Bringing taste to life

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FUTURE VALUE OF THE CONTENT OF MILK – AND COW

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DAIRY INDUSTRY INTRESTS TO MILK? DEFINITELY NOT JUST COMPOSITION!

- Consumer acceptability
  - hygiene, quality (TPC, SCC, chemical residues)
  - but how milk is produced? (e.g. impact on animal health and welfare, environment and resource efficiency)
  - A hot topic!
- The possible effects of milk on human well-being
- The possible effects of milk on human health problems
- The animal breeding industry has an impact – directly or indirectly on all of the above traits

MAIN COMPOSITION OF MILK

- Dry matter – economic value in the whole chain
  - within the industry we think that the economic value of liquid (≈ water) is close to zero or even negative
    - more milk is eaten than drunk
    - less water in logistics and processing
    - better udder health?
  - however, the prising systems of raw milk do not allways support the industry opinion
- Fat and protein maintain to be the key traits in breeding
  - represent the main economic value of the milk and should be in the breeding targets also in the future
- Minerals
  - some of the minerals may have a specific role for the milk products acceptance and human nutrition (e.g. Se, Zn and I)
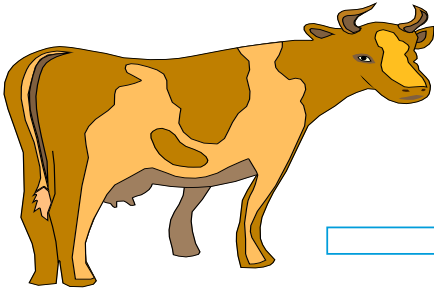 - perhaps not a breeding issue?

LONG-TERM PHENOTYPIC FAT AND PROTEIN (%) CONCENTRATION IN RAW MILK IN FINLAND
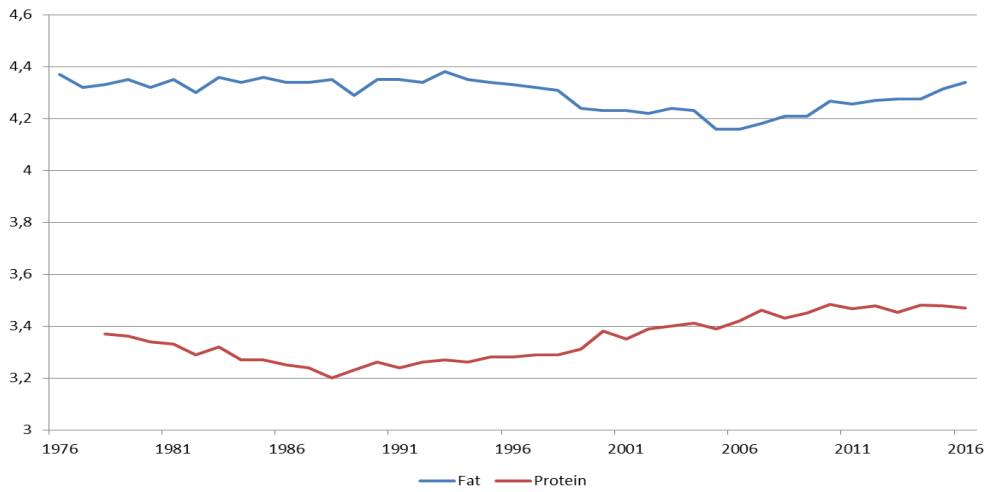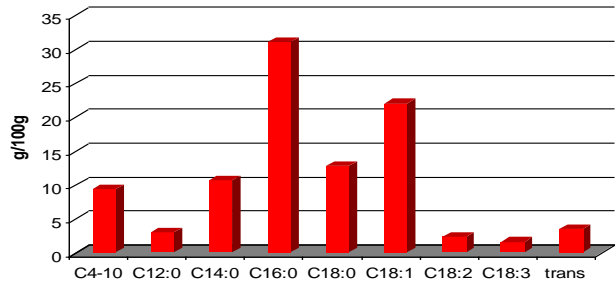
COMPOSITION ON MILK FAT

The challenge: milk fat contains lot of saturated fatty acids which may or may not affect human health

Diets contain predominantly polyunsaturated fatty acids

Milk fat contains predominantly saturated fatty acids coming from de novo synthesis and diet after biohydrogeantion

LOT OF DATA SHOWING HIGH VARIATION IN MILK FAT COMPOSITION BETWEEN DAIRY FARMS (COWS), SHOULD WE MEASURE IT (MIR TECHNOLOGY)?

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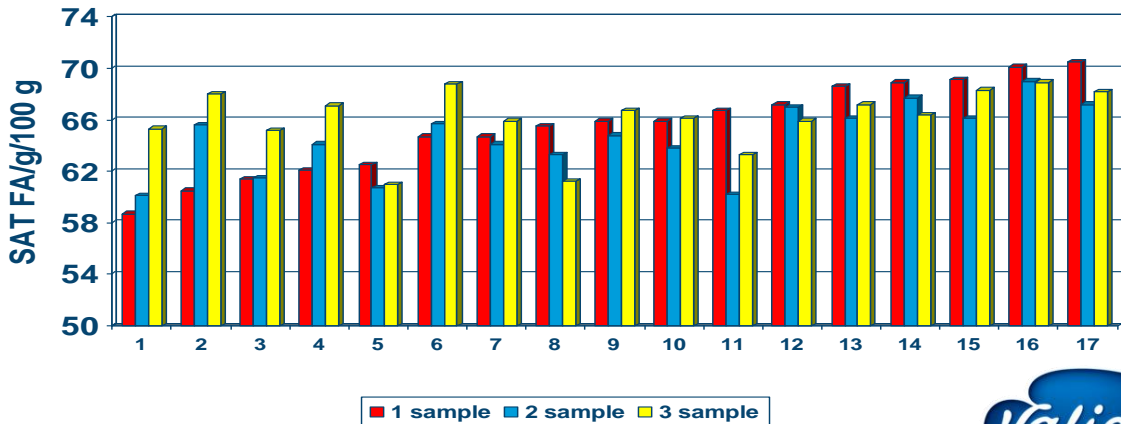
MILK FAT

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* Rehabilitation of milk fat reputation during the last 20 years: fatty adics that are either positive, neutral or negative in respect of human health
* The consumer (= business) potential somewhat unclear in enhancing milk fat composition
* What are the possibilites (and costs) in increasing the positive FAs and decreasing the negative FAs in the milk fat?

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COMPOSITION ON MILK PROTEIN

MILK PROTEIN

- A high business value
- NPN and urea-N
  - management, probably not a breeding issue
  - less is more
- Whey protein
  - one of the best protein sources in the nutrition
  - the genetic wp/casein realionship cannot be easily manipulated?
- Casein
  - a high economic value in cheese production
    - functional properties, e.g. rennettability
  - Casein types (especially β-casein); lots of discussion and even speculation
    - EFSA opinion quite clear

MEASUREMENTS FROM DHI-SAMPLES – WHAT IS THE RIGHT STRATEGY?

- IR and MIR technology widely used since 1970's
- Traditionally commercial calibrations utilized → predictions of milk traits (e.g. protein, fat, SCC, FFA, NPN, urea) stored in the database for breeding purposes
- The MIR –spectrum of contains lot of information from milk and cow that can be utilized both in the management and breeding; how can we know what is interesting/valuable and what we can dig up from the spectra after let say 5-10-20 years?
- New strategy: don't waste the data → all the information (whole spectra) should be stored for the possible future needs

THE FUTURE COW AND MILK PRODUCTION?

- Critisism against animal production → dairy and meat industry
  - environment, especially climate change
  - resource efficiency
  - a cow that can efficiently utilize grass and forages
- The whole milk sector should put emphasis on
  - efficient production and efficient cow
  - feed efficiency (FE) must be one of the most important traits to be improved → breeding industry
  - improving FE much more efficient in decreasing GHG that trying to mitigate e.g. methane
- Do we have consensus how to breed our cows for better FE?
  - I think that we don't have the consensus yet, but measuring DMI is central
  - efficiency can be easily described as milk/DM or milk E/E intake
  - this relationship cannot be used as a trait?
  - negative weight on LW and DMI

THANK YOU!

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