

Glycerin, molasses may help hay-fed heifers digest fiber

BEEF cattle have a fundamental competitive advantage over non-ruminant livestock due to their ability to transform forages into animal protein.

Characteristics of the southeastern U.S. make it unique compared to other beef cattle regions. The abundant forage production in this region provides an opportunity to decrease the cost of production, considering that feeding is the largest cost in a cattle operation.

However, the quality of the predominant forages in the southeastern U.S. can be of limited nutritive value and often are not sufficient to support high levels of production. As a result, there are some critical periods of the year during which there is a need for cow/calf operations to supplement the diet with energy and/or protein.

With low-quality forages, it is common to run into a situation in which the rumen microorganisms “starve” for energy and protein and decrease their efficiency in digesting fiber. It is during those situations when beef producers often turn to a little help from supplemental feed to provide energy (most commonly), protein or both.

Sometimes, this little bump of energy is enough to “jump-start” the rumen to a point that performance is boosted to levels beyond those that would be expected with the addition of supplement only.

Besides abundant forage production, another great regional advantage of the southeastern U.S. is the availability of several byproducts and co-products from diverse industries that can have a great nutritional value for cattle and can provide an excellent opportunity to correct nutritional imbalances through strategic supplementation.

The sugar industry is very strong in the southern states, and as a result, by-products such as molasses have been fed to cattle for decades. Molasses provides an excellent complement to the often low energy content of warm-season forages found in the Southeast.

In addition to molasses, crude glycerol is another liquid feed that has been researched as a potential energy supplement for ruminants. The production of biodiesel from plant oils releases large quantities of crude glycerol as a byproduct, and the expansion of the biodiesel industry has increased supplies of this component.

This glycerol, which is not pure and

Bottom Line

with
NICOLAS DILORENZO**



may contain 20% water, does not satisfy the legal requirements for pharmaceutical use but is a generally recognized as safe as an animal food ingredient and can, thus, be used as an energy supplement for ruminants at a decent cost.

Research was conducted at the University of Florida's North Florida Research & Education Center (NFREC) to determine the potential of crude glycerol mixed with molasses in a 50/50 proportion as feed supplement for growing beef cattle consuming hay (Ciriaco et al., 2015a, 2015b, 2015c).

Molasses has been used for years in Florida as a beef cattle supplement and is an excellent complement for low-quality forages. The physical and chemical characteristics of glycerol (a syrup-like compound ranging from clear to dark brown) make it almost perfect to combine with molasses to create a homogeneous mix with better flowability than just straight molasses.

The study was designed to evaluate the effects of increasing supplemental levels of a 50/50 mixture (as fed, or 49/51 on dry matter basis) of crude glycerol/molasses on growth performance and ruminal fermentation patterns in a growing heifers housed at the NFREC Feed Efficiency Facility.

Study setup

A total of 24 Angus crossbred heifers weighing an average of 838 ± 68 lb. were used in the study in a generalized randomized block design. Heifers were housed in individual pens and were provided with Tifton 85 bermudagrass hay *ad libitum*.

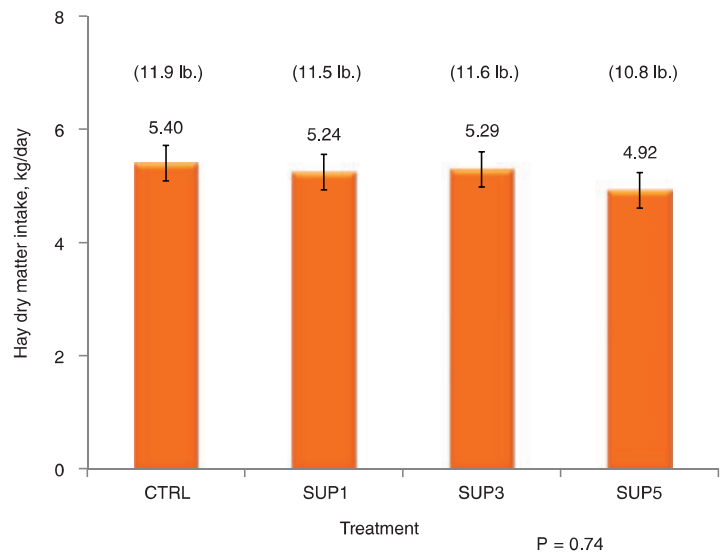
Four increasing amounts of the 50/50 mixture were compared: (1) CTRL = 0 lb. per day, (2) SUP1 = 1 lb. per day, (3) SUP3 = 3 lb. per day and (4) SUP5 = 5 lb. per day.

The liquid supplement mix, provided by Westway Feed Products, was weighed and offered to each individual animal daily in a plastic container inside the pen.

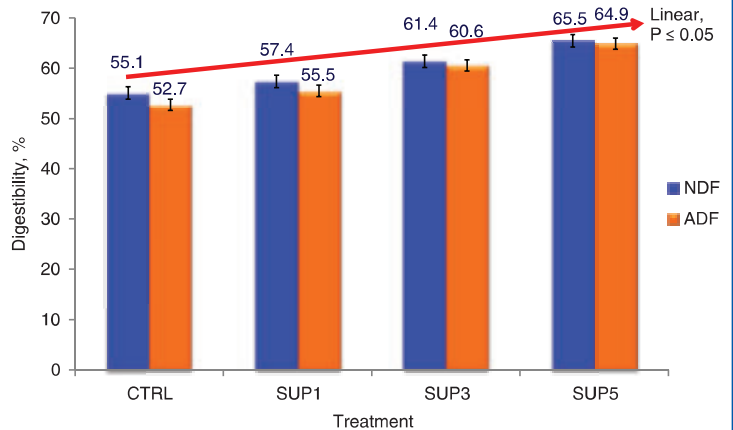
After a 14-day adaptation period to the diets and the facility, heifers were weighed, and collection of daily feed intake data started. Each pen at the facility was equipped with two GrowSafe feed bunks to record intake by weight change, measured to the nearest gram.

Beginning on days 22-23, feed (hay and liquid) and fecal samples were collected, respectively, for four consec-

1. Intake of Tifton 85 hay in growing beef heifers supplemented with 0, 1, 3 or 5 lb. per day of a 50/50 mixture of crude glycerol/molasses



2. Apparent total tract digestibility of NDF and ADF in growing beef heifers consuming Tifton 85 bermudagrass hay and supplemented with 0, 1, 3 or 5 lb. per day of a 50/50 mixture of crude glycerol/molasses



utive days to determine the apparent total tract digestibility of nutrients using indigestible neutral detergent fiber (NDF) as a marker.

Results

Figure 1 shows the Tifton 85 hay dry matter intake of the heifers over a 28-day period with increasing supplementation levels of the 50/50 glycerol/molasses mix. No differences in hay intake were observed among treatments, and intake averaged 11.5 lb. of dry matter per day.

Despite the lack of differences in hay intake, when the liquid mix was supplemented at up to 5 lb. per heifer per day, a linear increase in the average daily gain of heifers was evident, which can be attributed to two main effects or their combinations: increased energy

consumed by the supplemented heifers, or a potential improved efficiency of use of hay by improving its digestion.

Heifers consuming only hay gained 2.9 lb. per day, while heifers consuming 5 lb. of the crude glycerol/molasses mix gained 3.4 lb. per day. These great rates of weight gain are partially explained by the good quality of the Tifton 85 bermudagrass hay (12% crude protein and 55% total digestible nutrients) and, perhaps, some level of compensatory gain.

To investigate this further, a nutrient digestibility study was conducted to determine if fiber digestibility in heifers was affected. A linear increase in total tract NDF and acid detergent fiber (ADF) digestibility was observed in heifers as the supplemental amount of the liquid feed mix increased (Figure 2).

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Oregano may reduce cow methane emissions

In a new project, researchers from Aarhus University in Denmark — in cooperation with Organic Denmark and a number of commercial partners — will examine whether adding organic oregano to cattle feed can reduce the production of methane in the rumen and, thus, emissions of methane gas.

When ruminants digest their feed, methane is formed as a natural byproduct of the microbial process in the rumen, and since methane is 25 times more powerful than carbon dioxide as a greenhouse gas, there is a need to devise methods to reduce such emissions from cattle.

Methane production can be reduced by, for example, adding fat or nitrate to the feed or by increasing the starch content and improving the feed quality. However, for organic dairy farmers, these remedies either are not permissible or are being used already, thus creating a need for other solutions.

“Oregano — especially the species Greek oregano (*Origanum vulgare* subspecies *hirtum*) — is known for its high content of essential oils and its antimicrobial effect, and the plant is a natural tool for reducing methane production in the rumen,” said Kai Grevsen, project manager and senior researcher in the Aarhus department of food science. “The goal is to show that we can reduce methane emissions from dairy cows by up to 25% by adding oregano to the feed.”

As part of the project, the researchers will initially test the effect of supplementing oregano to rumen-fistulated and intestinal-fistulated dairy cows in special methane chambers. Further, they will examine how the cows react to different amounts of oregano.

The four-year project will also investigate how best to grow organic oregano and whether to process the plant as hay or as silage.

“To succeed with the oregano project in practice, it is essential that we develop a product that has both a high yield and a high concentration of essential oils. We also need to develop an organic farming concept and breed new varieties with higher concentrations of the oils,” Grevsen said, adding that he and his colleagues also collaborate with an organic herb producer who makes fields and a drying facility available for part of the experiment.

Climate-friendly milk. Although the climate is intended to be the main beneficiary of the project in the form of reduced methane emissions, the hope is that the project

will also benefit arable land and dairy farmers.

Previous studies have indicated that oregano can improve the fatty acid composition of the milk, and project participants will be researching this aspect as well as the flavor of the resulting milk.

“It’s also important to remember that the project is relevant not only for

organic milk producers: Should the results be positive, they can be implemented on all cattle farms — conventional and organic — so there is a really large potential,” Grevsen said. ■

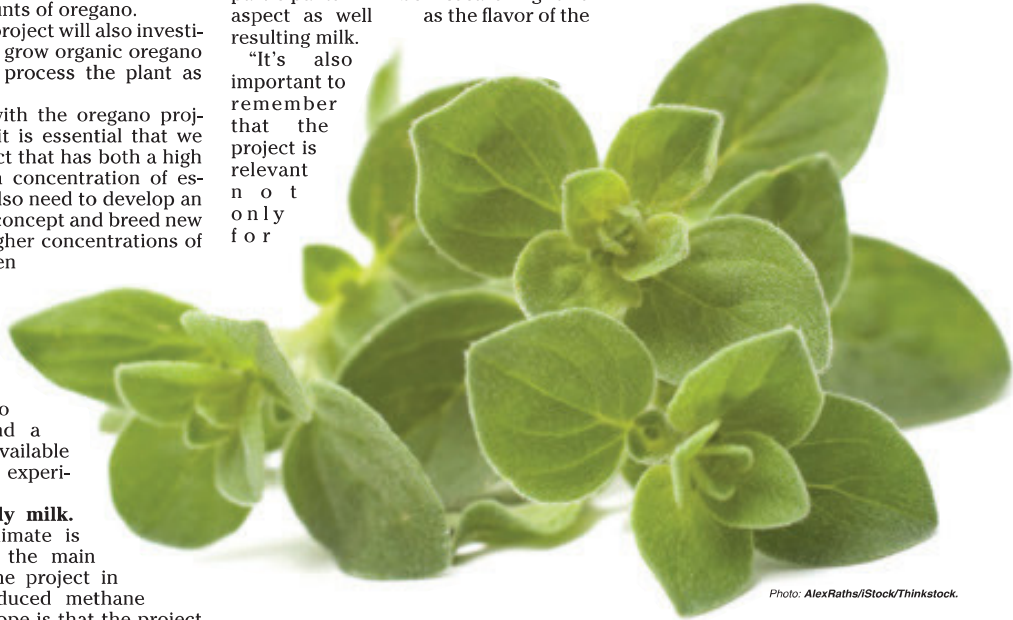


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Dairy producers focus on immune suppression

REGIONAL results of a new survey show that U.S. dairy producers are acutely aware of the consequences of immune suppression, and 59% of survey respondents rated mastitis as the top complication of compromised immunity.

To a lesser extent, U.S. producers identified immune suppression itself as the cause of this costly disease.

Elanco Animal Health presented the U.S. results at the recent 2016 National Mastitis Council annual meeting in Glendale, Ariz.

“As we reframe how we manage the vulnerable time around calving and make immune suppression a priority, we know that more than 80% of U.S. producers are looking to their veterinarians for help in protecting their cows’ immune systems,” said Dr. Paul Rapnicki, a dairy technical consultant with Elanco. “Focusing on immune suppression as the cause rather than managing the consequences will decrease costly diseases post-calving while setting cows up for a productive lactation.”

Survey findings further reveal that 96% of U.S. dairy producers agree that achieving a successful lactation cycle in the period from 60 days prior to and 30 days after calving — coined “The Vital 90 Days” — is “very important” for the health of their cows.

“Dairy producers universally agree

that The Vital 90 Days are critical in preparing their cows for the next lactation and related milk yields,” Rapnicki said. “Productive lactations are the result of well-managed energy balance and immune function around calving, and the recognition that it all starts in that pivotal 90-day window is the first step in making the goal of a successful lactation a reality.”

While setting up cows for a healthy lactation is a top ambition, the survey findings indicate that U.S. dairy producers additionally rate optimizing nutrition (40%), preventing mastitis (32%) and enhancing reproduction (28%) as their leading dairy health care priorities.

The survey was conducted on behalf of Elanco from December 2015 to January 2016 in an effort to gauge the awareness, knowledge and understanding of immune suppression around the time of calving and to identify topics of concern in dairy health care.

All survey respondents had at least 20 years of experience working in the dairy business. The survey was conducted among 1,200 dairy producers in seven countries. Responses were gathered from 187 U.S. participants representing an average herd size of 850 head and an average of 33 years of dairy experience. ■

Glycerin, molasses mixture

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BECAUSE the only fiber present in the heifer’s diets was coming from the hay, it was concluded that supplementing with up to 5 lb. of a 50/50 mixture of crude glycerol/molasses likely aided in ruminal microbial activity (perhaps by providing more energy), which, in turn, increased the digestion of the bermudagrass hay.

The Bottom Line

Although it is difficult to separate the contribution of the added supplemental energy to the daily gain response from that of the increased fiber digestion, it is likely that the latter contributed significantly, considering that hay ranged from 74% (5 lb. per day of the liquid mix) to 94% (1 lb. per day of the liquid mix) of the total dietary dry matter consumed by the heifers.

In conclusion, a 50/50 mixture of molasses/crude glycerol provides a rapidly fermentable source of carbohydrates in the rumen, possibly stimulating microbial growth and, consequently, increasing fiber digestibility in the total tract. The increase in fiber digestibility, along with energy supplementation, led to an increase in the animals’ average daily gain.

More research is needed in the future to determine breakeven prices or other economic parameters of this type of supplement. However, as a first

approach, a mixture of crude glycerol and molasses may have potential as an alternative supplement for wintering growing cattle that consume hay, provided that the increased demand for biofuels creates sufficient crude glycerol at a relatively competitive cost.

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