EVALUATION OF BRIX REFRACTOMETRY FOR MEASUREMENT OF COLOSTRUM QUALITY

A. Skidmore¹, P. Dinsmore², V. Bielmann³, S. Godden⁴, K. Leslie³, S. LeBlanc³

¹Intervet Schering-Plough Animal Health, Alexander, NY, ²Colorado State University, Ft. Collins, CO, USA, ³University of Guelph, Guelph, ON, Canada, ⁴University of Minnesota, St. Paul, MN, USA

Introduction: Measurement of colostrum immunoglobulin (Ig) is an important on-farm procedure to ensure adequate transfer of Ig to the newborn calf. Acquisition and delivery of high quality colostrum are important factors influencing neonatal calf health. New techniques to evaluate colostrum and passive transfer in dairy cattle are needed. These methods must be simple, rapid, accurate, inexpensive, and adaptable to farm conditions.

Objectives: To evaluate Brix refractometers for assessment of bovine colostrum.

Materials and methods: Two studies were conducted. In study 1, first-milking colostrum was obtained from 117 cows on a large Colorado, USA dairy. Colostrometer measurements were made by farm personnel. Brix measurements were made in triplicate on fresh samples. The samples were submitted for radial immunodiffusion (RID) measurement of IgG. A subset of samples (17) was tested at 3°C, 20°C, and 38°C. Multiple linear regression analyses yielding the highest $R^2$ (0.63) included Brix value and lactation group.

Results: Correlations between colostrometer and RID and Brix values and RID were 0.36 and 0.63, respectively. No temperature effect was found. In study 2, colostrum samples from 288 Holstein cows from 3 dairy herds in Ontario, Canada and Wisconsin, USA were used. The Ig concentration of the colostrum samples was measured by radial RID assay. The correlation coefficient between the RID and the Brix scores on frozen samples was $R^2=0.53$. Using a Brix score of 22%, the sensitivity and specificity for identifying fresh colostrums samples with inadequate IgG concentrations (50g/L) was 90.5% and 85.0%, respectively. No significant difference was found between Brix scores taken at 3 different colostrum temperatures (5, 20 and 38°C). Interestingly, no substantial difference in colostrum quality was observed between primiparous and multiparous animals in this study.

Conclusions: There was good correlation between Brix refractometer values and Colostrum IgG. The Brix instruments were simple to use, and were unaffected by temperature of the colostrum.

Keywords: Refractometer, Colostrum, Calves