

# Validation of a handheld somatic cell count device

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## Introduction

Mastitis is the most common and costly disease of dairy cattle. It impacts farm economics through diagnostic and treatment costs and loss of income through discarded milk, decreased milk production, and loss of milk quality premiums. It negatively affects cow comfort and increases the culling risk. Most cases of mastitis are subclinical, leading to undetected economic losses. To mitigate these losses, surveillance for subclinical mastitis (SCM) indicators can be useful. One such indicator is the somatic cell count (SCC). Elevated SCC indicates inflammation, most likely caused by bacterial infection. One barrier to early detection of SCM is the lag between sample collection and availability of test results. The objective of this study was to evaluate a novel handheld, cow-side instrument for the enumeration of somatic cells in milk, the DQI iPod Touch Cell Counter. Our goal is to determine the sensitivity, specificity, and agreement of the instrument compared to currently available laboratory methods.

## Materials and Methods

Milk sampling was conducted on 3 dairy farms within 7 days of routine DHIA sampling. Herds agreed to allow DairyOne to share DHIA results with the research team. Cows were identified from DHIA results and targeted for sampling to achieve a meaningful distribution of SCC. Samples were collected in the parlor, post-milking. Each sample was analyzed for somatic cell count by the following methods: DeLaval Cell Counter (DCC), DQI iPod Touch Cell Counter with DQI cartridge (DQI), and DQI with DCC cartridge. The remainder of the sample was transferred to a 60mL vial containing bronopol, a milk preservative and submitted to DairyOne Labs for somatic cell count analysis by Fossomatic Cell Counter (FC). After all samples were analyzed, they were blocked into SCC categories as follows: SCC1:  $\leq 50,000$  cells/mL; SCC2: 50,001

– 100,000 cells/mL; SCC3: 101,000 – 200,000; SCC4: 200,001 – 400,000 cells/mL, SCC5: 400,001 – 750,000 cells/mL, SCC6: 750,001 – 2,000,000 cells/mL, and SCC7:  $> 2,000,001$  cells/mL. The epidemiologic sensitivity and specificity of the ICC and DCC was estimated in comparison to the FC as the gold standard.

## Results

The sensitivity and specificity were calculated for the ICC with each cartridge and the DCC, at each of 6 somatic cell count blocks. Sensitivity and specificity were reasonably accurate at low and mid-range cutoff points (200,000 cells/mL and below). The ICC achieved a sensitivity and specificity of 93% and 92%, respectively, when using DeLaval cartridges. Sensitivity and specificity varied depending on the diagnostic cut-point used, as well as the cartridge used (DeLaval or Dairy Quality Initiative). In general, the DCC cartridge performed better than the DQI cartridge on the ICC device. At a cut-point of 200,000 cells/mL the DCC machine had a sensitivity and specificity of 99% and 87%, respectively.

## Significance

The ICC device appears to be a useful test for subclinical mastitis, especially when using a diagnostic cut point of 200,000 cells/mL. The sensitivity and specificity, especially when used with the DCC cartridge, would allow accurate identification of cows with subclinical mastitis or not. The speed with which the device makes the SCC calculation, typically less than 3 minutes per sample, would allow rapid management decisions. The DCC machine also achieved useful sensitivity and specificity at 200,000 cells/mL.