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Differential Somatic Cell Count (DSCC) for Detecting Intra-mammary Infections

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SCC and DSCC

Intra-mammary infections (IMI) causes reduced animal welfare and economic problems for farmers worldwide. Somatic cell count (**SCC**) is often used as an indicator of IMI. In case of high SCC, IMI can be confirmed with bacterial culture (BC) or PCR. SCC represents variation in all immune cells of the udder, and SCC increases with IMI.

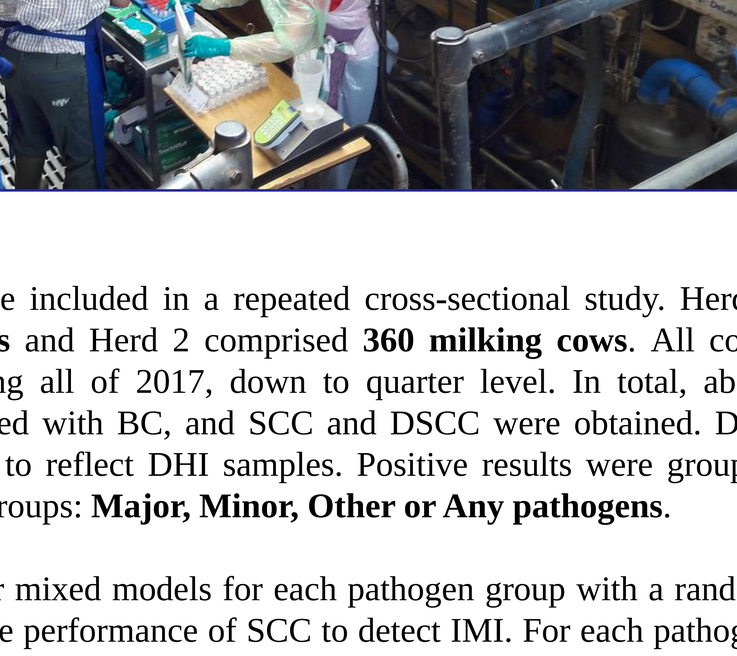
The differential SCC (**DSCC**), was recently introduced as an additional indicator for IMI. DSCC represents the proportion of polymorphonuclear neutrophils (**PMNs**) and **lymphocytes** relative to the **macrophages** in milk, measuring the acute response and therefore it has the potential to avail more precise indication of IMI. We present the first results from a field experiment to **evaluate the additional value** of combining DSCC with SCC for detection of IMI in DHI samples. Furthermore, we explore the dynamics of DSCC during the lactation to **evaluate the stability** of this new indicator for IMI.

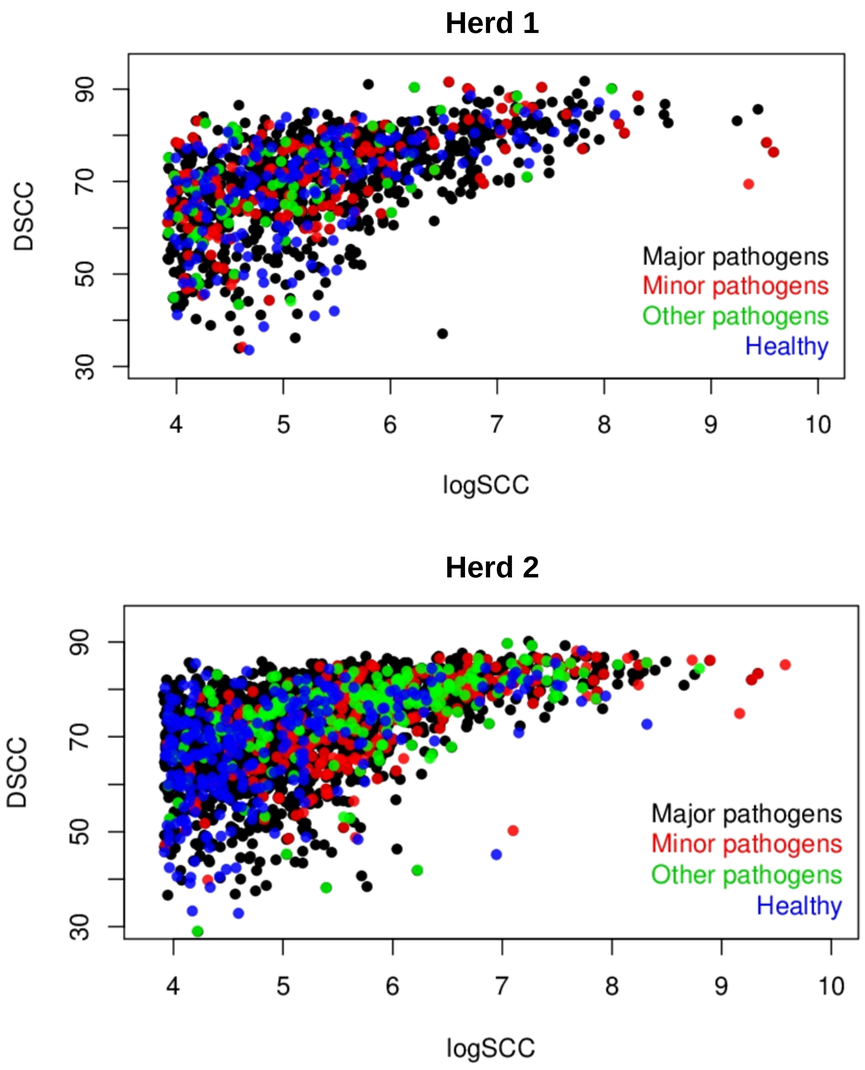
Materials and methods

Two Danish dairy herds were included in a repeated cross-sectional study. Herd 1 comprised **180 milking cows** and Herd 2 comprised **360 milking cows**. All cows were sampled monthly during all of 2017, down to quarter level. In total, about **22,500 samples** were analyzed with BC, and SCC and DSCC were obtained. Data were collapsed to cow level to reflect DHI samples. Positive results were grouped into the following pathogen groups: **Major, Minor, Other or Any pathogens**.

We constructed general linear mixed models for each pathogen group with a random effect of cow, to determine the performance of SCC to detect IMI. For each pathogen group we here compare a model with SCC with a model that also include DSCC, to evaluate if it improved significantly.

Behavior of DSCC during the lactation. The DSCC measures loosely resembles the milk lactation curve with increasing values in the beginning and a slow decrease over the lactation.





Correlation between SCC and DSCC for cows with Major, Minor and Other pathogens and healthy cows for the two herds in the study. Log denotes the natural logarithm. All samples that showed high SCC also had high DSCC. But all samples with high DSCC did not have high SCC.

Results

In Herd 1, we found a high frequency of major pathogens (mainly ***Staph. aureus***) and less Minor pathogens, whereas in Herd 2 we found few Major and relatively more Minor pathogens (***Corynebacterium*** *spp.* and NAS (**non-aureus staphylococci**)).

Overall, the **DSCC seemed to decrease slightly during the lactation**. We found a general positive correlation between DSCC and SCC.

The models with **DSCC performed significantly better for detecting infections in general in both herds**. This was also the case for detection of Minor and Other pathogens in Herd 2. DSCC was not found significant for detecting Major pathogens in any of the herds, or Minor and Other pathogens in Herd 1.

Conclusion

DSCC contributed significantly to the detection of IMI in DHI samples even when SCC was already known. Thus**,** DSCC showed added value for detecting IMI for infections in general as well as for Minor and Other pathogens separately in Herd 2**.**

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