

Evaluation of serum immunoglobulin G concentrations in dairy calves by use of an automated turbidimetric immunoassay

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Introduction

Administration of colostrum to newborn calves is recognized as an important component of dairy calf health maintenance because colostral immunoglobulin absorption is required to establish passive immunity. Despite the importance of a good colostrum management program, over one-third of dairy operations still depend on the calf nursing the dam as the only method for colostrum delivery, and 19.2% of calves are estimated to have failure of transfer of passive immunity. Multiple assays have been described to assess serum immunoglobulin G (IgG) concentrations in calves; however, none are ideal for routine use on farms. The purpose of this study was to evaluate the reliability of a new commercially available automated turbidimetric immunoassay and portable analyzer for measuring serum IgG concentrations in dairy calves.

Materials and Methods

Serum from 100 Holstein calves (one to five days of age) that had received colostrum was collected for this study. For each calf, serum IgG concentrations were determined using a commercially available automated turbidimetric immunoassay (Bovine Serum/Plasma IgG, Midland Bio Products, Boone, IA) conducted in accordance with the manufacturer's instructions by

means of a portable analyzer (MBC QTII,TM Midland Bio Products, Boone, IA). Serum IgG concentrations were also determined by a radial immunodiffusion assay (RID). Linear regression was used to compare IgG concentrations determined by RID with those determined with the automated turbidimetric immunoassay.

Results

Serum IgG concentrations in calves from this study ranged from 460 to 3,640 mg/dL (mean, 1,515 ± 71 mg/dL) as measured by RID, and 402 to 3,586 mg/dL (mean 1,473 ± 70 mg/dL) as measured by the automated turbidimetric immunoassay. Regression analysis revealed that results from the automated turbidimetric immunoassay closely paralleled those obtained by RID (r^2 , 0.975).

Significance

On the basis of the results of this study, the immunoassay technique using the portable analyzer represents a reliable method that can be run within 15 minutes and provide an accurate serum IgG level. Although the cost is not insignificant, this assay could be easily implemented on a dairy farm to help monitor transfer of passive immunity.