Association between Results of Portascc, the CMT and Isolation of Mastitis Pathogens

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Introduction

Subclinical mastitis is detected using a variety of direct and indirect laboratory tests but the primary definition is based upon enumeration of somatic cells (Ruegg and Reinemann, 2002). The California Mastitis Test (CMT) is the most common cow-side test used to estimate SCC. However, previous research has shown that CMT is not particularly sensitive or accurate (Dingwell et al., 2003; Ruegg and Sekito, 2004). The PortaSCC is a rapid cow-side test that was developed for the detection of subclinical mastitis (Barratt et al., 2003). The objective of this study was to determine the test characteristics of PortaSCC for isolation of mastitis pathogens from quarter samples.

Materials and Methods

Duplicate quarter milk samples (n = 296) were collected from a single quarter per cow located on farms (n = 10) with BTSCC >250,000 cells/ml. Immediately after collection, one milk sample was used to perform the PortaSCC test according to manufacturer's instructions and the CMT. The additional milk samples were submitted to the laboratory for microbiological analysis and enumeration of somatic cells using the Fossomatic. Microbiological analysis was performed according to the NMC. Isolation of Coliforms, Staph. aureus, Strep. agalactia or environmental streptococci from both duplicate quarter samples were defined as infection with major pathogens. Isolation of Coagulase-negative staphylococci, and C.bovis from both duplicate quarter samples was considered a minor infection. The detection limit was 30 cfu and plates with more than 2 colony types were considered contaminated. The maximum PortaSCC value is 3,500,000 cells/ml so SCC values determined in the laboratory that exceeded that threshold were recorded as 3,500,000 cell/ml. SCC values were analyzed using log10 transformation. For one analysis, a cutpoint of 200,000 cells/ml was used as the threshold value for defining intramammary infection. Statistical analysis was performed using Statistix 8.0 (Analytical Software).

Results and Discussion

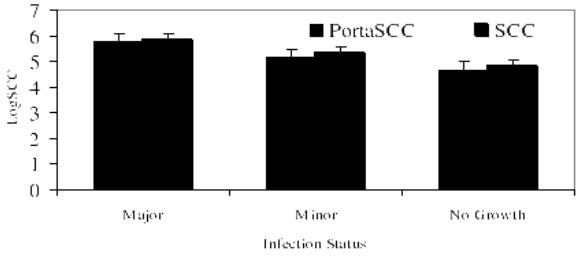
A total of 300 samples were obtained. Of those, 11 were excluded from analysis because of missing milk samples (n = 7) or error messages received from the PortaSCC meter (n = 4). Data from 289 samples was used in statistical analysis. The correlation between the log10PortaSCC and the log10SCC was 0.81. When a threshold of 200,000 cells/ml was used to define infection, there was 87.8% observed agreement between the SCC and the PortaSCC and kappa was 0.73. Results of the CMT were available for 200 milk samples. The Log10PortaSCC increased with increasing CMT score (Table 1).

Table 1 - PortaSCC values by CMT score

CMT Score	Number	LogPortaSCC	PortaSCC (cells/ml)	SCC (cell/ml)
Negative	147	4.5^{a}	107.844	104,687
Trace	12	5.4^{b}	486,583	386,500
One	13	$5.6^{b,c}$	406,462	481,462
Two	13	$6.2^{c,d}$	1,705,000	1,633,000
Three	16	6.2^{d}	1,988,000	2,328,000

a,b,c,d means with suberscript differ (P < 0.05) Using ANOVA, there was a significant relationship between results of the PortaSCC and infection status and results of the SCC and infection status (Figure 1; P< 0.001).

Figure 1. LogSCC values for PortaSCC and SCC



Conclusion

Results of the PortaSCC were similar to results of conventionally determined SCC values and a high degree of agreement was identified when a threshold of 200,000 cells/ml was used. The SCC and PortaSCC values for all CMT scores greater than trace were indicative of probable infection. Somatic cell count values measured using either traditional laboratory methods or the PortaSCC were associated with infection status.

References

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