

An Evaluation of the ColiMast™ Test for Detection of Coliform Mastitis in Dairy Cattle

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Introduction

Since the distribution of pathogens causing clinical mastitis varies widely among dairy herds, a rapid and accurate method of determining the type of pathogen involved would be useful. The ColiMast™ test consists of selective growth media in a vial. After incubation, a color change indicates the presence of coliform organisms. This research evaluated characteristics of the ColiMast™ test for detecting coliform organisms in clinical mastitis milk samples and as a diagnostic aid in a mastitis treatment decision-making protocol.

Materials and Methods

Milk samples from cows with clinical mastitis or high somatic cell counts (SCC) were obtained from routine submissions to the University of Guelph laboratory. A ColiMast™ vial was inoculated with 2 ml of milk and incubated at 98.6°F (32°C). Color change was evaluated at 12 and 24 hours. The original milk samples were submitted for standard bacteriological culture. In addition, four farms inoculated a ColiMast™ test with milk from each case of clinical mastitis. The producer was asked to check the ColiMast™ test at the next two milkings (12 and 24 hours after incubation) and to observe and record any color change. The original milk sample was frozen and sent to the University of Guelph. A second ColiMast™ test was performed on the same sample after thawing, then sent for routine bacteriological culture. Using the culture results as the gold standard, sensitivity and specificity of ColiMast™ were calculated. In addition, reasons for false positive and false nega-

tive ColiMast™ tests were identified. A Kappa Value for the agreement between the ColiMast™ tests done on-farm and in the laboratory was calculated.

Results and Conclusion

Bacteriological culture and ColiMast™ results were obtained from 505 samples. A total of 172 samples were positive for coliforms by bacteriology (101 *Escherichia coli*, 34 *Klebsiella* spp, 37 other coliforms). After 24 hours of incubation, 128 of these known positive samples were also positive on ColiMast™ (sensitivity = 0.74). Of the 333 samples that were negative for coliforms on culture, 261 were ColiMast™ negative (specificity = 0.78). This means that 72 ColiMast™ tests gave a false positive result. It is noteworthy that 26 of the 72 false positive tests had no significant growth on bacteriological culture. The ColiMast™ uses approximately 2 ml of milk in an enriched liquid growth medium, compared to a 0.01 loop inoculum in milk culture. This larger volume may allow for relatively small numbers of coliform organisms to grow and cause a color change. The Kappa Value of 0.85 when the test was read at 12 hours suggested excellent agreement between ColiMast™ tests done on the farm and in the cleaner environment of the laboratory. The agreement was substantially less at 24 hours ($K = 0.48$).

The ColiMast™ test offers considerable promise as a rapid and convenient method for preliminary determination of the major pathogen in cases of clinical mastitis and high SCC. When read at 12 hours, the test is relatively reliable for use in formulating a treatment protocol.