

Spray Dried vs. Freeze Dried Colostrum Supplement: Serum IgG Levels, Total Protein, and Blood Gas Effects in Holstein Neonates

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Objective: Efforts to change current processing methods of colostrum supplements to increase absorbable immunoglobulin levels are being evaluated. Freeze-dried (**FD**) product may provide more available immunoglobulin G (**IgG**) than commercially available spray-dried (**SD**) product, which is heated during processing.

Study Design: An experiment was conducted to compare IgG absorption by newborn calves fed either SD (n=10) or FD (n=20) colostrum supplement. Calves were randomly assigned to receive one or the other colostrum supplement products, but the identity of the products were coded so administration and subsequent calf sampling were done blindly. Serum total protein (**TP**), arterial blood gas, and serum IgG levels were evaluated.

Procedure and Sample Population: Thirty singlet Holstein bull calves (43±3.6 kg) that were born without assistance were used for this study. At birth, calf weight, rectal temperature, mentation, and calving score as well as dam identification and lactation number were recorded. Whole blood was collected via jugular venipuncture at birth (0h) and at 24 and 48h after birth for TP and IgG analysis. At 0h, arterial blood was collected in a heparinized syringe from the brachial artery for immediate blood gas analysis. At approximately 1h after birth and again at approximately 12h after birth, calves were fed either a FD or SD powdered colostrum supplement in 1.4L of warm water via a bottle or esophageal feeder. Serum TP was evaluated by refractometry and single radial immunodiffusion was used to determine serum levels of IgG.

Results: At 0h, 53% of calves were hypoxic ($pO_2 < 58$ mmHg), and 30% were acidemic ($pH < 7.3$). There was a trend of higher mean IgG in SD (1115.5 mg/dl) vs. FD (923.3 mg/dl) fed calves at 24h ($P=.09$). The same trend was identified at 48h ($P=.08$). Mean TP levels at 24h and 48h were similar in both the SD (5.17 g/dl and 5.22 g/dl, respectively) and FD (5.24 g/dl and 5.35g/dl, respectively) groups. Thirty-eight percent of hypoxic calves and 44.4% of acidemic calves were considered to have failure of passive transfer at 48h, however, when compared to normal calves, these blood gas parameters had no impact on FPT ($P=.70$).

Conclusions: Results of this study indicate that IgG absorption was similar, regardless of processing method. Further examination of processing methods is necessary to determine if freeze drying will be an economical and advantageous means of improving quality of colostrum supplements.