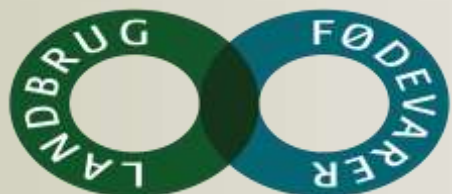




DETAILED MILK FATTY ACID PROFILING OF THE DANISH DAIRY CATTLE POPULATION

- Lisa Hein, SEGES
- Albert Johannes Buitenhuis, Aarhus University
- Sandra Beyer Gregersen, Aarhus University
- Lotte Bach Larsen, Aarhus University
- Dino Demirovic, Eurofins, Steins
- Solvej Warnecke, FOSS
- Arne Munk, SEGES
- Lars Peter Sørensen, SEGES
- Jørn Pedersen, SEGES
- Morten Kargo, Aarhus University
- Niels Henning Nielsen RYK (Danish Milk Recording)

ICAR Chile
October 27th. 2016



RYK provides milk recording for dairy cows. RYK are collecting annually about 5.5 million milk samples, serves 3.000 dairy farmers, and have a turnover of 16 million euro. We have 65 employees, and offices in Aarhus, Sorø, Holstebro, and Vojens.

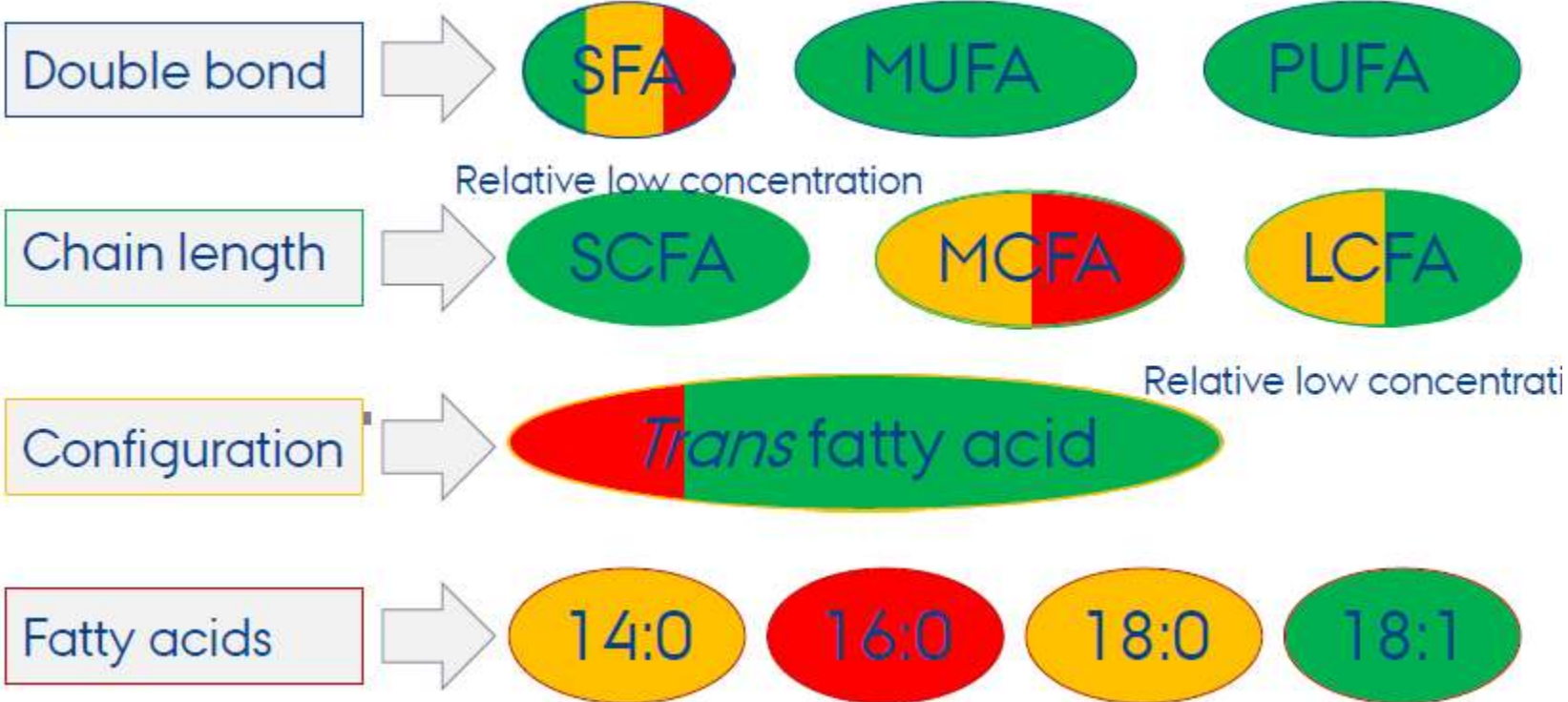


MILK FATTY ACID PROFILING OF THE DANISH DAIRY CATTLE POPULATION IN MORE THAN ONE YEAR

- **3,5 million milk samples (organic and conventional milk)**
 - Routine milk recording scheme applied.
 - Using milk infrared spectroscopy MilkoScan™ FT+/FT6000.
 - Foss Application Note 64.
 - 11 Fatty Acids categories (seven FA groups and four individual FA).
- The Activities are carried out in the project **SOBcows** (runs 2014-2018)
 - **Specialized Organic Breeding** goals and breeding Schemes for dairy cattle
- One of the aims of SOBcows:
 - Investigate opportunities to develop organic cow lines producing milk with a healthier FA profile



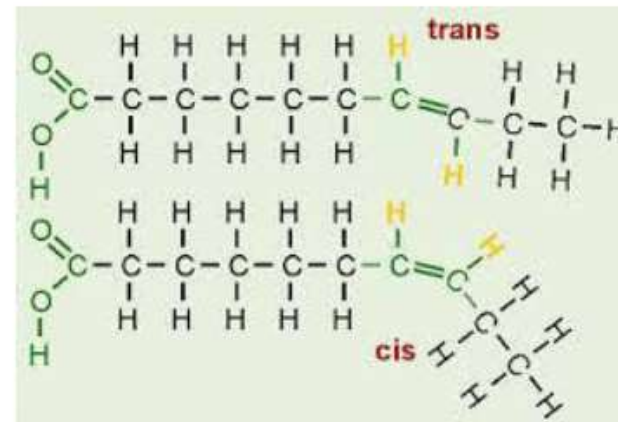
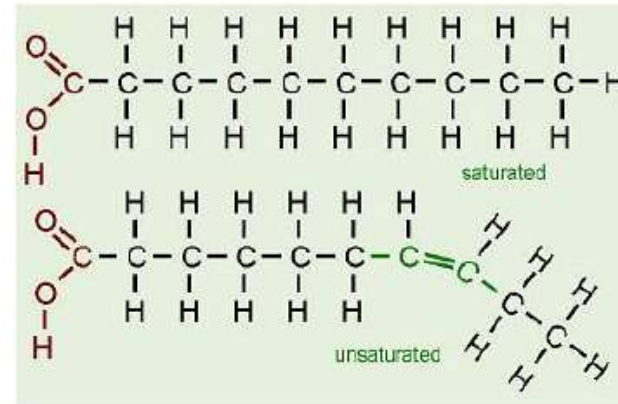
FATTY ACID PREDICTION BASED ON MILKOSCAN FOSS APPLICATION NOTE 64



FATTY ACIDS

Fatty acids

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

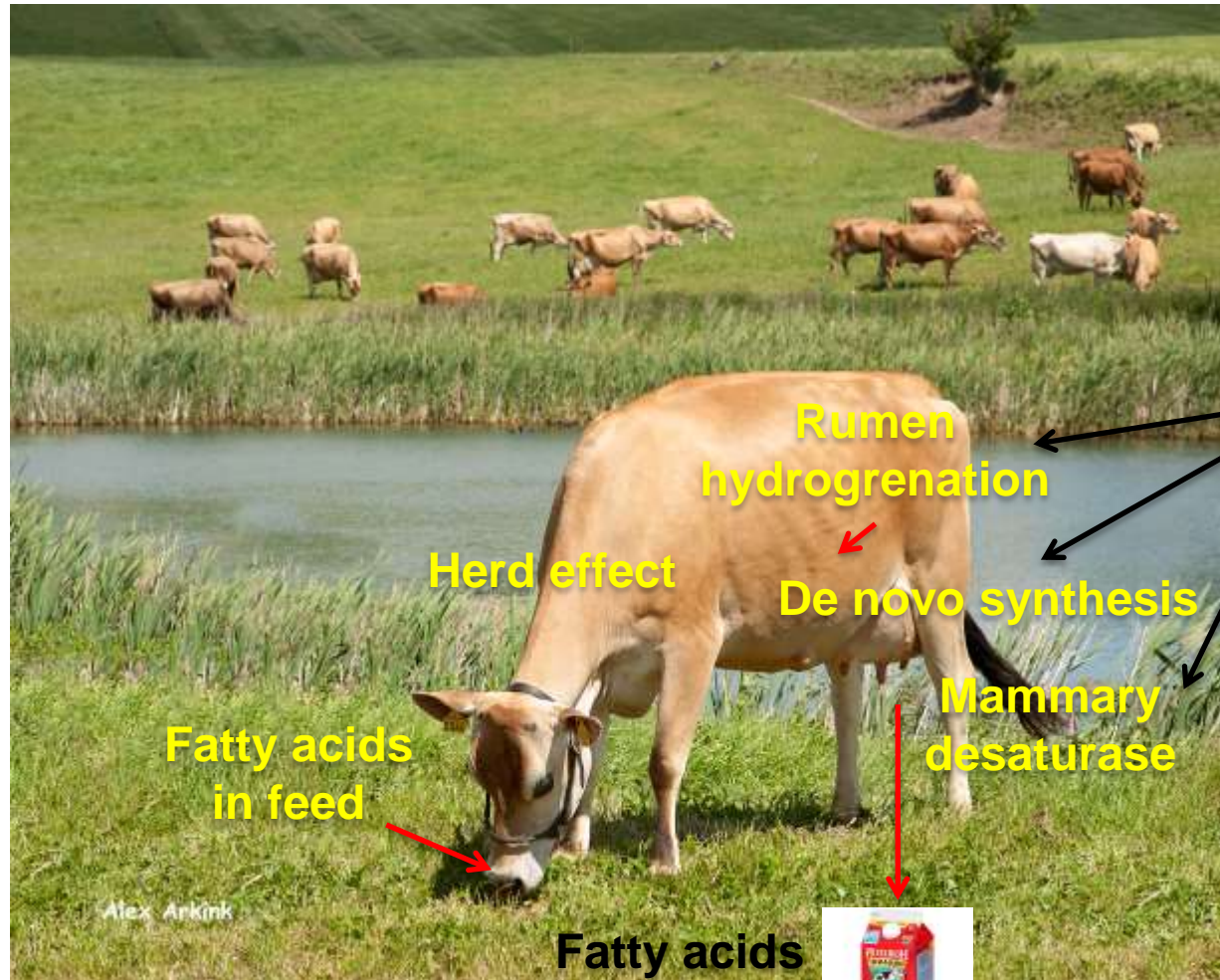


FATTY ACID CONTENT IN MILK

Fatty acids	% in milk
Saturated (SFA), total	65-75
- C4→C14	10-20
- C16:0	22-45
- C18:0	6-12
Monounsaturated (MUFA) (mainly 18:1)	15-30
Polyunsaturated (PUFA) 18:2 and 18:3	2-5



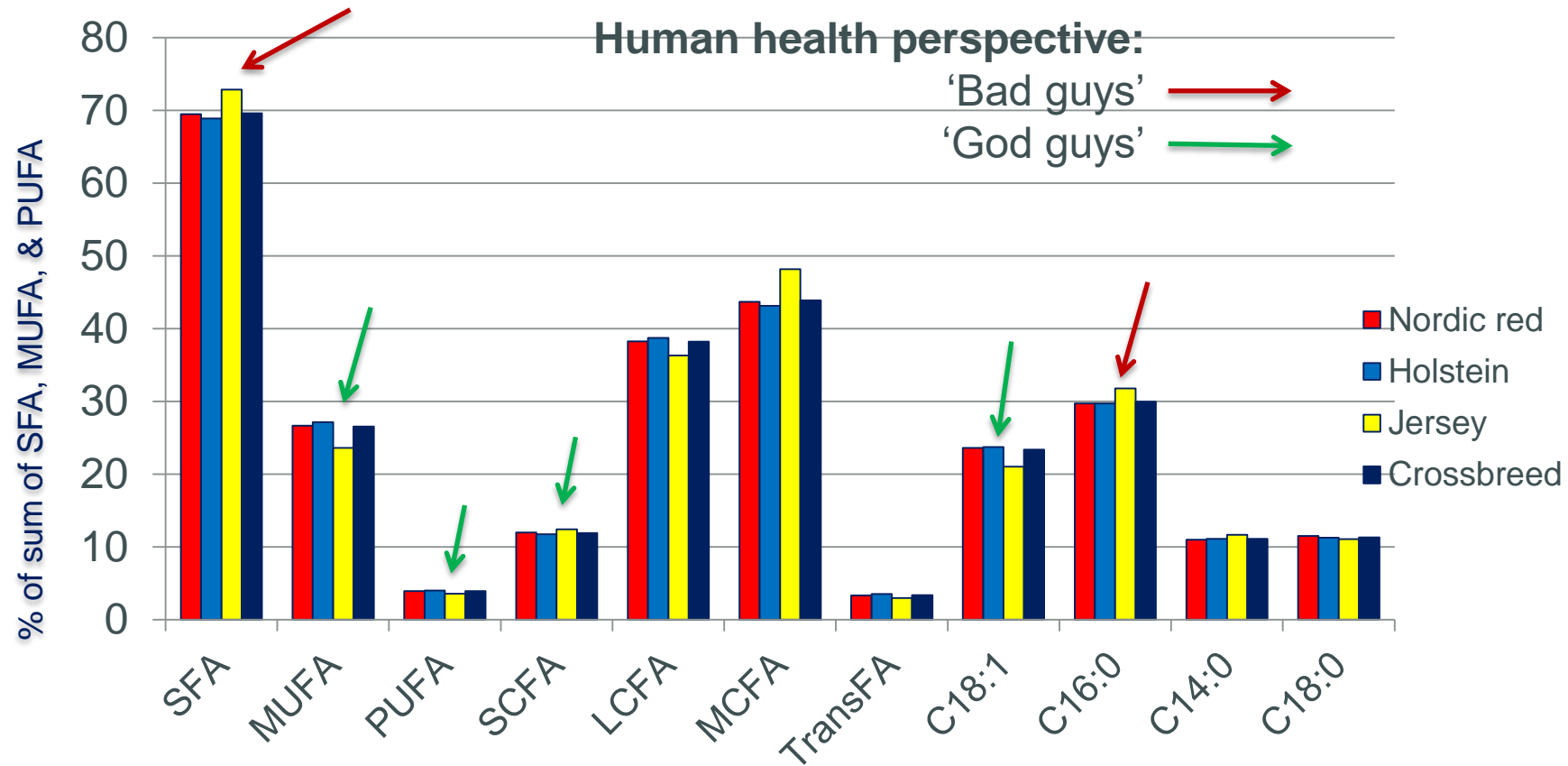
SOURCES OF FATTY ACIDS IN MILK



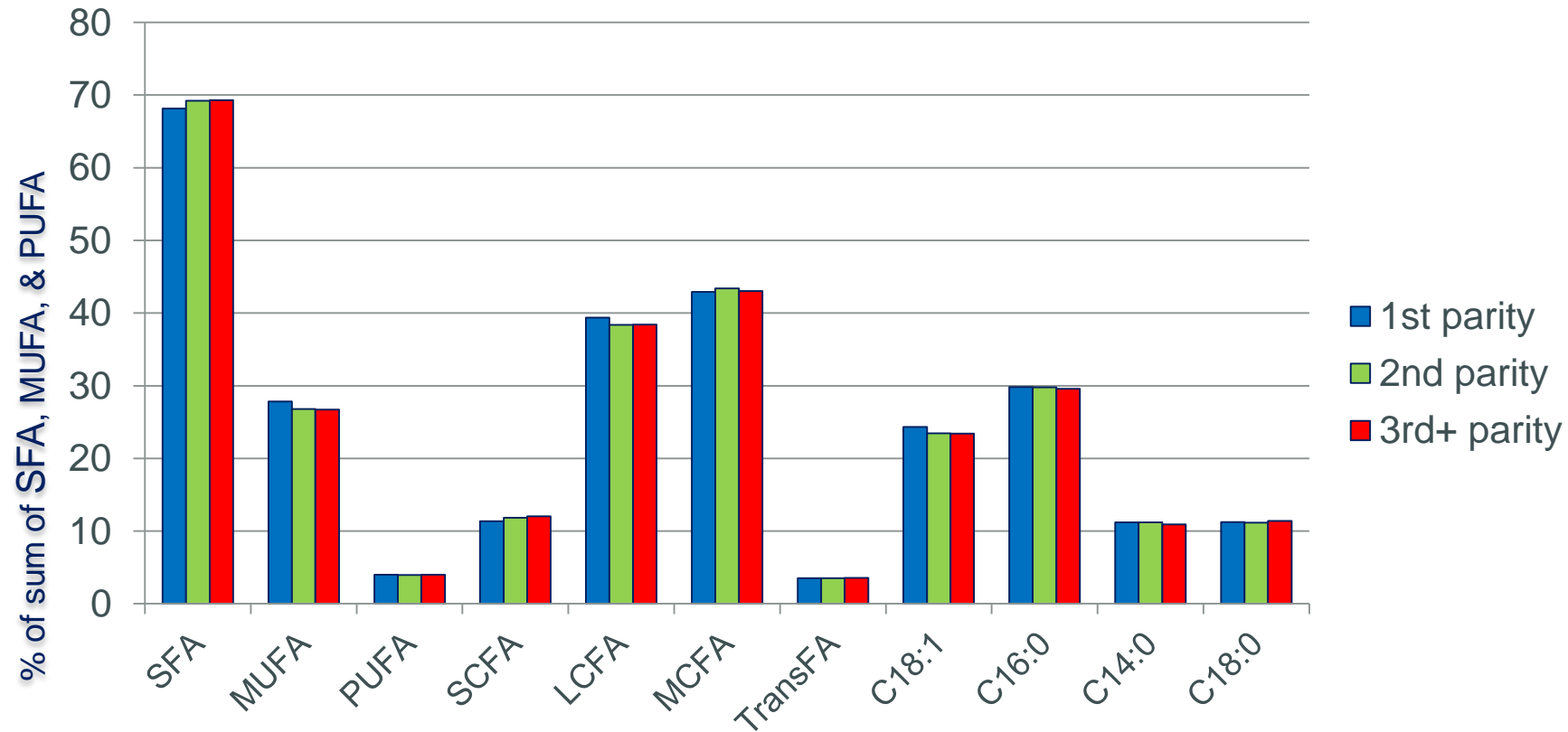
Partly
guidet by
genetics



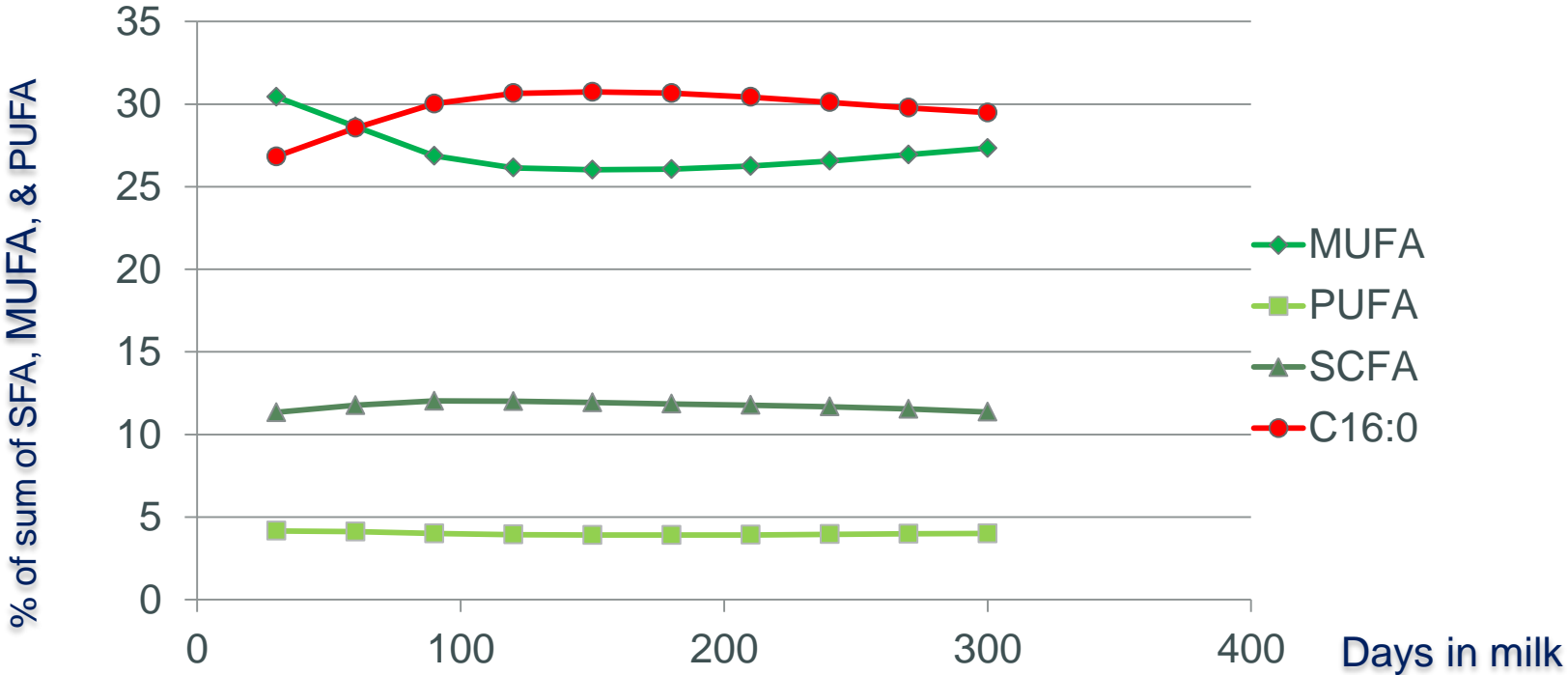
EFFECT OF BREED ON FATTY ACID COMPOSITION IN THE DANISH DAIRY CATTLE POPULATION



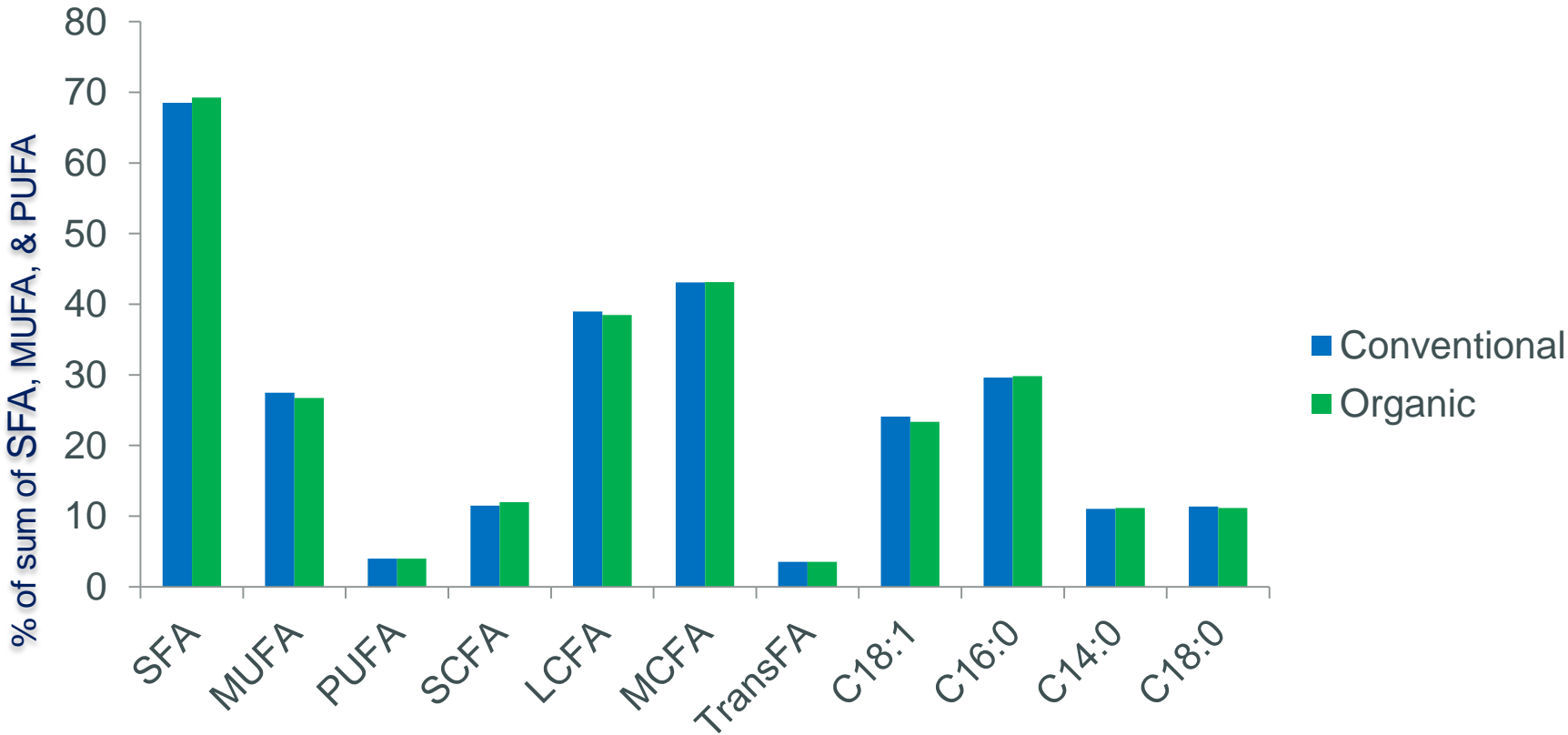
THE EFFECT OF PARITY (HOLSTEIN ONLY) ON FA COMPOSITION WAS SIGNIFICANT FOR ALL FA AND PARITY LEVELS



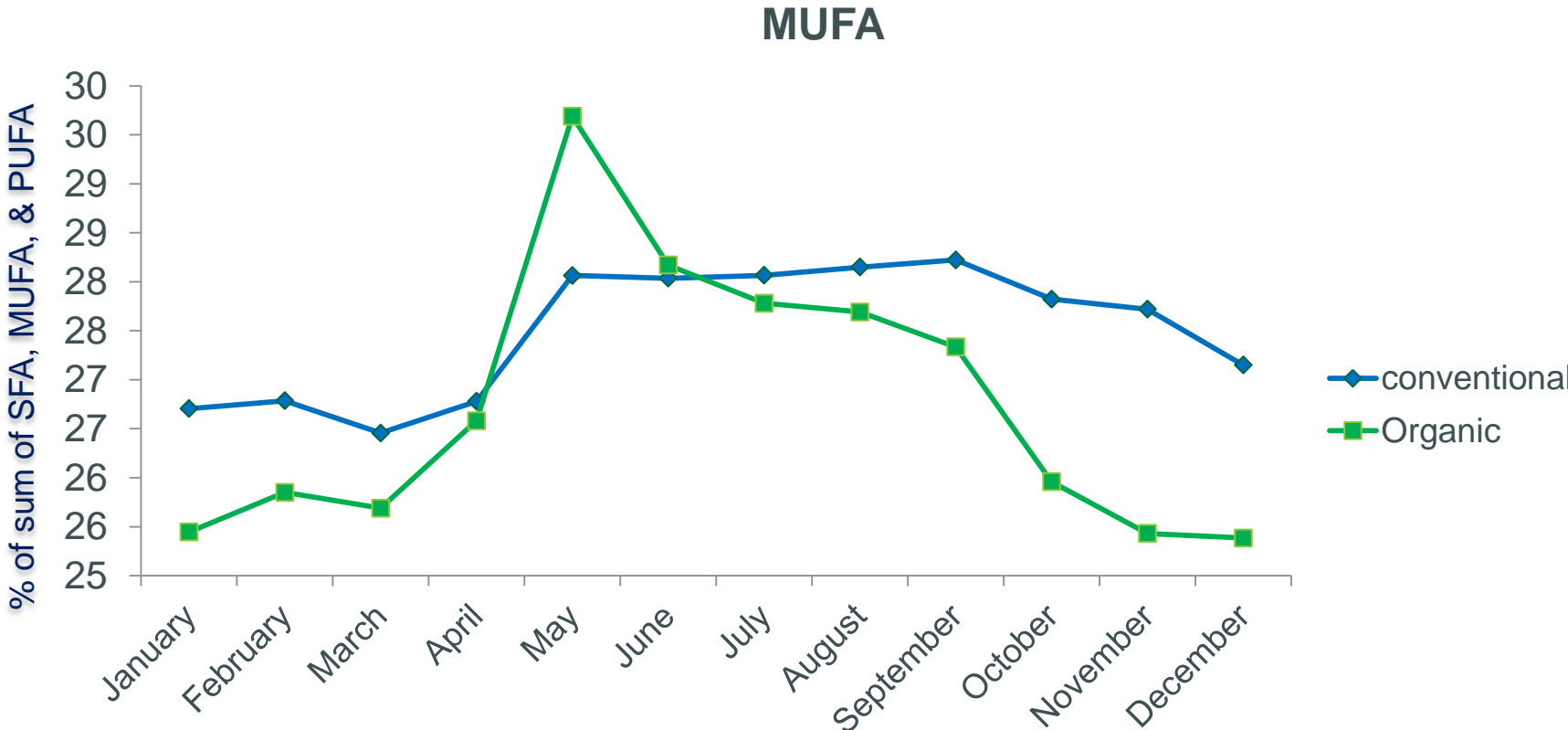
EFFECT OF LACTATION STAGE OF FATTY ACID FOR HOLSTEIN (MUFA,PUFA,SCFA,C16:0)



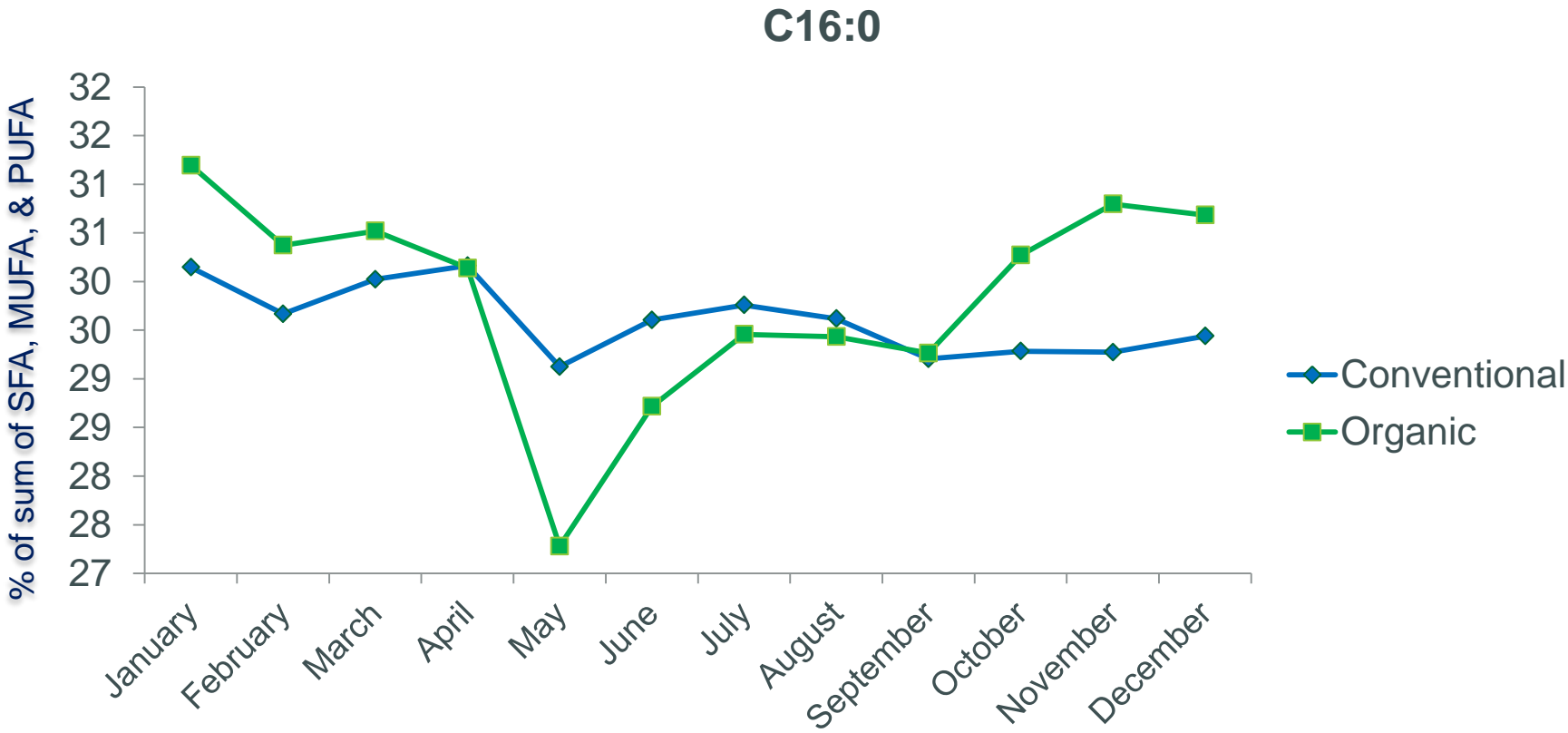
EFFECT OF PRODUCTION SYSTEM



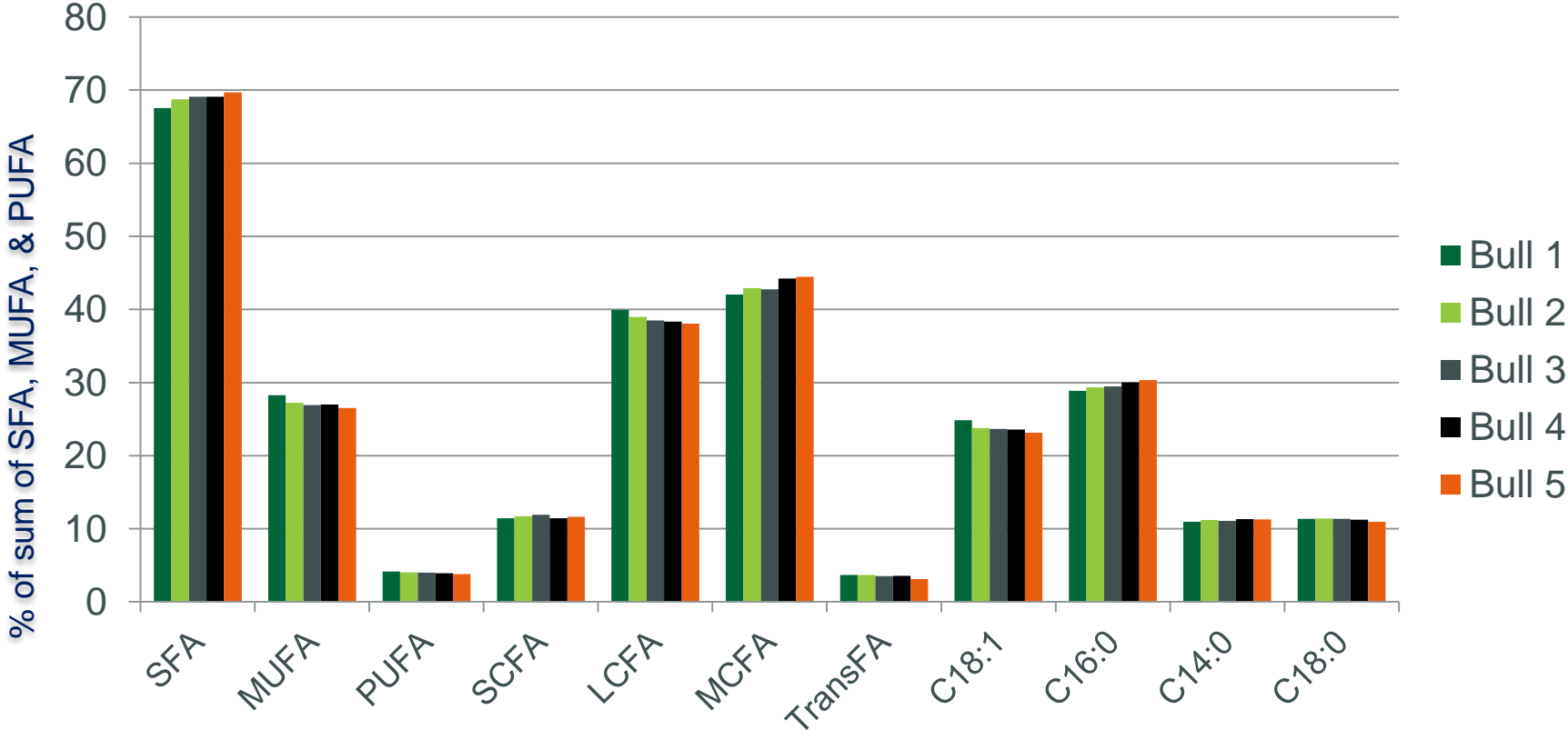
EFFECT OF PRODUCTION SYSTEM X SEASON ON THE PROPORTION MUFA



EFFECT OF PRODUCTION SYSTEM X SEASON ON THE PROPORTION C16:0



EFFECT OF SIRE (THE FIVE HOLSTEIN BULLS WITH MOST DAUGHTERS IN THE DATA SET)



DETAILED MILK FATTY ACID PROFILING - CONCLUSION

Effect of:

- ✓ Breed
- ✓ Parity
- ✓ Lactation stage
- ✓ Season
- ✓ Production systems (Organic/Conventional)
(Feeding)
- ✓ Sire (genetic variation)



PERSPECTIVES:

- WHY FATTY ACIDS IN MILK IS INTERESTING

- Benefits from a healthier FA profile of milk
 1. Improved diets and reduced associated health risk



2. Reduced use of non-sustainable palm oils for cows
3. Reduced harmful greenhouse gas emission
4. Increased sales and enhanced reputation (retailer)
5. Increased payment to dairy farmers

Source: Case study, University of Reading, UK

MIRACLE MILK WILL CUT FAT IN A PINTA (EXPRESS OCT 11, 2011)

A NEW “super healthy” milk which promises to slash 84 tons of saturated fat a year from the nation’s diet goes on sale this week.



The revolutionary pinta comes from cows fed only a natural diet, reducing the amount of harmful fat

Slashing the amount of saturated fat in our diet could drastically reduce the toll of Britain’s biggest killer, heart disease, and save the NHS up to £3billion a year. And reducing intake to around 20g a day can cut cholesterol by up to 10 per cent.

Healthy option, the new M&S milk

WHY FATTY ACID IS INTERESTING? OTHERS WILL SAY..

- Is milk an important dietary source of omega-3 fatty acids? Not really. Not to criticize milk – it is valuable source of protein, Vitamin D, Riboflavin, Vitamin B12, Phosphorus and Calcium, and my kids drink a lot of milk with every day.
-According to the USDA standard reference database, ... I get more than 20 times the omega-3 fatty acids from a serving of salmon that I get from a glass of milk, and they are the long-chain varieties. And if the milk is non-fat or skim the amount goes down to 0.0049 grams of omega-3s, because – well they removed the fat!

Yes, but what about cheese and butter?



PERSPECTIVES

- Genetic potential for achieving better fatty acid profile
- Feed effect – the farmer have influence
- Healthier products
- Niche products
 - "The story"
 - Chesse
 - Butter
- Increased payment to farmers.



ACKNOWLEDGEMENTS

- This research was carried out in the project Specialized Organic Breeding Goals and Breeding Schemes for Dairy cattle (SOBcows). The project is coordinated by ICROFS and part of The Organic Research, Development and Demonstration Programme Organic RDD 2, supported by GUDP under Ministry of Environment and Food of Denmark.
- Also thank you to:
L. Hein, Seges, Agro Food Park 15, 8200 Aarhus N, Denmark
A. J. Buitenhuis, Aarhus University, Department of Molecular Biology and Genetics - Center for Quantitative Genetics and Genomics, Blichers Allé 20, 8830 Tjele, Denmark

Undersøgelsen er en del af Organic RDD 2-projektet SOBcows

STØTTET AF
promilleafgiftsfonden
for landbrug

