



Milk Replacer Research Plasma

Summary

Low bacteria plasma can be used to elevate immunoglobulin concentrations in calf milk replacers.

Plasma as an ingredient

For years, plasma has been used in piglet feeds and calf milk replacers. Various plasma sources are available. Several of the plasma sources that we have evaluated for calf milk replacers are high in bacterial concentrations. When visually examining some plasma sources, the material appears scorched or burnt. APC, Inc., offers a low bacteria plasma source that is light colored (no appearance of scorch), appropriate for neonatal calves.

Research with plasma

We have evaluated plasma from APC, Inc., in a 26% CP, 17% fat milk replacer fed at 1.5 lb of powder per head daily in 3 different trials totaling 60 calves per treatment. In these trials, plasma replaced approximately 15% of protein from whey protein concentrate. Average daily gain (ADG) and starter intake did not differ between treatments as shown in Table 1 below. Additionally, hip width change (1.4 inches per 56 days), body condition score change (0.1 unit per 56 days), and days with scours (1.1 days per 56 days) did not differ between treatments. The only concerning aspect of the trials was the greater variation in performance with milk replacers with plasma than milk replacers without plasma as shown in Table 2.

Table 1. Performance Change with Plasma

Item	ADG, lb/day	Starter intake, lb/day
Pre-weaning		
No Plasma	0.95	0.34
With Plasma	0.94	0.32
Post-weaning		
No Plasma	1.36	3.33
With Plasma	1.35	3.23

Table 2. Variation in Performance with Plasma

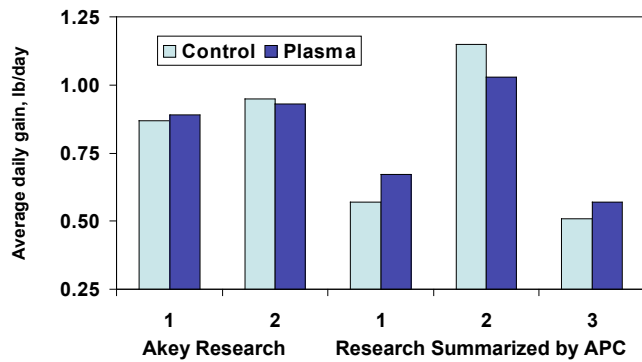
	ADG, Variation	Starter intake, Variation
Pre-weaning		
No Plasma	8%	11%
With Plasma	15%	25%
Post-weaning		
No Plasma	7%	9%
With Plasma	13%	19%

Plasma is often discussed positively because it is high in immunoglobulin concentration. Numerous trials have been published using plasma (typically included at 5% of powder) in conventional milk replacers fed at rates of approximately 1 lb of powder per calf daily. Average daily gain has not been changed from all milk protein control treatments with the use of plasma in either Akey research or research summarized by APC, Inc. (Figure 1). In our research, health measures were not changed by adding plasma to milk replacers. However, in the APC, Inc., summary, scouring and death loss was often reduced (Table 3).

Table 3. Mortality and Scouring in Calves fed Conventional Milk Replacers with or without Plasma

Item	Calves, n	% Mortality	Calves, n	Days with Scours
No plasma	130	14.6%	83	6.1
With plasma	130	5.4%	96	5.2

Figure 1. Average Daily Gain in Calves fed 20% Protein, 20% Fat Milk Replacers with All Milk Protein (Control) or with Added Plasma



Research with Added Immunoglobulins and Essential Fatty Acids

Similarly we have observed improvements in calf performance when adding other immunoglobulin sources to milk replacers (Table 4). In this trial a 26% CP, 17% fat milk replacer fed at 1.5 lb of powder using 16 calves per treatment. The days with scours were less in calves fed high vs. low immunoglobulin milk replacers.

Table 4. Performance Change with Added Immunoglobulins (IG)

Item	ADG, lb/day	Starter intake, lb/day	Feed efficiency	Hip width change, in	Body condition score change	Days with scours
Pre-weaning						
Low IG	0.94	0.26	0.57	0.5	0.1	1.7
High IG	1.06	0.47	0.56	0.6	0.1	0.9
Post-weaning						
Low IG	1.14	3.21	0.36	0.7	0.0	0.0
High IG	1.22	3.34	0.37	0.9	0.2	0.0

When specific functional fatty acids were added to the diets of calves, scouring has been reduced and average daily gain and efficiency has been increased. In the trial reported in Table 5, a conventional 20% protein, 20% fat milk replacer was fed at 1 lb of powder per calf daily to 24 calves per treatment. Here both high immunoglobulin and essential fatty acid concentrations reduced scouring and increased average daily gain when included individually. Additionally, the combination of high immunoglobulins and essential fatty acids was better than either treatment alone.

Table 5. Performance Change with Immunoglobulins (IG) and Essential Fatty Acids (EFA) Added to Conventional Milk Replacers

Item	ADG, lb/day	Starter intake, lb/day	Feed efficiency	Hip width change, in	Body condition score change	Days with scours
Pre-weaning						
Low IG, Low EFA	0.64	0.56	0.42	0.8	0.4	6.8
Low IG, High EFA	0.74	0.64	0.46	0.9	0.6	4.9
High IG, Low EFA	0.72	0.59	0.46	0.9	0.5	5.8
High IG, High EFA	0.76	0.71	0.46	0.9	0.6	4.1

Conclusion

Akey milk replacers have added essential fatty acids and immunoglobulins, along with a balance of amino acids. The research data are clear-cut. These components in milk replacers improve calf performance in repeated trials. Adding low bacteria plasma provides the final milk replacer powder with an even greater concentration of immunoglobulins. Provided plasma from APC, Inc., is cost-effective, we recommend its use in calf milk replacers to further elevate immunoglobulin concentrations.