THIS ARTICLE IS SPONSORED BY THE
MINNESOTA DAIRY HEALTH CONFERENCE.

UNIVERSITY OF MINNESOTA

College of Veterinary Medicine

VETERINARY CONTINUING EDUCATION

ST. PAUL, MINNESOTA
UNITED STATES OF MINNESOTA

Cow Side Microbiology

Russ Bey and Ralph Farnsworth
College of Veterinary Medicine
University of Minnesota
St. Paul, MN 22108

To assist the veterinarian and dairy producer in making the correct decision on the appropriate course of therapy for the cow with clinical or subclinical mastitis, we have developed a relatively easy culture system designed to identify some of the most common pathogens infecting the bovine udder. This culture system/protocol uses a limited number of relatively simple microbiological analysis procedures to identify some of the most common bacteria known to cause mastitis or increased somatic cell counts. We evaluated this system in a pilot study involving on farm veterinary service and those dairy operations lacking on farm veterinary services. Each farm was given culture plates, laboratory manual with instructions, flow chart and pictures to compare their culture plate results against. All dairies purchased a small incubator for their use. The results obtained with this culture system was used to make informed decisions regarding treatment regimens or the development of management practices.

Media Used

The following media are used in this system for the microbiological analysis of milk samples: Blood agar, Factor (F), Modified TKT (MTKT) and MacConkey. Using outdated media makes interpretation of the results difficult. Blood agar plates allow the growth of all aerobic bacteria in the sample. Factor plates are used to identify gram positive bacteria (staphylococcus, streptococcus, bacillus, corynebacteria, arcanobacteria (actnomyces), and yeasts. MTKT plates select for *Streptococcus species* only. MacConkey plates select for gram negative bacteria (*E.coli*, *Klebsiella species*, *Enterobacter species*, *Proteus species*, *Serratia species*, *Pseudomanas species*, *Acinetobacter species*, etc.).

Results To Date

Overall this microbiological culture system worked very well with correct identifications occurring 94% or more of the time where the on staff veterinarian was performing the bacteriological analysis. On the dairy were a technician was performing the analysis, correct identifications occurred at least 80% of the time. Microbiological analysis performed by the herdsman was the least correct overall. The reason for the lower number of correct identifications is unknown, but, may be due to the lack of adequate training and/or background. However, this person correctly identified *Staphylococcus aureus* cows 85% of the time. Most errors occurred in attempting to "over read" the identification system when identifying the non-ag *Streptococcus species*. The errors occurred when the person evaluating the culture plates tried to distinguish *Enterococcus species* from *Streptococcus uberis* which the culture system, at this point, was not designed to do. However, if one classifies the organism as a non-ag-strep the over all

agreement was 98% for those dairies with a veterinarian on staff. On diaries were the herdsman was doing the culturing, if the non-ag strep data is eliminated, the correct responses occurred 85% of the time. The most common error in this instance was that the herdsman recorded no-growth for some of the samples which had non-ag strep growth. Again, this may be due to the lack of adequate training or background. Limited errors occurred when reading the coliforms and *Staphylococcus species*. If an error did occur it was because globs of milk were considered as growth, thus the animal was scored as a false positive. This occurred only on two occasions.

From the data generated to date it appears this culture system is adequate for the identification of agents causing mastitis in diary herds.

Organism	Vet. on staff	Farm manager (Vet visit 3 x per wk)	Limited trained tech. (vet on staff)	Overall
Staph aureus	9/9 (100%)	8/9 (89%)	1/1 (100%)	18/19 (95%)
Staph Spp.	17/18 (94%)	11/13 (85%)	12/13 (93%)	40/44 (91%)
Non-ag-Strep	13/13 (100%)	6/21 (30%)	11/14 (79%)	30/48 (63%)
Coliform	38/38 (100%)	8/9 (89%)	11/13 (92%)	57/60 (95%)
St. ag	1/1 (100%)			1/1 (100%)
No Growth	5/5 (100%)	22/10 (45%)	5/6 (83%)	25/16 (64%)