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THE SUITABILITY OF MILK SAMPLES FROM A NATIONAL MILK ANALYSIS CENTRE FOR BOVINE LEUKAEMIA VIRUS SURVEILLANCE

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Greater than 90 percent of all dairy herds in New Zealand submit individual cow samples to a national milk analysis centre for production and somatic cell count testing at least four times annually. The opportunity to use these samples for individual animal testing for Bovine Leukaemia Virus (BLV) was investigated because of the significant economic benefits from using pre-existing samples. Milk samples can be collected from the entire adult herd during the late spring and summer because cows calve seasonally in New Zealand.
Serum and production test milk samples were collected from all lactating cows in nine BLV infected herds. The results of commercial enzyme linked immunosorbent assays (ELISA) for BLV using serum, and milk production samples from the National Milk Analysis Centre were compared. Serum ELISA positive animals were defined as a positive cases. ELISA tests of the production test samples had a relative sensitivity of 96.7%, but a specificity of 90.2%. The positive predictive value of this test method was only 37.9% but the negative predictive was 99.8%. Within herd contamination of these samples was identified as the primary reason for the poor specificity. Animal identification at production testing or at custom sample collection was not a significant problem.
Less than 7 percent of New Zealand herds are BLV infected and in those herds the mean within herd prevalence of BLV is estimated at 3.7%. The routinely collected production milk samples were considered appropriate as an initial screening test to establish herd status and to identify subgroups of animals requiring individual serum samples for final diagnosis of BLV status.

The New Zealand dairy industry has begun a control scheme for Enzootic Bovine Leucosis (EBL). At least 90 percent of dairy herds regularly submit individual cow samples to a national milk analysis centre for production testing. The use of these samples for Bovine Leukaemia Virus (BLV) testing of herds and individual cows was investigated as scheme costs are reduced. Milk samples can be collected from the entire adult herd during the late spring and summer because cows calve seasonally in New Zealand. Enzyme linked immunosorbent assays (ELISA) are available for testing aggregate and individual milk samples for BLV (Klintevall et al. 1991). Although milk samples are routinely used for BLV elisa testing in several countries, herd production test samples have generally been considered unsuitable. Cross contamination of the samples at milking and from the herd test equipment is the most important reason for not using such samples.
Serum and production test milk samples were collected from all lactating cows in nine BLV infected herds. The test results using commercially available ELISA kits for BLV using serum and milk production test samples were compared. Serum ELISA test results were regarded as the "gold standard" for BLV infection in this study.
There were 1031 cases included in the study of which 60 were positive to the serum ELISA test. A similar commercial ELISA test used on the production test milk samples had a relative sensitivity of 96.7% and a relative specificity of 90.2%. The positive predictive value of this test method was only 37.9% but the negative predictive was 99.8%. Within herd cross contamination of the milk samples was identified as the primary reason for the poor specificity of the milk ELISA test. Animal identification at production testing was not a significant problem. A cross sectional study indicated that 6.5% of New Zealand herds are BLV infected. Testing for BLV of 9,443 cows from 50 BLV infected herds gave an estimated true prevalence after adjusting for test sensitivity and specificity of 3.7% and did not identify any herds that were incorrectly classified as infected.
These results indicate that ELISA testing of production test milk samples is a suitable method of identifying infected and uninfected herds in a control scheme. The samples and test methods are also appropriate for identifying subgroups of animals that require individual serum samples for final diagnosis of BLV status. Although the positive predictive value is poor, only a small proportion of infected herds will require blood sample collection as disease prevalence is low. No additional on-farm sample collection is required for tested negative herds.

REFERENCE LIST

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