Where will new techologies take milk recording?

Large scale screening of the Danish dairy cattle population for their fatty acid profile

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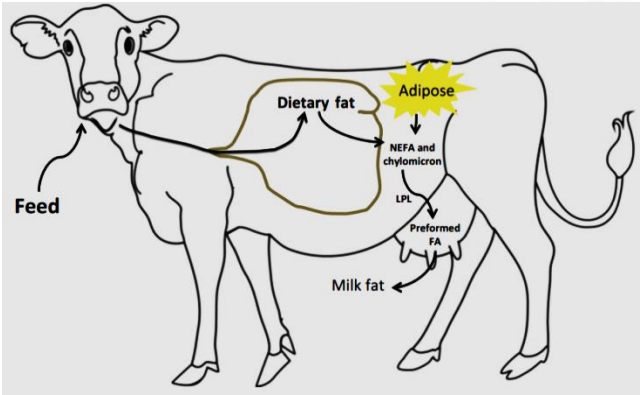
Fatty acid (FA) profiles in raw milk – possibilities and opportunities

- Brief overview – where are we now?
- Farm management possibilities
- Future perspectives in healthy milk and healthy happy cows

Fat in milk is not just fat…

The butterfat has multiple origins…

- Directly and unaltered from the feed
- From the feed after biohydrogenation in rumen
- By *de novo* synthesis in the mammary glands
- Mobilized FAs from the adipose tissue
- From the feed or adipose tissue after desaturation in the mammary glands



Alterations of FAs in raw milk

Butterfat in milk can be altered by…

- Feed
- Genetics
- Environment

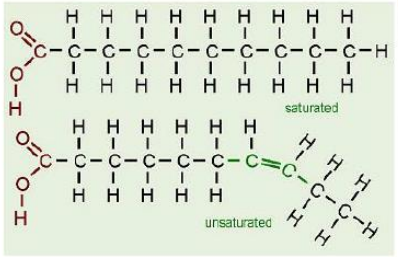
FA profiles have multiple implications…

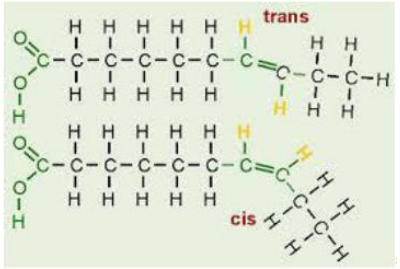
- Decreased somatic cell count (SCC)
- Reduced prevalence of ketosis
- Increased fertility
- Environmental effects

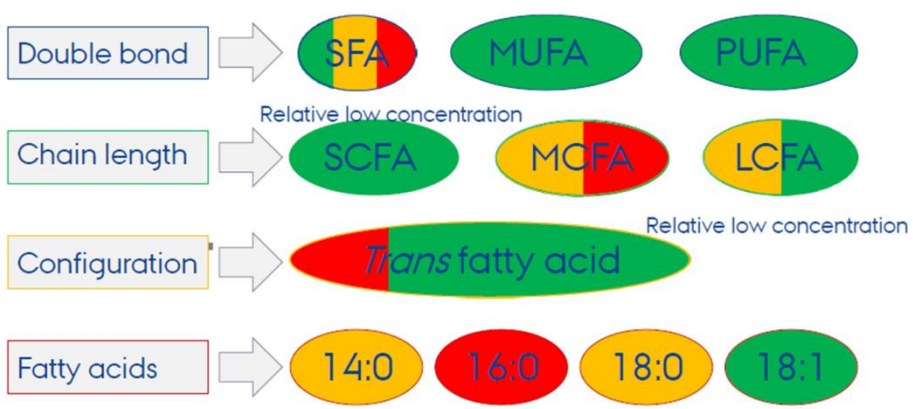
Fatty acids compositions

Fatty acids

- Carbon chain length
- Number of double bonds
  - Saturated
  - Unsaturated
    - Monounsaturated (MUFA)
    - Polyunsaturated (PUFA)
- Configuration of double bond33
  - *Cis* fatty acids
  - *Trans* fatty acids





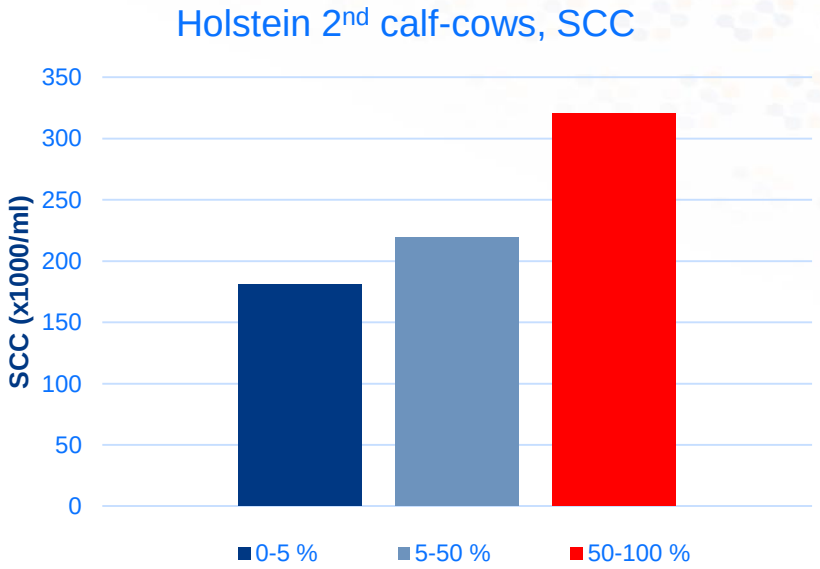


De Novo fatty acids indicate rumen health

- *De novo* FAs are created in the rumen.
  - The more *de novo* FAs, the more is the supply from the rumen
  - Better supply = good functioning rumen = healthy cow
  - Healthy cows with a healthy rumen, has a shorter dry period.

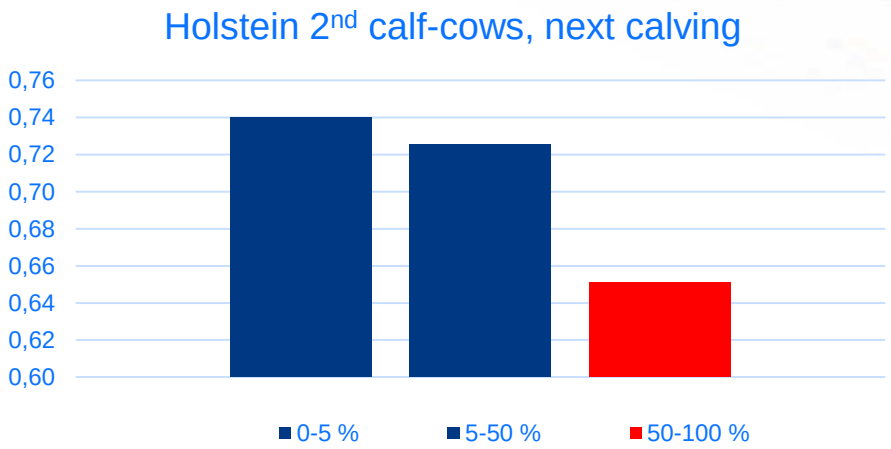
De novo at herd level

- In herds where there is a large share of cows with less than 24g *de novo* FAs per. 100 g fat, there is, on average, higher SCC.

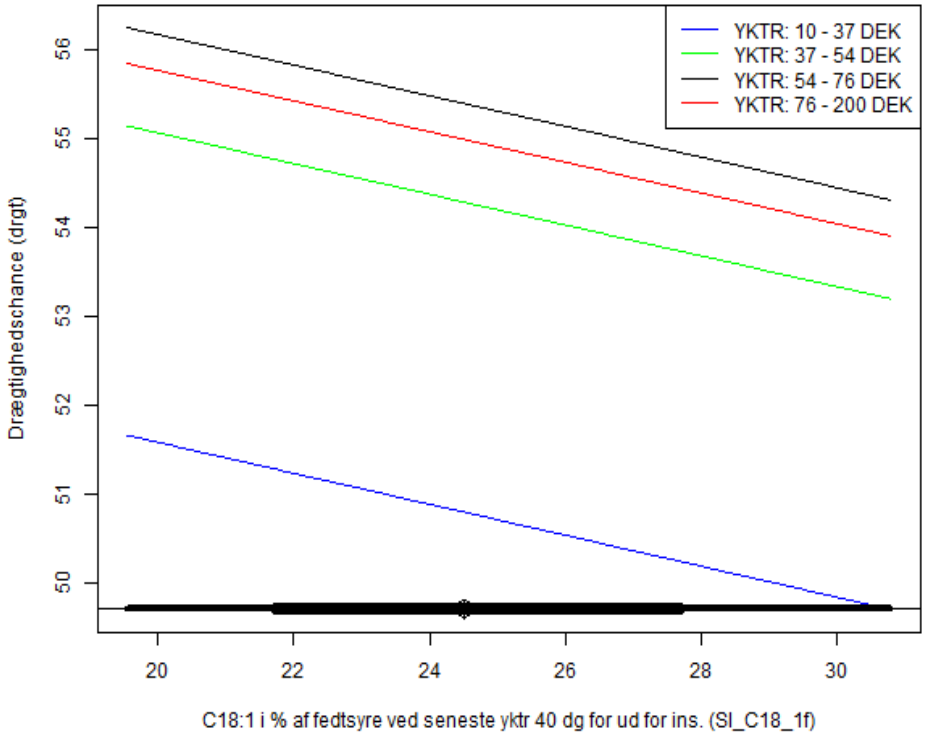


De novo at herd level

- In the herds where a large part has less than 24g *de novo* FAs per 100 g fat, there is, on average, fewer cows who gets a second calving.



Fatty acids can be used as predictor for future reproduction opportunities



Data is provided to the farmer for action

Fedtsyre målinger

De novo fedtsyre målinger (g fedtsyrer / 100 g fedt) på kontroldato

	19/3	24/4	31/5
Gns. de novo, alle køer 120-250 dage	26,6 (137)	26,8 (137)	26,4 (164)
- 1. kalvs 120-250 dage	27,1 (49)	27,4 (44)	26,7 (60)
- 2. kalvs 120-250 dage	26,3 (42)	26,4 (37)	26,0 (34)
- Øvrige kalvs 120-250 dage	26,3 (46)	26,5 (56)	26,2 (70)

Faktorer der påvirker andelen af de novo fedtsyrer

Reducerer: Højt fedtsyreindhold i foderrationen, frisk græs og negativ energibalance

Øger: Højt sukkerindhold i foderrationen og en høj grovfoder andel (NDF)

Fedtsyre målinger

De novo fedtsyre målinger (g fedtsyrer / 100 g fedt) på kontroldato

	3/4	7/5	6/6
Gns. de novo, alle køer 120-250 dage	25,3 (50)	27,0 (56)	25,7 (61)
- 1. kalvs 120-250 dage	25,2 (15)	25,9 (16)	25,9 (18)
- 2. kalvs 120-250 dage	For få dyr*	26,8 (12)	24,3 (13)
- Øvrige kalvs 120-250 dage	25,5 (27)	27,8 (28)	26,2 (30)

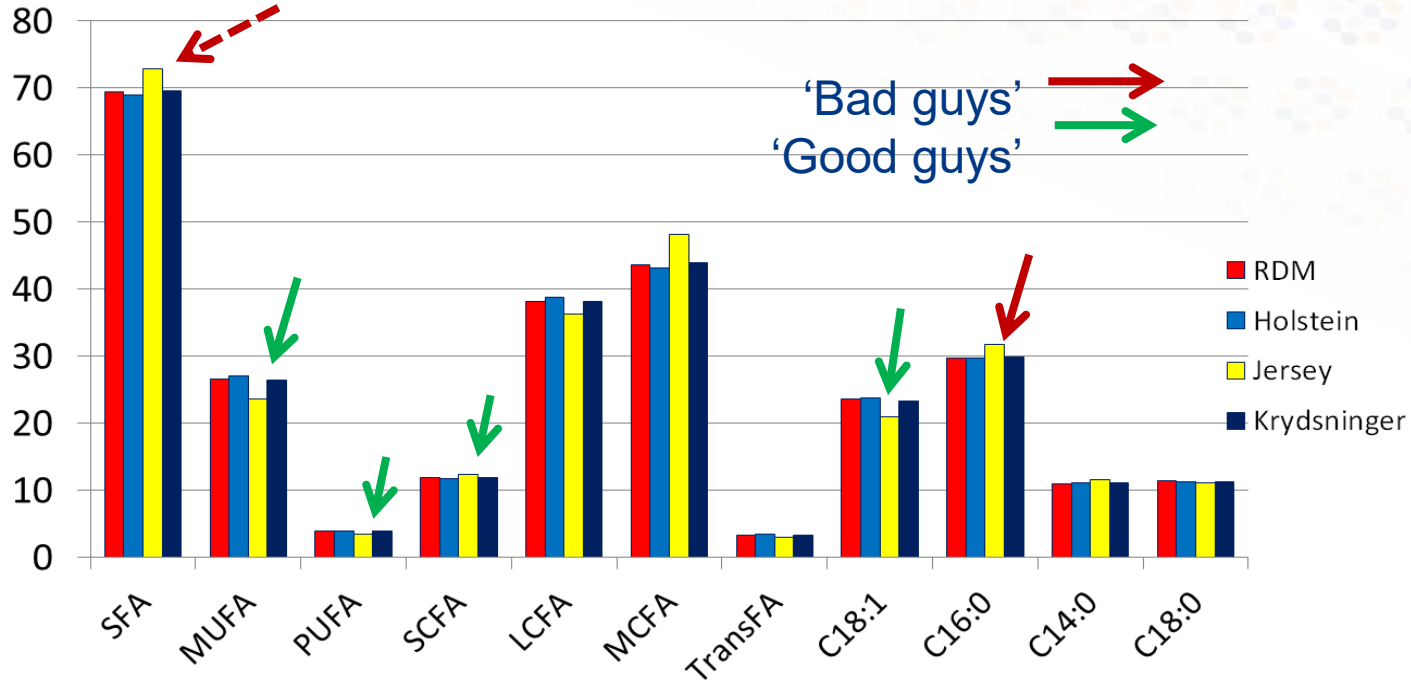
Faktorer der påvirker andelen af de novo fedtsyrer

Reducerer: Højt fedtsyreindhold i foderrationen, frisk græs og negativ energibalance

Øger: Højt sukkerindhold i foderrationen og en høj grovfoder andel (NDF)

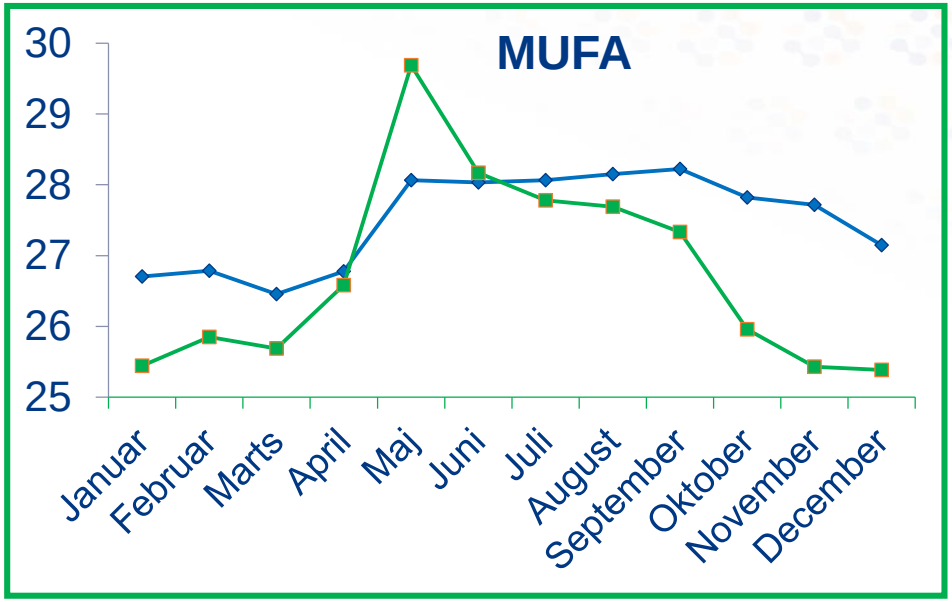
* Der er for få dyr til beregningen (minimum 10 dyr)

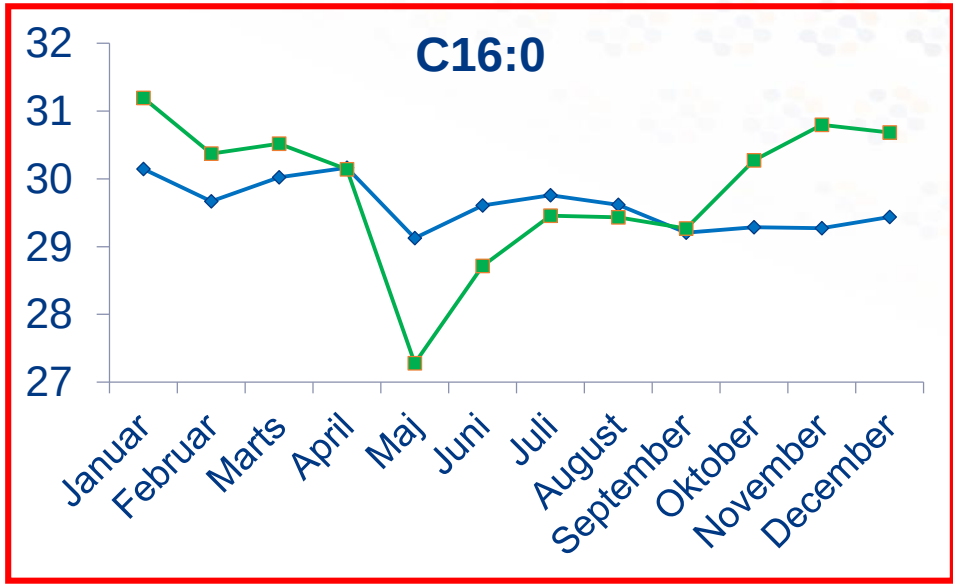
Big differences between the different breeds in FA compositions



*Results from the Danish DHI programme, of more than 3,5 M samples

Great seasonal differences…





Conventional

Organic

Cheese produced from two different Holstein herds

- Cheese 1: Milk with 31,1 % UFA
- Cheese 2: Milk with 23,4 % UFA

- Taste differences in favor of cheese 1

- Big difference in the feeding in both herds.

Future perspectives in products with altered fatty acids…

- Environmental footprint in dairy production
- Differentiated products at the dairy plants
- Increased productivity at the dairy farms
- Increased animal welfare

Thanks for listening, and all participants in this project…

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STØTTET AF
promilleafgiftsfonden for landbrug

Undersøgelsen er en del af Organic RDD 2-projektet SOBcows