

COMPARISON OF DIFFERENT METHODS FOR MEASURING IMMUNOGLOBULIN CONTENT IN CALF SERUM

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Objectives. The correlation between an IgG1 ELISA and different methods for immunoglobulin and serum protein determination was examined in calves 1-77 days of age to compare methods to establish failure of passive transfer of immunoglobulins.

Materials and Methods. Blood samples were taken from 92 calves and age, sex, general condition and weight (weighing or thorax measure) were recorded. In serum total protein concentration was measured by Biuret's method and refractometer (Atago, Bie and Berntsen A/S). Immunoglobulin contents was measured by the semiquantitative serum glutaraldehyde test (Tennant et al. 1979, 174, 848-853, a commercial whole blood IgG test (Quick Test Calf Whole Blood IgG KTM, Midland Bio-Products Corporation) and a direct sandwich IgG₁ ELISA developed in our laboratory.

Results. Significant correlations was found between serum IgG₁ concentration and serum protein concentration measured by refractometer or Biuret and between the two methods of protein determination. Tests positive (>10g/l IgG) with the commercial test kit had significant higher IgG1 concentration (29.79 g/l) than negative test (9.75 g/l). Significant correlation was also demonstrated between IgG₁ and the glutaraldehyde coagulation test.

The table below shows the sensitivity, specificity, positive (posPV) and negative (negPV) predictive value and % correct classified calves (CCC) with the commercial test kit (CTK), the glutaraldehyde test (GAT) and refractometer (REFR) in relation to an IgG₁ >10 g/l = no failure of passive transfer and IgG₁ <10 g/l = failure of passive transfer.

Method	sensitivity	specificity	posPV	negPV	%CCC
Commercial test kit	0.70	0.92	0.88	0.79	81.57
GAT time					
10 min	0.35	0.02	0.24	0.03	17.36
15 min	0.58	1	1	0.73	80.59
20 min	0.58	0	0.24	0	27.13
REFR					
40 g/l	0.05	1	0	0.54	55.49
50 g/l	0.54	0.90	0.82	0.69	72.85
55 g/l	0.95	0.69	0.73	0.94	81.83
60 g/l	1	0.45	0.61	1	70.63

Conclusions. With ELISA IgG1 as reference significant correlations were demonstrated between the various methods used. In calves from 1-77 days of age a serum protein concentration of 55 g/l measured by refractometer correctly classified 81.63% of the calves as having serum IgG1 concentrations below 10 g/l. Therefore, the simple refractometer method is recommended for field use to measure failure of colostrum uptake in individual calves.