Temporal Repeatability of Positive Test Results of *Mycobacterium avium* subspecies *paratuberculosis*-antibody Milk ELISA-positive Cows

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Introduction

Johne's disease (JD) of dairy cows is caused by *Mycobacterium avium* subspecies *paratuberculosis* (MAP). Although the majority of infected cows are subclinical, the infection causes production losses which lead to economic losses for the farm. Available tests do not identify all subclinically infected cows, and anecdotal reports from producers indicate that some cows can test positive for Johne's disease or MAP antibodies at one test, and the same cow can test negative at a following test. These contradictory results often lead to frustration and uncertainty among producers about the interpretation of test results and their implication for JD control on their farm. Therefore, the objective of this study was to identify characteristics of the cow and her Dairy Herd Improvement (DHI) milk test at the time of a positive MAP-antibody milk ELISA (MAP milk ELISA) result that is followed by a different milk ELISA result, i.e. negative or suspect, compared to a cow's milk test where cows tested positive at both the initial and subsequent MAP milk ELISA.

Materials and Methods

Records for all cows tested with a MAP milk ELISA by CanWest DHI since the introduction of the test between March 2005 and April 2009 were available for analysis, including 158 cows with at least one MAP milk ELISA following a positive MAP milk ELISA result. The data were analyzed with a logistic regression model (PROC GLIMMIX) including herd as a random effect. The outcome was either a change in test result from the first positive test to suspect or negative at the next test (1) or no change (0), i.e. the MAP milk ELISA result was positive at both tests. The potential predictors were the test day characteristics of the cow and the milk and component production data at the time of the initial positive MAP milk ELISA.

Results

Most (62 %) of 158 test-positive cows remained positive at the subsequent test, indicating a consistent immune response to MAP infection and test result consistency. This was true especially as the optical density (OD) of the initial test increased or for cows that tested positive despite high milk production at the end of lactation. OD results varied between DHI test days, which could explain some of the changes in milk ELISA results for cows at or near the cut-points for defining negative, suspect or positive tests. Breed, milk composition, and the cow's lactation number were not associated with the likelihood of milk ELISA change.

Significance

In conclusion, most MAP milk ELISA-positive cows will remain test-positive at subsequent tests. However, milk production on test day, stage of lactation, and OD score of the MAP-antibody milk ELISA should be taken into consideration when interpreting positive MAP-antibody milk ELISA results of individual cows.