Can we preserve immunoglobulin G in frozen colostrum of mares for three years?

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Foals need good quality colostrum at birth, containing large amounts of immunoglobulins to have adequate passive transfer for early life protection, as antibodies do not cross placenta during pregnancy. Colostrum is therefore a key factor for immunity of foals, as they are born almost without immunoglobulins. Colostrum banking is routinely used by breeders all over the world to overcome failure of passive transfer in the newborn foal. However, to our knowledge, there are no data in the literature regarding long term preservation of immunoglobulin G (IgG) in frozen mare colostrum. Radial immunodiffusion (RID) is the gold standard method to measure IgG concentrations in colostrum of mares. Objective was to evaluate IgG concentrations in frozen colostrum and to compare RID and refractometry methods to measure IgG in frozen colostrum. We hypothesized that IgG concentrations remain stable for 3 years and that refractometry is a reliable method to evaluate the quality of frozen colostrum. During the foaling season of 2014, colostrum was collected from 36 mares of several breeds in Normandie, France. After a simple filtration, IgG concentrations were measured by RID and refractometry. All samples were divided into 2 ml plastic Eppendorf microtubes before freezing. At 3, 6, 9, 12, and 36 months, 2 samples from each mare were thawed in a water bath at 37°C. Immunoglobulin G concentrations were measured using both methods. Colostrum from 22 Thoroughbreds, 12 Standardbreds, 1 Warmblood, and 1 pony were collected immediately post foaling and prior to a foal suckling its dam. Before freezing, IgG concentrations were measured. They were higher ($p < 0.005$) in the colostrum (thick yellow) of Standardbreds compared to the colostrum (watery and white) of Thoroughbreds. There was no significant difference between the 2 methods. After 12 months, IgG concentrations remained stable and there was no difference between methods. At 36 months, IgG concentrations was significantly higher than before freezing when evaluated by RID and stable by refractometry. In a Mixed Model, the 'mare' factor was the only significant effect on colostrum concentration. The RID method had higher variation within the same sample compared to refractometry, whereas refractometry results were highly repeatable. Compared to RID, refractometry was a practical and reliable method to evaluate colostrum quality of frozen thawed colostrum. Furthermore, IgG concentrations in frozen colostrum were stable after 36 months.

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