

Concentrated Bovine Serum Globulin Protein as a Colostrum Replacement/ Supplement in Receiving Dairy Beef Calves

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This experiment was run to show the effectiveness of utilizing spray dried bovine serum globulin protein (BGP) as an effective colostrum adjunct for the attainment of passive immunity in receiving dairy beef calves less than 24 hours of age. Calves were randomly assigned to four groups. Two groups received 1/2# of an all milk milk replacer on reception at a calf ranch. Two groups received 1/2# of spray dried BGP on reception. Over a one month period **4198 calves** were received. **1779** calves received 1/2# **milk replacer** only upon arrival. **2375** calves received 1/2# **dried serum protein** upon arrival. Calves were housed in individual wood calf hutches of three calf hutches per unit. Calves receiving only milk replacer (**#1779**) had a mortality of **11.7% (209/1779 died)**. Calves receiving BGP had a mortality of **3.7% (89/2375 died)**. The overall death rate of calves, measured for a period of sixty days from arrival was **298/4154 died, a 7.2% death loss**. This experiment shows that if calves received BGP there was a **decrease in death loss of 8%** over a 30 day period. All calves were receiving calves which had questionable colostrum ingestion and questionable colostrum immune protection.

A second experiment was run to compare the effect on scours and serum IgG levels by orally dosing incoming day-old calves with 45 or 90 grams of bovine serum globulin protein (BGP), 45 grams of BGP plus 10 grams of egg yolk IgG, or milk replacer. Calves were

randomly assigned to four groups. Group one received 45 grams of bovine globulin protein, group two received 90 grams of BGP, group three received 45 grams of BGP with 10 grams of egg IgG and group four received 1/2# of all milk milk replacer. Calves were bottle fed upon arrival at the ranch. Blood was obtained through jugular puncture on arrival and at 24 hours. Blood IgG concentrations were measured through R.I.D. technique. Scour scores were periodic visual observation. Scores were 1=normal, 2=pasty formed, 3=pasty unformed, 4=watery, 5=watery with blood. BGP enhanced the IgG concentrations of calves that were below 6mg/ml initial IgG concentration. There was a decrease in the scour scores in calves receiving BGP and BGP with egg IgG in comparison to milk replacer. Blood IgG levels at 24 hours ranges from 1.9 to 7.8 mg/ml higher comparing BGP over milk replacer. The range in scour scores was 2.3 (highest) with milk replacer to 1.5 (lowest) with BGP. These data suggest that it may be beneficial to utilize BGP in newborn calves that have inadequate colostrum immunity. Using both sets of data it appears that the benefits of oral administration of dried bovine globulin protein may well have a place in newborn calves as a supplement to colostrum, and as an enhancement to reduce failure of passive transfer in calves that have received inadequate amounts of colostrum or poor quality colostrum.

Comparison of dam and neonatal trace mineral levels in Nebraska sandhills beef cattle

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Trace mineral deficiencies in copper, selenium, zinc, and manganese have been reported from neonates and perinatal calves in Western Nebraska, including the Gudmundsen Sandhills Laboratory (GSL) at Whitman, NE. Deficiencies or imbalances of trace minerals such as copper and selenium may play an independent or

interacting role in the neonate's ability to produce immunity. To try and document the effect of these non-infectious conditions and the role they may play in neonatal and perinatal losses in West Central Nebraska, the following trial was initiated in 1993 at GSL.

One hundred 4-6-year-old MARC II cows were di-

vided into 4 groups, utilizing a 2 x 2 x 3 factorial experiment with the following treatments for 3 years: control untreated, copper injection, selenium bolus/injection, and combination of copper and selenium treatments. Treated cows received copper by injection and selenium supplementation by bolus (MolyCu® and DuraSe® boluses; Schering-Plough) in January and June, 1992 and 1993. The second year, selenium was supplemented by injection (Mu-Se®; Schering-Plough) instead of the DuraSe® boluses. Dosage was according to field recommendations; 2 cc of MolyCu®/sq (400 mg of cupric glycinate) was the equivalent of 120 mg copper. The DuraSe®-120 bolus contained the equivalent of 360 mg selenium as sodium selenite. It delivered a controlled amount of 3 mg/day for 4 months. Mu-Se® (selenium; vitamin E) was injected at 1 ml/200 pounds body weight. Each ml contained 10.95 mg sodium selenite (equivalent to 5 mg selenium) 50 mg (68 USP units) vitamin E (as *d*-alpha tocopherol acetate). By staying within the commercial guidelines, we wanted to determine the economic benefits of this mode of trace mineral supplementation and its effect on the calves' immunity. All calves were weighed at birth and bled at

24 hours of age. The serum was analyzed for immunoglobulin (IgG) levels by single radial immunodiffusion (SRID). Ten head of cows per group were liver biopsied twice a year and the third year their calves were liver biopsied.

By combining the 1993-1994 calf numbers, the copper group SRID showed significant statistical but not clinical significant differences when compared to the control calves ($P=0.08$). No significant differences occurred in the SRID groups in 1995, or when the three years were combined.

In the 1995 calf liver biopsy groups, the treatment analysis indicated significantly elevated calcium ($P<0.08$) in the selenium injected group.

Liver biopsies of cows had higher concentrations of manganese, cadmium, and molybdenum than their calves ($P<0.01$). Liver biopsies of calves had higher concentrations of magnesium, zinc, potassium, calcium, and copper ($P<0.01$) than cows. Phosphorus, barium, nickel, sodium, sulfur, iron, chromium, and vanadium in liver biopsy samples were not different between cows and calves ($P>0.10$).

Case-control Study of Clinical Salmonellosis in Cattle Herds

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Veterinarians in Virginia's Shenandoah Valley noticed an increased number of cases of clinical salmonellosis in cattle during the Summer of 1994. Cases occurred sporadically in some herds, but many beef and dairy herds experienced outbreaks with high mortality in preweaned calves or adult cows. Data from the Virginia State Department of Agriculture showed there was an increase in the number of herds diagnosed with salmonellosis during July and August 1994. It was not known whether the apparent increase in clinical salmonellosis actually represented higher disease incidence or whether salmonellosis was diagnosed more often because of heightened awareness of the disease after outbreaks occurred in several herds. About 84% of the salmonella isolates from bovine samples submitted to the regional diagnostic laboratory were *S. typhimurium*.

A field study was conducted to identify potential risk factors for clinical salmonellosis in a sample of cattle herds near Harrisonburg, Virginia. Commercial herds with at least one laboratory-confirmed case of salmonellosis during 1994 were identified from diagnostic laboratory records. Of 27 herds identified, 14 dairy

and 9 beef farms agreed to participate in the study. Herd veterinarians were contacted to select control herds matched with case herds by type of enterprise (beef vs. dairy), veterinary practice, and zip code zone. Twenty-five (4.7%) of 531 fecal, feed and environmental samples collected from 46 case and control herds were positive for salmonella. Lagoon and preweaned calf fecal samples had the highest percentages of positive samples (21% and 6%, respectively). *S. typhimurium* was the serotype most commonly isolated. Herds with a history of clinical salmonellosis were significantly more likely to have at least one positive culture from samples collected during the study than control herds ($p=0.04$). Positive samples were obtained from case farms up to seven months after the clinical cases occurred. Isolation of salmonella from fecal or environmental samples was more common for dairy herds than beef herds, but this may have been partly due to the accessibility of preweaned calves for collection of fecal samples. Case herds tended to be larger than control herds considering both the number of mature cows ($p=0.03$) and the total number of cattle on the farm ($p=0.08$).

Most factors related to manure handling, water