Super Supplements

Specialty feed ingredients offer to boost cattle health, performance and carcass quality.

Story by
KINDRA GORDON

Research is yielding promising potential for several nutritional supplements — many from natural sources like flax, yeast culture and seaweed. The impressive results from these nutritional additions to cattle diets include enhanced immune response, weight gain, beef quality and better reproductive performance. Read on for a roundup of these super supplements.

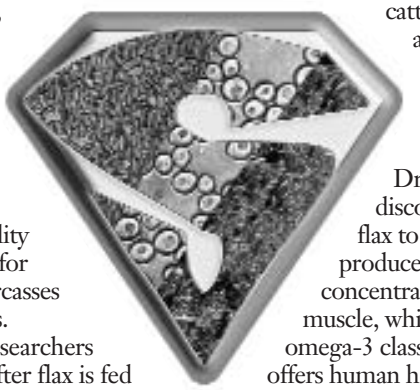
Flax phenomenon

Adding flaxseed (or flaxseed oil) — which is high in protein (22.8%) and oil (40%) — to feedlot rations is showing potential as a nutritional product that improves cattle health and carcass quality, as well as boosts concentrations of heart-healthy omega-3 fatty acids in the beef produced.

Kansas State University beef cattle nutrition professor Jim Drouillard initially began studying flaxseed's effect on cattle performance about five years ago because of its high omega-3 fatty acid content of alpha-linolenic acid (ALA). Early studies looked at controlling the inflammation that occurs with bovine respiratory disease (BRD) in cattle and found that when cattle consume the fatty acid ALA — in this case, flaxseed — the inflammation was partially suppressed, which benefited calf health.

Drouillard reports that adding flax to the diet also resulted in large increases in feed intake, meaning calves ate and gained more. Among animals fed flax, death loss was reduced, and sick animals appeared to respond more favorably to antibiotic therapy.

More recently, his flax research has focused on the finishing animal because of the supplement's ability to enhance gains, carcass quality and the potential for enrichment of carcasses with omega-3 fats.



Specifically, researchers are finding that after flax is fed to stressed feeder calves the first five to six weeks, those calves demonstrate a 10%-30% improvement on marbling and quality grade about 180-220 days later. In one instance, starting with a baseline of 33% Choice or better, Drouillard says flax may have boosted the figure to 44%. He cites another study where cattle fed no fat had a quality grade baseline of 67%, which, after feeding flax, increased to 82%. When the supplement was changed from flaxseed to flax oil, the improvement jumped to 94% Choice or better, with 39.8% Prime.

Even short-term feeding of flax for just the first 35 days after entering the feedlot has been shown to increase carcass weight. In a study on different fat sources in calf diets during the first 35 days in a feedyard, the control group's average carcass weight was 663 pounds (lb.); cattle fed tallow had carcass weights averaging 668 lb.; and cattle fed flaxseed averaged 670 lb. Those fed flaxseed oil averaged 680 lb.

Additionally, Drouillard has discovered that feeding flax to yearling steers produces a high concentration of ALA in the muscle, which is among the omega-3 class of fatty acids and offers human health benefits.

Drouillard reports that feeding flax to cattle for 70-120 days before harvest can mean a tenfold increase in omega-3 fats deposited in muscle tissue.

Despite its potential, there are some considerations before including flax in your cattle finishing rations. Foremost is economics. Flaxseed, and particularly flax oil, can be expensive — $6-$8 per bushel (bu.) — so the producer should identify buyers willing to pay more for omega-3-enhanced beef to make feeding the supplement economical.

Additionally, flax oil is not readily available, and linseed meal (the protein meal remaining after extraction of oil from flax seed) generally isn't a good feed source due to the very low level of oil left in it. For his research, Drouillard buys commodity flaxseed, grinds it and adds it to feed at about 10% of the diet.

Drouillard cautions that feeding flax can also create an off-flavor or rancidity, which he says is due to the increase in ALA in the muscle. To resolve the issue, he has found adding vitamin E to the ration (1,000 units or more per day per animal) as an antioxidant eliminates the off-flavor problems.

As Drouillard's flax research continues, he is trying to determine if flax still offers benefits if fed in the unprocessed form. Larger-scale feedlot studies are also under way to better understand more about the timing of flax feeding in order to derive the greatest benefit in terms of carcass quality and carcass enrichment with omega-3 fats.

Seaweed success

A strain of brown seaweed (*Ascophyllum nodosum*) that grows along the North Atlantic coastline is earning acclaim as a beneficial supplement in cattle diets. Known commercially as Tasco,™ the supplement is made from seaweed, and was initially researched in the early 1990s because it showed potential in reducing the endophyte toxicity problem in tall fescue.

Vivien Allen, presently a researcher at Texas Tech University in Lubbock, was one of the first to conduct research with Tasco on fescue pastures while she was at Virginia Tech. Allen recalls that the first group of cattle that grazed the Tasco-treated pastures responded with improved immune functions. Surprisingly, the calves reared on those pastures also went on to grade higher at harvest.

The unexpected boon to carcass quality prompted researchers to further study Tasco as a feed supplement. Numerous research trials since that time have showed that supplementing feedlot cattle with Tasco at 2% of the diet for either two weeks early in the finishing period or during the last two weeks before harvest increased the percentage of carcasses grading Choice and Prime and reduced the number of those grading Select or Standard. The most recent recommendation for a quality grade boost is to feed Tasco for two weeks at least 100 days prior to shipment, says Dan Colling, Kansas City, Mo., a consulting nutritionist with Acadian AgriTech, the processor of Tasco.

Other benefits of supplementing Tasco to cattle were also noted, Allen says, including an increase in tolerance of hot and cold stress. Colling explains that maintaining a constant body temperature is fundamental to a productive and profitable animal. Thus, heat-stressed animals reduce intake in an effort to stay cool. If intake is sufficiently reduced, production suffers — reproduction first, followed by lowered milk production and reduced body condition.

Colling adds that several producers report improved bull fertility, conception rates, shortened calving intervals, and even better embryo quality for flushes after having Tasco added to their mineral supplements. He says this stands to reason because if cattle are cooler

Differences in yeast products

When talking about yeast products, there are many different types, including yeast culture, active dry yeast, brewers' yeast, primary dried yeast, torula yeast, yeast extract, etc. What's the difference?

Craig Belknap, beef field technical specialist with Diamond V Mills Inc., says collectively they are referred to as yeast products, but they are each different and are added to the diet for different reasons.

For example, brewers' yeast is a byproduct of the brewing industry and is a good source of protein and B vitamins, but it has been shown to have little effect on rumen fermentation. Active dry yeast is made of live organisms but is unstable and has inherent problems with yeast viability. Yeast culture, while typically lower in protein and B vitamins compared to brewers' yeast, is a fermentation product that does not rely on live yeast cells. It seems to be the most effective of the yeast products in stimulating rumen fermentation and digestion. So, be sure to visit with a nutritionist to see which product best fits the needs of your cattle.

and eating properly, they should be eating sufficient grass and mineral to breed.

To that end, Tasco is being used today to supplement cattle grazing tall fescue pastures, as well as in cow-calf and feedlot rations. Colling estimates Tasco meal costs about 75¢ per head per month to feed to grazing cows, with the recommended amount of about 0.5 ounces (oz.) per head per day mixed into a mineral supplement. For cow-calf operations, Colling suggests starting to feed it to both cows and bulls a minimum of 30 days before turning the bulls out.

In a feedlot setting, Tasco can be fed early or late in the finishing period. Supplementing early in the finishing period costs $1.80 to $2 per head. Fed late in the finishing period, when cattle are consuming more feed, the supplement costs $3.75 to $4.75 per head. Colling does caution that if over-fed, Tasco can cause some negative responses and increased sickness.

Acadian AgriTech recently partnered with Minnesota-based BioIngenuity LLC to bring Tasco into the U.S. market. Researchers believe that in addition to cattle, Tasco has potential in swine, horse and even human nutrition, but more research and testing are needed.

Yeast culture's appeal

For calves freshly weaned and just getting on feed, yeast culture supplements are proving to be a saving grace at the feedbunk. The yeast culture in receiving rations tends to enhance palatability of the feed, so calves start eating and get past the stress of their new environment.

But, making the feed taste better isn't the only thing the yeast culture does. It enhances digestibility as well by nurturing healthy populations of microflora in the rumen. These microbial populations actively break down feedstuffs and help make more nutrients available to the calf for its growth and immune system. As a result, the animal's appetite is stimulated, stress is reduced, and the calf maintains a more consistent dry matter (DM) intake.

Beyond receiving rations, yeast culture can be kept in the feedlot ration all the way to finishing to maximize daily gain and feed efficiency. Research conducted by Diamond V Mills Inc. reveals that daily gain and feed efficiency were improved in 21 out of 23 feedlot trials (a 91% response). Approximately 2,500 head of cattle were involved in the trials, and the level of response was such that the economic return was approximately 10¢ per head per day on feed.

Some feeders turn to yeast culture when they see a problem cropping up. For example, if cattle have a stall-out, where they quit eating due to stress, weather changes, bloat, etc., feeders will often top-dress the ration with yeast culture to boost palatability and get cattle back on feed.

In pasture situations, including yeast culture in a free-choice mineral mix — or in creep feed — can improve the palatability and intake of the mineral, which can otherwise be bitter. In turn, the increased digestibility that the yeast culture elicits in the rumen also results in better forage intake and forage utilization by the animal.

A three-year trial at Ohio State University confirmed that providing yeast culture to grazing beef cows can help cows produce heavier calves at weaning.

The research findings, conducted in conjunction with Diamond V Mills, indicated that yeast culture provided with a free-choice mineral mix improved mineral palatability and intake, as well as forage digestibility among cows. In turn, cows supplemented with mineral containing the yeast culture had increased milk production and weaned calves an average of 16.2 lb. heavier compared to calves weaned from cows supplemented with mineral alone.

In converting those extra pounds to real dollars, Craig Belknap, beef field technical specialist with Diamond V Mills,

(Continued on page 40)

Supplements *(from page 39)*

says that at $130 per hundredweight (cwt.) for four-weight calves, this would equate to an additional $21.06 per calf weaned, which is about a 4-to-1 return on investment, assuming a 1 oz. per head per day supplementation rate of yeast culture for a 210-day lactation.

"We are seeing a lot of interest in yeast culture supplements from people raising all-natural cattle," Belknap adds, "because the product fits well in those programs where no antibiotics, ionophores, etc., are allowed."

Most recently, research indicates there may be benefits related to feeding yeast culture in rations containing ethanol coproducts. The studies indicate yeast culture contains nutritional metabolites that coproducts lose during the ethanol process. Hence, including yeast culture in such rations may make them more nutritionally complete.

Core Max is a new line of liquid supplements introduced by Quality Liquid Feeds designed to offer varying levels of crude protein (CP) and other nutrients to help balance variations in coproduct feedstuffs. Available in four levels of CP — from 10% to 40% — the additional protein provided by the Core Max supplements promotes increased microbial activity in the rumen and aids overall animal performance. The liquid supplements also contain calcium and other vitamins and trace minerals beneficial for finishing cattle.

Yeast culture supplements are available from Diamond V, Alltech Biotechnology, Lallemand and several other animal nutrition companies.

Mineral makeover

Another recent nutrition innovation for feedlots is ROC™ from Cargill Animal Nutrition. It is a patent-pending technology that makes it possible to provide very high-mineral supplements in pelleted form to commercial feedlots.

Clint Calk, a Cargill consulting nutritionist based in Amarillo, Texas, explains that the technology eliminates the need for carrier ingredients that are required in traditional dry and liquid supplements. Calk says, "It corrects product consistency and handling problems that are prevalent with loose meals."

Because of ROC, lower value feedstuff carriers — like wheat midds in dry supplements and water or molasses in liquid supplements — can be eliminated from the supplement package, Calk says. "The key message for feedlots is that with ROC, you only buy what you need."

And, because it has no carrier, supplement inclusion rates can be reduced 50%-70%, allowing feedlots to replace supplement in their rations with higher-energy ingredients, resulting in higher-energy diets and potentially higher animal performance. Calk says lower inclusion rates also allow the feedlot to reduce inventory levels and total supplement purchases.

Calk says ROC may not work for every situation, but says it is well-suited for rations that do not need supplemental natural protein, such as rations containing high-protein byproducts. For more information call Cargill at (866) 424-1224.