

# Use Of Leukocyte Differential Patterns To Optimize Diagnosis Of Bovine Intramammary Infections: Evaluation Of Partitioned Vs. Non-Partitioned Testing

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## Objectives

To explore the use of leukocyte patterns in diagnosing infectious mastitis.

## Materials and methods

Quarter milk samples were investigated in 3 cross-sectional studies conducted in the US (study I, n=120; and study III, n=500) and Israel (study II, n=484). The somatic cell count (SCC), milk microbiological cultures, and the percentages, total counts and relative proportions of lymphocytes, macrophages and neutrophils were established. Non-periparturient (studies I and III) and periparturient (study II) cows were assessed. Samples were collected without (studies I and III) and with previous determination of health status (study II). Disease prevalence was >40% (study I) and <20% (studies II and III). An algorithm was used to group (or separate) similar (o dissimilar) leukocyte patterns. Microbial species were classified as either major (e.g., *Staphylococcus aureus*) or minor (e.g., CNS) pathogens. Milk culture results were used to establish the sensitivity and specificity of both SCC and leukocyte patterns.

## Results

Using leukocyte indicators (e.g., the neutrophil %, the lymphocyte %, the ratio of phagocytes/lymphocytes), 3 major patterns were observed: "no mastitis" (NM), "early mastitis" (EM), and "late mastitis" (LM). Significant differences in the major/minor (M/m) pathogen ratio were noticed: for example, EM showed a high M/m pathogen ratio, while NM displayed a low M/m ratio. A higher proportion of both disease-negative and disease-positive samples was correctly diagnosed by "partitioned" testing (based on samples subsets characterized by leukocyte differential patterns) than by the (SCC-based) "non-partitioned" testing method: 81.7 vs. 75.8% (study I), 98.6 vs. 98.1% (study II), and 92.6 vs. 84.0% (study III), respectively.

## Conclusions

"Partitioned" testing may (a) provide more information, (b) yield higher diagnostic accuracy, and (c) detect disease subsets likely to be missed by the SCC alone. Further studies, aimed at establishing the prognostic value, generalizability, and applicability of these findings are recommended.