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New Technologies to Identify Mastitis Pathogens: Challenges and Opportunities

David F. Kelton, DVM, PhD.

Professor of Epidemiology and Health Management
 Dept of Population Medicine, Ontario Veterinary College
 University of Guelph, Guelph, Ontario, Canada, N1G 2W1

In February 2009 CanWest Dairy Herd Improvement (DHI) began to offer a PCR based mastitis diagnostic service to its customers in Ontario and Western Canada. This service is based on the PathoProof™ Mastitis Major 3 PCR Assay developed by Finnzymes Diagnostics, part of Thermo Fischer Scientific (<http://diagnostics.finnzymes.fi/pathoproof/>). This assay identifies DNA from three major mastitis pathogens, *Staphylococcus aureus*, *Streptococcus agalactiae* and *Mycoplasma bovis*. Given that the test is applied to metered composite milk samples collected as part of the routine DHI milk recording service, the service offers some significant advantages and some important challenges when compared to the routine culture of milk samples for mastitis diagnosis. The following table summarizes some of the important differences between the two testing programs as they are currently being used in dairy herds in Ontario, Canada.

	Bacteriological Culture of Milk	Major 3 PCR Testing of Milk
Sample Type	Aseptically collected quarter or composite milk samples	Metered composite non-aseptic milk samples
Sample Collection	Purpose-specific targeted activity	Routinely collected as part of the DHI milk recording service
Sample Handling	Samples must be cooled and transported quickly as bacteria will continue to multiply	Preservative added at time of sample collection so bacterial multiplication is arrested and samples are robust to storage and handling conditions
Pathogen Detection	Growth of bacteria on culture media followed by colony identification and counting	Bacterial DNA extracted and identified using real-time PCR
Range of Pathogens Identified	Broad – but not all pathogen (for example <i>Mycoplasma bovis</i> requires specific media for growth and identification)	Limited to <i>Staph. aureus</i> , <i>Strep. agalactiae</i> and <i>Mycoplasma bovis</i>
Identification of β -lactamase producing <i>Staph. aureus</i>	<i>Staph. aureus</i> colonies are picked and tested	Presence of Staphylococcal β -lactamase gene identified by PCR
Classifying sample as contaminated	Based on identification of 3 or more bacterial species in one sample	Difficult given the limited number of bacteria identified
Laboratory time from sample to result	Days	Hours
Cost	\$8 per sample	\$24 per sample