Prevalence of subclinical ketosis detected by near infra-red analysis of BHB in DHI milk samples

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Abstract Text: Subclinical ketosis is a common early lactation disorder. Herd prevalence is often unknown because there are no specific clinical symptoms and because individual testing of dairy cows can be costly and time consuming. Since October 2011, Valacta (Dairy Centre of Expertise, Quebec and Atlantic Canada) offers routine infra-red testing of β-hydroxybutyrate (**BHB**) in DHI milk samples. Over 293,000 milk samples from fresh cows (DIM 5-35) from 4179 dairy herds have been analyzed for BHB concentration (199,003 multiparous and 94,036 primiparous cows). Based on a previously published trial comparing blood and milk BHB concentrations, threshold were established as follows: cows with milk BHB concentrations ≥ 0.20 mM were declared ketotic (**POS**); cows with milk BHB concentrations below 0.15 mM were declared non-ketotic (**NEG**); and cows with intermediate BHB concentrations were classified as potentially ketotic (**SUSPECT**). Overall incidence of subclinical ketosis (POS and SUSPECT) was 24.7% over the first 5 weeks of lactation. Incidence for DIM 5 to 35 was 21.5 and 26.6% for primiparous and multiparous cows, respectively. Distribution of incidence in relation to DIM was different between primiparous and multiparous cows. Highest incidence for primiparous cows (33.7%) was in the first week postpartum but in the third week for multiparous cows (33.5%). By DIM 35, incidence declined to 13.1% and 17.9% for primiparous and multiparous cows, respectively. Among herds with at least 10 cows analyzed for BHB (n=3560), within herds prevalence of ketosis for the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} percentile were 11, 17, 24, 33 and 43% respectively. Ketosis prevalence was affected by month of calving ($P<0.001$). Highest incidence was observed for cows calving in May-June and October-November whereas lowest incidence was observed for cows calving in August and September. Ketosis prevalence was also affected by breed ($P<0.001$), prevalences for Ayrshire (n=12,443), Brown Swiss (n=1814), Holstein (n=271,367) and Jersey (n=6554) cows were 24.4, 22.7, 24.7 and 34.6%. respectively Milk BHB concentration was negatively correlated with milk Fat:Protein ratio ($R=-0.39$; $P<0.001$) and the correlation was affected by breed. Correlations between milk BHB and Fat:Protein ratio were -0.34, -0.35, -0.39 and -0.32 for Ayrshire, Brown Swiss, Holstein and Jersey cows, respectively ($P<0.001$). Results indicate subclinical ketosis incidence varies greatly among dairy herds and is influenced by breed and season. Monitoring of subclinical ketosis prevalence is important as a first step towards greater transition success.

Keywords: Ketosis, Dairy cow, DHI