

Detection of hyperketonemia in dairy cows using FTIR and test day information

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The objective of this study was to assess the quality of a diagnostic model for the detection of hyperketonemia in early lactation dairy cows at test days, using FTIR spectroscopy analysis of milk ketone bodies and available test day information. Blood samples of 1,678 cows from 118 randomly selected farms were collected on the test day and analyzed. The prevalence of hyperketonemia was 11.2% in this study but observed herd prevalences varied largely between farms. The value of FTIR predictions of milk acetone and milk BHBA concentrations as single tests for hyperketonemia were found limited given the relatively large number of false positive test day results. A multivariate logistic regression model with a random herd effect was constructed, using test day information and FTIR predictions of milk acetone and milk BHBA as predictive variables. The obtained diagnostic model had a sensitivity and a specificity of more than 80% for the detection of hyperketonemia at test days. Confirmation of test-positive samples with wet chemistry analysis of milk acetone or milk BHBA concentrations (serial testing) improved the diagnostic performance of the test procedure. The presented model was considered not suitable for individual detection of cows with ketosis due to the length of the test day interval and the low positive predictive values of the investigated test procedures. The diagnostic model is in our opinion valuable for herd level monitoring of hyperketonemia, especially when the model is combined with wet chemistry analysis of milk acetone or milk BHBA concentrations.