

The Effect of Fluid Volume Fed on the Serum Immunoglobulin in Calves

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Serum immunoglobulin in calves is highly correlated with the mass of immunoglobulin in colostrum fed in the first 24 hours of life. The immunoglobulin concentration of colostrum can be estimated by determining its specific gravity, using a hydrometer. When the specific gravity of colostrum is undetermined, feeding 3.78 L of colostrum reportedly results in an adequate serum immunoglobulin concentration in calves. The objective of this study was to compare the serum immunoglobulin in calves fed the same mass of immunoglobulin in two different volumes of fluid.

For a five day period, on a large commercial dairy in Tulare, California, Holstein calves less than 6 hours old were randomly assigned to one of two groups. Group 1 received 1.89 L of colostrum, and group 2 received 1.89 L colostrum combined with 1.89 L of whole milk obtained from the bulk tank of the test dairy for a total volume of 3.78 L. The colostrum was from a common batch collected on the test dairy, had an IgG concentration of 56.4 mg/ml, and was frozen in 1.89 L aliquots. Each 1.89 L bag, containing 107 grams of IgG, was thawed in a warm water bath just prior to feeding. All calves were fed via an esophageal feeder. In order to ensure that calves

had not suckled colostrum from the dam in the maternity pen, blood samples were obtained prior to colostrum feeding. Serum IgG was determined using an IgG Single Radial Immunodiffusion kit (VMRD Inc., Pullman, WA). Those calves with a pre-feeding serum IgG > 100 mg/ml were excluded from the study. Following the initial colostrum feeding, all calves were fed a mixture of milk replacer and non-saleable whole milk, receiving 2L twice daily. This was the typical calf feeding regimen for this dairy. Blood samples were also obtained 24 and 48 hours after the initial colostrum feeding, and the same IgG Single Radial Immunodiffusion kit was utilized to ascertain serum IgG levels.

The SRID results are shown in Table 1. The mean serum IgG concentration for groups 1 and 2 did not differ significantly prior to colostrum feeding, indicating that the two groups were homogenous. The mean serum IgG concentration for groups 1 and 2 did not differ at 24 or 48 hours after colostrum feeding. These results indicate that fluid volume does not affect serum IgG concentration when the same mass of immunoglobulin is fed to calves less than 6 hours of age.

Table 1.

Volume fed	Mean [IgG] Pre-feeding	Mean [IgG] 24 hours post feeding	Mean [IgG] 48 hours post feeding
1.89 L (n=16)	20.0 mg/dl	1129.0 mg/dl	934.9 mg/dl
3.78 L (n=17)	27.882 mg/dl	1258.1 mg/dl	979.3 mg/dl
p value	.16361	.56908	.78220