

Comparison of different methods to measure IgG in sow colostrum

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Introduction

There is increasing interest in the production and the carry over of maternal antibodies towards the sows offspring. A good reliable techniques to measure the IgG content in colostrum is therefore important. In the current scientific literature several methods are used to measure colostrum IgG resulting in different analysed IgG concentrations. In our own research we were confronted with difficulties in using an ELISA to measure IgG concentrations in colostrum. In bovine colostrum Radial immunodiffusion (RID) is the current golden standard. However, as far a we know, there is no published data of a comparison of methods to measure IgG in porcine colostrum.

Material and methods

In an earlier study in 2013 we obtained colostrum from 70 sows (Topigs 20) directly after birth of the first piglet. Samples were measured for IgG with a commercial available ELISA (Bethyl laboratories) and protein (spectrophotometric determination). Colostrum samples were stored at -32 °C and were thawed again for the determination of IgG with the other methods using a refractometer and radial immunodiffusion (RID). To homogenize fat, colostrum was warmed up for 30 minutes at 36°C and cooled back towards 20°C. The Breaking index percentage (BRIX) was measured using a calibrated refractometer (VWR, 0-50% brix). Colostrum samples were diluted 50% with demineralized water to measure IgG with a RID kit (Triple J farms swine IgG kit). Calibrated wiretrol pipets (Drummond) were used to add 5µl of sample to the wells. After 24 hours incubation at 22° C end point reading was done using a digital calliper. Samples exceeding the reference sample concentrations were diluted to 25% colostrum solution and measured again. Data between methods were compared using linear regression models (SPSS).

Results

Total protein of the colostrum was 174 g/kg (min 131 g/kg; max 225 g/kg; sd 24). Colostrum IgG, measured with RID, had an average concentration of 60.2 mg/ml (min 32.3 mg/ml; max 77.1 mg/ml sd 8.56). Elisa showed a higher variation with a mean IgG of 993 mg/ml (min 88 mg/ml, max 2650 mg/ml; sd 777) and was only weakly correlated with RID IgG (R^2 0.29; $p < 0.001$) Brix percentage was positive correlated with RID IgG (R^2 0.68; $p < 0.001$) and total protein (R^2 0.90; $p < 0.001$).

Conclusion

The results clearly showed different values for Elisa and RID measured IgG. Elisa IgG was only weakly correlated with RID IgG. On the other hand a very simple brix percentage measurement showed a much higher correlation with RID. For research the RID will remain the golden standard. However the refractometer proved to be a quick and robust method to measure colostrum IgG under field conditions.