

Using milk leukocyte differentials for diagnosis of subclinical bovine mastitis

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Short title: **Milk leukocyte differentials to identify mastitis**

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Summary

This research study aimed to evaluate the use of the milk leukocyte differential (**MLD**) to: (a) identify quarter milks that are culture-positive; and (b) characterize the milk leukocyte responses to specific groups of pathogens causing subclinical mastitis. The MLD measures the absolute number and relative percentage of inflammatory cells in milk samples. Using the MLD in two dairy herds (170 and 172 lactating cows, respectively), we studied all lactating cows with a most recent monthly Dairy Herd Improvement Association somatic cell count (**SCC**) $> 200 \times 10^3$ cells/mL. Quarter milk samples of all selected cows were analysed by MLD and aseptically collected milk samples were subjected to microbiological culture (**MC**). Positive MC were obtained from 102/156 (65.4%) of MLD-positive milk samples, and 28/135 (20.7%) of MLD-negative milk samples were MC-positive. When MC was considered the gold standard for mastitis diagnosis, the calculated diagnostic *Se* of the MLD was 65.4% ($IC_{95\%} = 57.4$ to 72.8%) and the *Sp* was 79.3% ($IC_{95\%} = 71.4$ to 85.7%). Quarter milks positive on MC had higher absolute numbers of neutrophils, lymphocytes and macrophages, with higher neutrophils% and lymphocytes% but lower macrophages%. The $\text{Log}_{10} \text{N/L}$ ratios were the most useful ratio to differentiate specific subclinical mastitis quarters from healthy quarters. Use of the MLD on cows with monthly composite SCC $> 200 \times 10^3$ cells/mL for screening at quarter level identified quarters more likely to be culture-positive.

In conclusion, the MLD can provide an analysis of mammary quarter status more detailed than provided by SCC alone; however, the MLD response to subclinical mastitis was not found useful to specifically identify the causative pathogen.