Milk replacers are formulated to meet the nutrient requirements of the young calf by providing protein, energy, minerals and vitamins. Protein levels are usually from an all milk source and are balanced to a certain percent of the diet. Energy is the next most commonly discussed nutrient in milk replacers and it is primarily the percentage of fat and lactose in the product that determines energy level.

**What are Fatty Acids?**

Another component of energy within the fat category are fatty acids. Fatty acids are the building blocks of fat and may have their own requirements beyond total fat levels. Fatty acids are classified by the number of carbons they contain.

Butyrate is a short chain (C4) fatty acid that is most known for its ability to stimulate rumen papillae development from starter feed fermentation. Butyrate has also been found to increase amylase in plasma (Table 1) and increase the development of the intestinal villi when fed in milk replacers. Amylase is the enzyme that digests starch and its levels are low at birth but increase with age. Butyrate increases the maturation of the digestive system, helping to prepare the calf for weaning and the transition to starter feeds.

Medium chain fatty acids (often found in coconut oil) have also been found to improve calf health and growth in the young calf. Lastly, the essential long chain fatty acid, linolenic acid (C18:3) has also been shown to improve calf health and growth.

Feeding calves with all three lengths of fatty acids is not new to the calf since whole milk from cows being fed pasture naturally contains all the fatty acids mentioned above. It is in the conventional formulation of calf milk replacers with lard and tallow as the fat source that a narrower range of fatty acids has been fed.

**Do Fatty Acids Improve Performance Over Traditional Fat Sources?**

There have been several peer-reviewed research studies over the past several years that have found better calf performance when the fatty acid profile of a milk replacer is expanded to be more like what is found in cow’s milk.

Table 2 shows results from a trial where calves were fed an “intensive” type of milk replacer to calves for eight weeks. Calves were offered calf starter and free choice water. Body weight and health parameters were measured over the full 8 week trial. Calf body weight gain, feed efficiency and abnormal fecal scores were all significantly and positively affected with the addition of these fatty acids to the diet. NeoTec4, a commercially available product for use in milk replacers, was fed in this trial to supply the various fatty acids.
Do Fatty Acids Have a Benefit Other Than Just Growth?

It appears that there may be a benefit to the calf’s immune system when additional fatty acids are fed to calves. The calves in the above research trial looked at certain immune markers in calves fed NeoTec4. The calves were stressed on Day 35 by giving a full dose of a Pasteurella (Presponse HM) vaccine. Calves have typically responded in the past to this vaccine by developing a fever and becoming lethargic. The calves fed the NeoTec4 fatty acids, however, had less refusals of their milk replacer offering (Table 3). In addition, Table 4 shows the NeoTec4-supplemented calves did not have as great an increase in body temperature when vaccinated with the Pasteurella vaccine.

The Calf’s Immune System is Strong When Fed NeoTec4

One concern with the above findings is the immune system response. If the calves did not become lethargic and run a fever, did they even respond to the vaccine? The answer is YES they did. The proof is in the higher levels of globulin protein (Table 5) found in the calves being fed NeoTec4. Additionally, these calves were vaccinated for BVD and IBR on day 7 and day 28. Titers to BVD and IBR as measured on day 49 and 56 were greater in the calves fed NeoTec4. There are additional findings (tumor necrosis factor alpha and IL-4 level changes) that further support healthier calves with a fully functioning immune system in calves being fed the additional fatty acids found in NeoTec4.

Summary

Research trials have noted that the use of supplemental fatty acids in milk replacers can improve calf performance and health. More specifically, NeoTec4*, which contains a specific blend of supplemental fatty acids, has shown to be of benefit when included in an intensive milk replacer program. Hubbard Feeds’ Mother’s Pride intensive milk replacer contains NeoTec4 to help facilitate performance in calves on an intensive milk replacer program and after they are transitioned to a starter diet.

*NeoTec4 is a registered product of Provimi North America.