



The potential of on-line SCC in udder health management and herd improvement

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Why Online SCC?

- On-line somatic cell count (oSCC) technologies enable quantitative, high-resolution monitoring of udder health at cow and herd level and are receiving increasing attention.
- To fully unlock the potential of oSCC technologies on-farm, for welfare assessment, genetics and milk recording purposes, we need to know
 - Technical performance
 - Conditions of interest that can be measured
 - Applications within and across farms

**The aim of this talk is to share and discuss performance and use of oSCC based on two DeLaval solutions:
DeLaval OCC and its next generation, the DeLaval BioSensors Milk Cell Analysis MCA**

Online SCC – add-on to the DeLaval VMS

DeLaval Online Cell Counter OCC:

- Direct measurement and counting of SCC
- Continuous or risk based sampling and measurements
- Composite representative sample mixed with reagent, camera captures stained SCC



New: DeLaval BioSensors Milk Cell Analysis MCA:

- Same principle as OCC with improved performance
- Higher sustainability
- Five different sampling models



Technical Performance – validation against SCC reference laboratory

External validation, OCC and SCC ref. lab.

- $R = 0.86$ (seven herds equipped with 16 AMS with OCC, Sørensen et al., 2016)
- Concordance correlation coefficient (CCC) 0.82 to 0.91 (Fadul-Pacheco et al. 2018, Nørstebø et al., 2019)

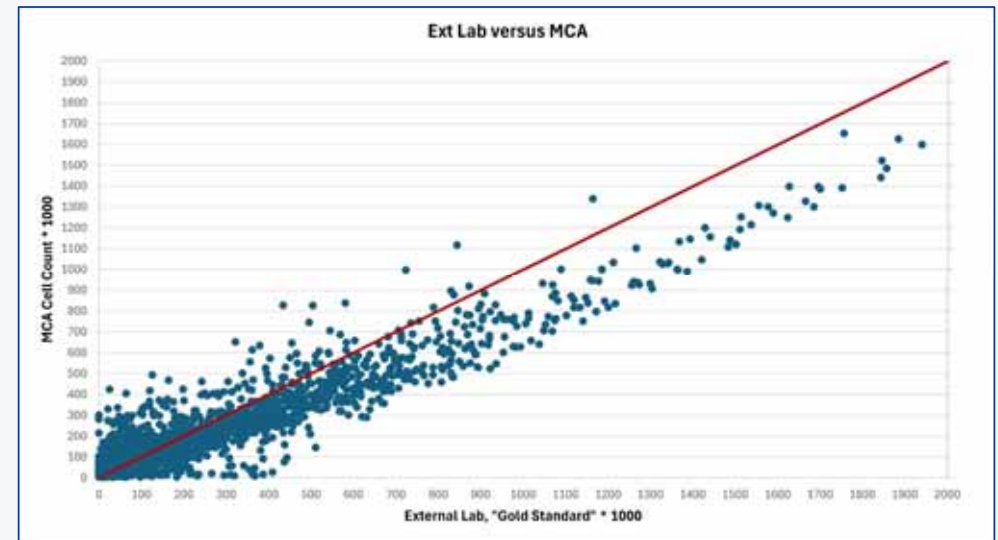
Internal validation MCA and SCC ref. lab.

- 2 herds, 7131 matched samples

CCC: 0.92 (Christensen et al. 2026)

Conclusion:

- High performance of OCC to quantify SCC.
- New MCA shows promising result



OCC - Performance to identify different conditions of interest

Dalen et al. 2018; Nørstebø et al., 2019

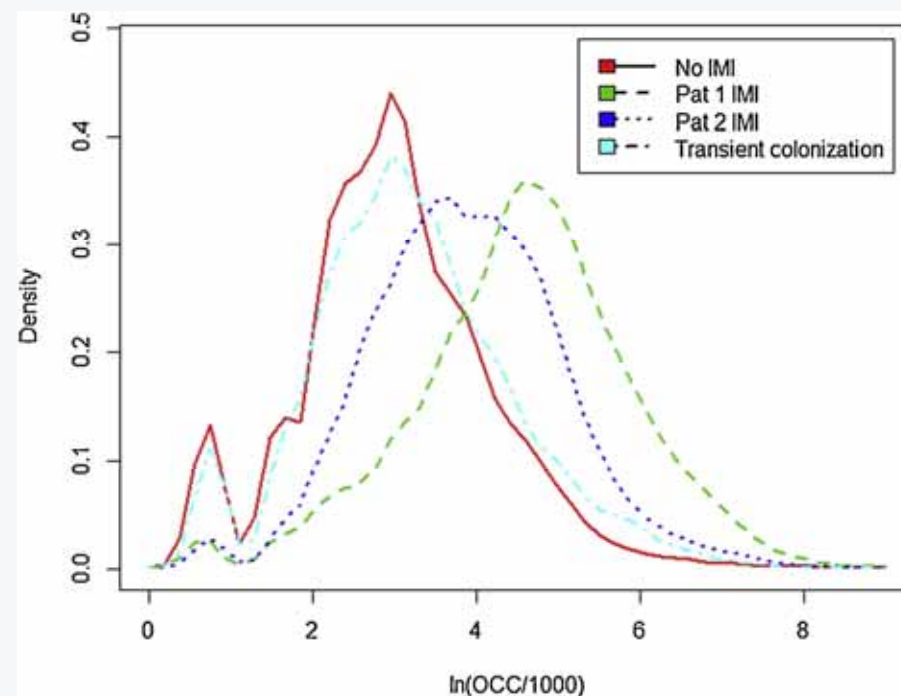
- 17 month longitudinal study, research herd, 155 cows,
- 82,182 OCC samplings
- 5,330 monthly taken quarter milk samples for bacterial culture

Results

New clinical mastitis, threshold OCC > 1, 4 million/ml;
single OCC value SE 60 (32–84) at SP 99

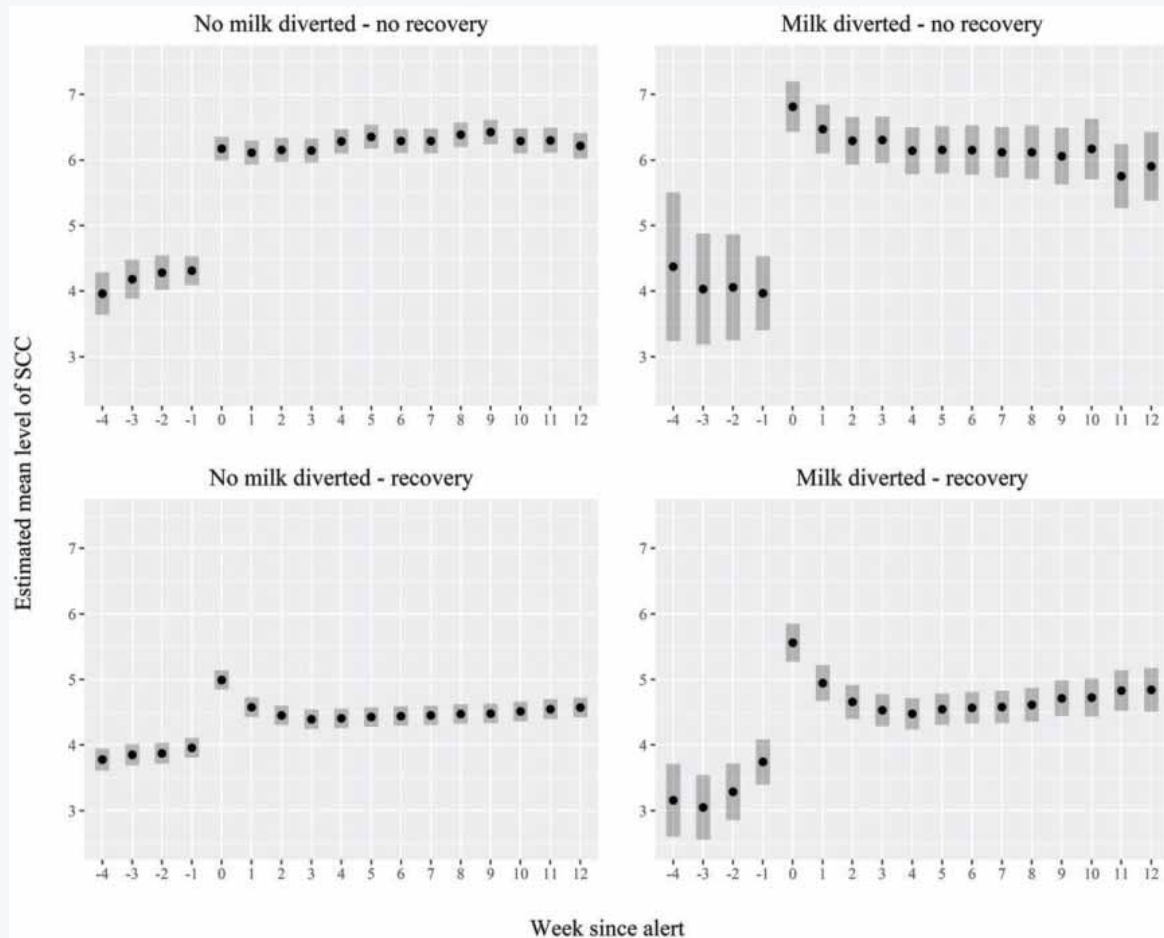
Subclin. mastitis with Pat IMI 1; threshold OCC $\geq 77,000$ /ml;

7-day average SE 69 (69–70) at SP 80



Distribution of ln-transformed OCC values (in 1000 cells/mL) in periods of 1) no intramammary infection (No IMI), 2) IMI with known mastitis pathogens from which a high somatic cell count would be expected (Pat 1 IMI), IMI with other known mastitis pathogens (Pat 2 IMI), and 3) Transient colonization

Applications: Determining high SCC episode length



OCC patterns wk before to 12 wk after the initial SCC $\geq 200,000$ cells/mL

- 4 subsets of cows using the estimated marginal effects of linear mixed models with 95% CI of the weekly mean.
- 2,584 episode sequences
- 15 herds
- Milk diversion – proxy for treatment

Conclusions:

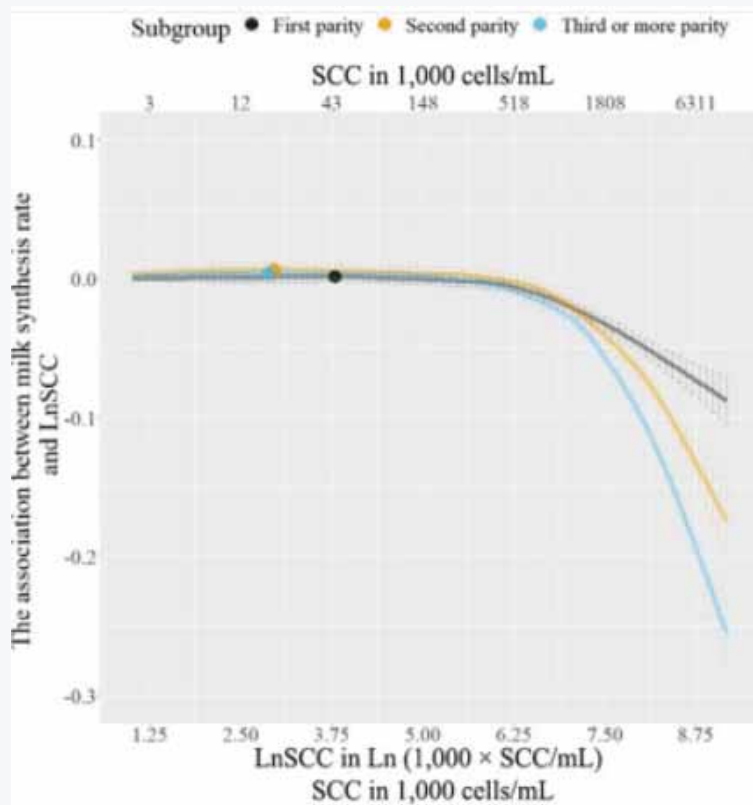
If cows recover, they do so within 3-4 weeks.

Cows with elevated SCC > 4 weeks are unlikely to recover = chronic case

Applications:

The association between SCC and milk synthesis rate is NOT linear

Bonestroo et al. 2022



OCC data, 21 AMS herds, 3352 cows with 4,516 lactations:

- Older cows have larger milk losses than younger cows
- Stage of lactation not significant
- Chronicity negatively associated with milk synthesis rate
- Milk synthesis rate started to decrease substantially more for SCC higher than 277,000 SCC/mL

Conclusions

- oSCC systems have a high performance to identify SCC and clinical mastitis
- Identification of pathogen specific subclinical mastitis based on SCC patterns is a challenge!
- Frequent sampling enables timely detection, determination of episode length, chronicity and recovery
- Herd specific thresholds for detection and intervention dependent on
 - Purpose of measurements
 - Farm goals
 - Herd situation

**Research results and IDF
guidelines
inspired development of
next generation MCA.**



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Novel ways to use sensor data to improve mastitis management

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Needs & Perspectives

Needs:

- External validation on technical performance and applications on the MCA
- Research for better understanding how farmers work with oSCC systems
 - Research to explore benefits on-farm and along value chain

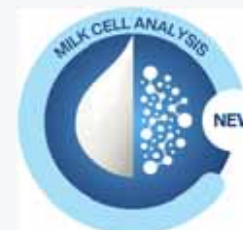


Perspectives

- Increase of global uptake of MCA/oSCC solutions

Milk Cell Analysis x Milk Solids Analysis

- Detailed & accurate daily information on SCC, fat, protein.
- Data of high value for milk recording, nutrition management, genetics and breeding.



Thanks!

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sustainable
food production
possible

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