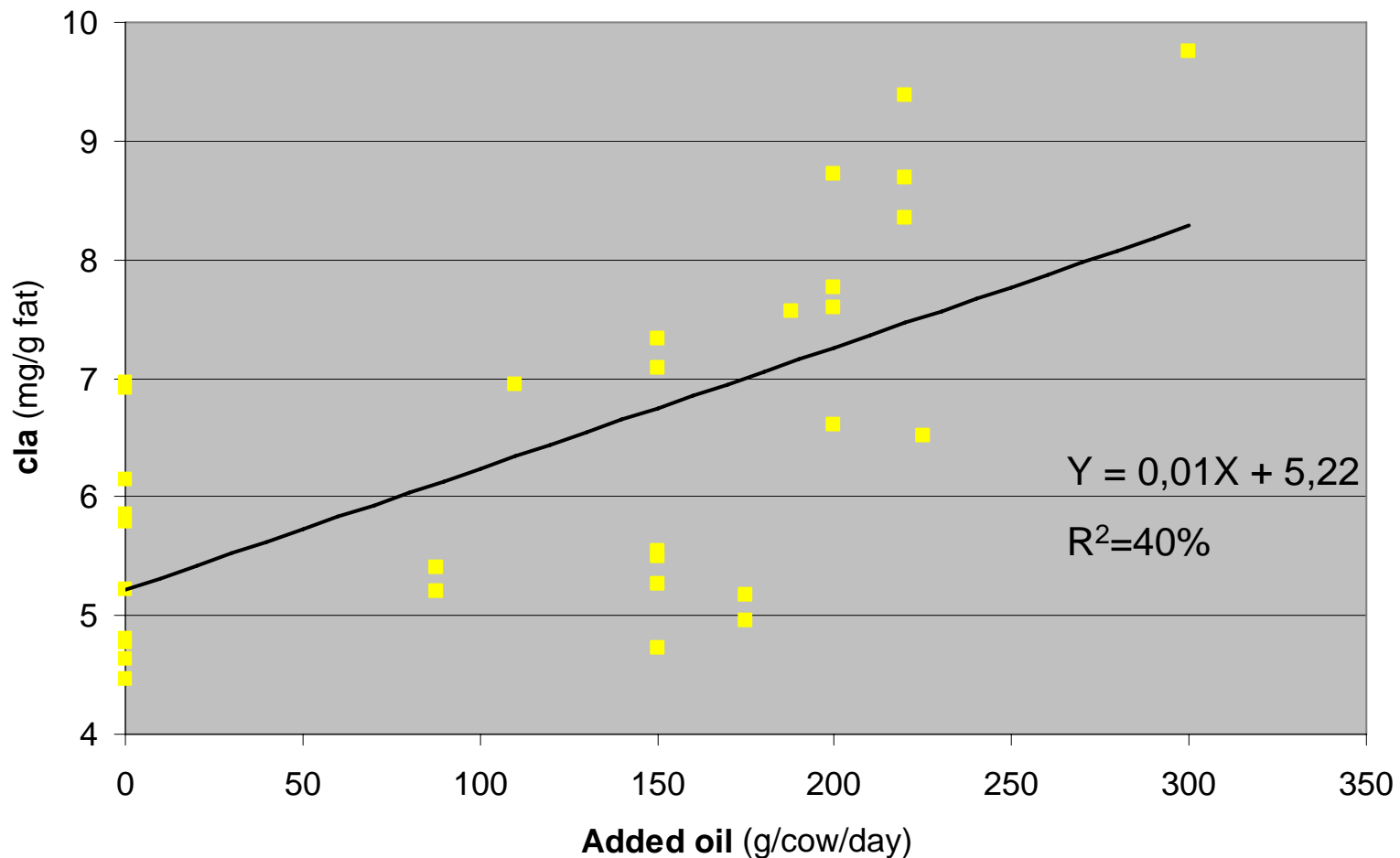
Multiple linear regression:

CLA: model fit OK, 81% explained variance with “farms” only contributing 16%

Omega-3: less satisfying, a large ‘farm’-effect contributing 49% of the 66% explained variance

Omega-3 more influenced by:
animal factors (breed, negative energy balance)
and/or non-recorded feed characteristics (roughage quality)

Product development: organic cheese with high levels of CLA in winter



Organic quality?

- conventional agriculture: higher levels possible (e.g. >200 mg omega-3 per g fat) by using rumen protected fatty acids
- organic ambition: high quality products as an inherent reflection of proper agricultural practices.
- quality more than material composition: what is more than PUFA's (and other substances)?

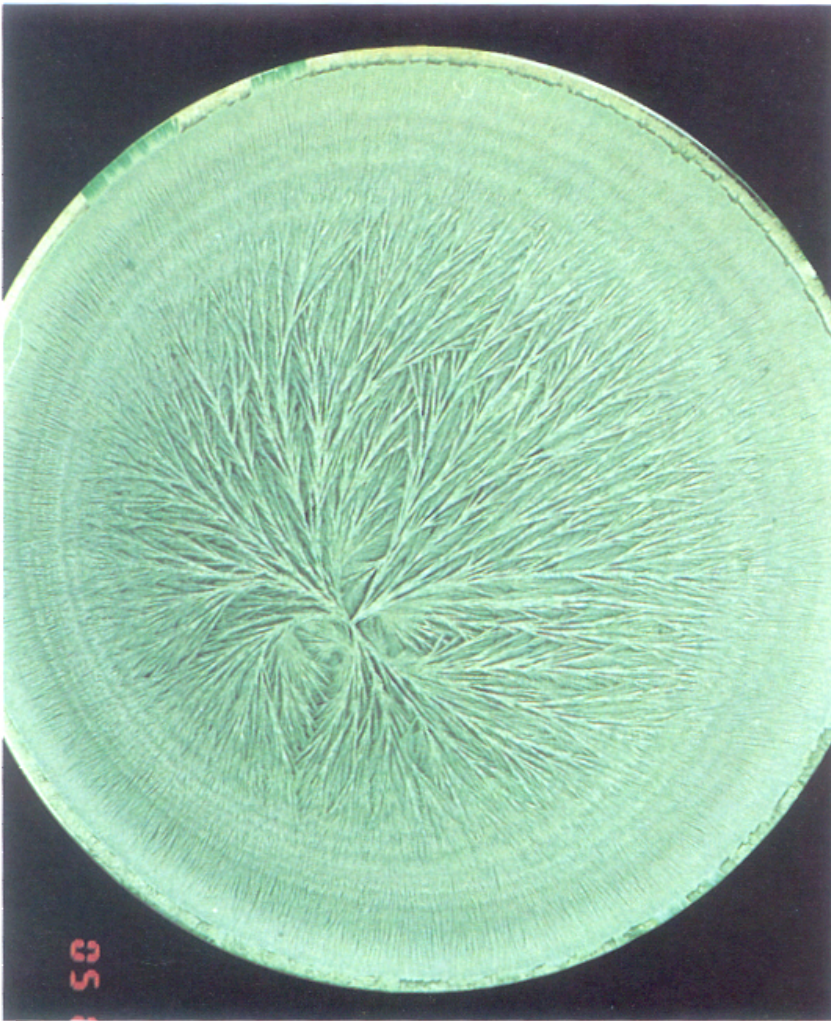
Holistic quality parameters: an option?

Biophotons and bio-crystallisations

Hypothesis for both:

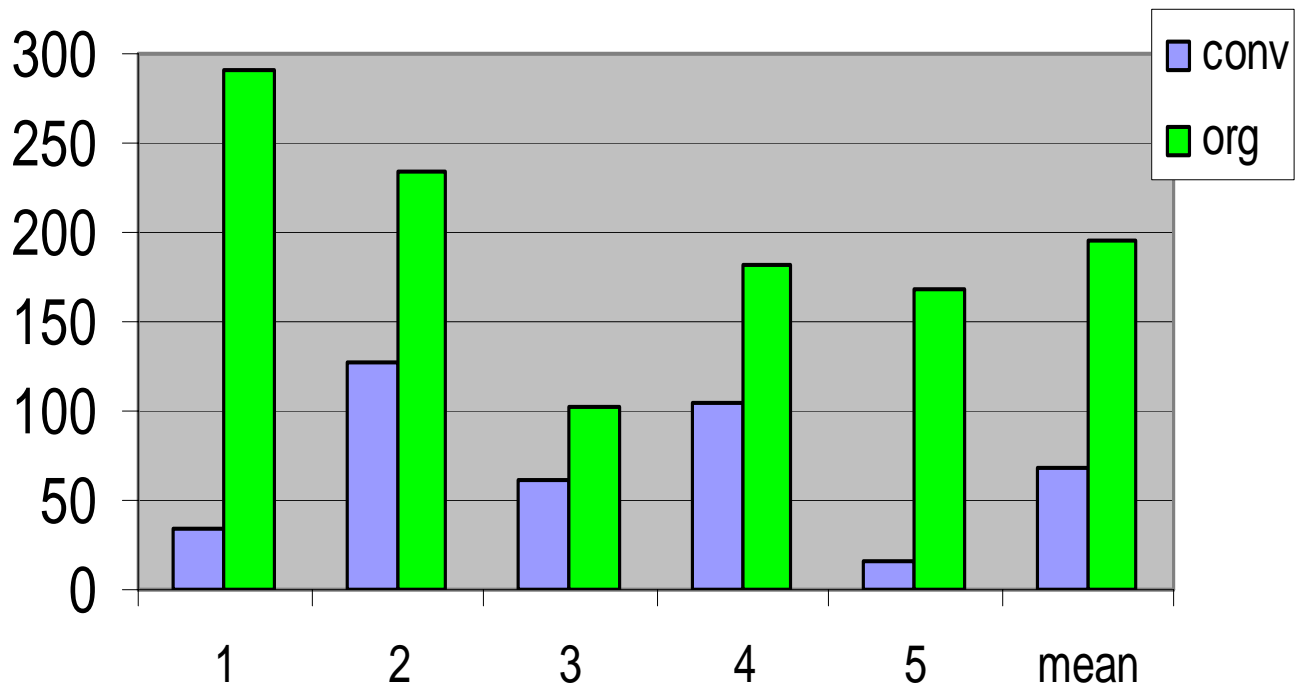
the structure (the 'order') of food is as important to human health as the material composition.

Pilot survey with 5 conventional and organic farms (Adriaanse et al, 2005): organic scores better on both



Biocrystallisations milk:
Biodynamic raw vs. Conventional

Biocrystallisation: computer analysis of needle density



Research continues

- * Sept. 2005 – Dec. 2006
- * 16 farms, partly different

Preliminary analysis of results:

- fatty acid patterns are confirmed
- holistic parameters: hardly any relation with farm characteristics
(some on biocrystalizations and ordening)

The organic chain: tasteful products supporting human health from a healthy production system

