At the FEEDER with new-life mills

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In this Issue...

Use of Calf Starter to Promote Early Rumen Development

*NEW Employee Highlight: Meet Urs Nievergelt

NextGen 22% Calf Starter

Ultralac 30/40E Dairy Topdress Supplement

Prevalent Mycotoxins, Effects and Control

Promote Early Rumen Development Through Calf Starter

Written by: Kristin Thompson, Ruminant Nutritionist, MSc., PAg

The calf nutrition program during the first 3 months of life directly determines the rate and degree of rumen development. This development has a significant impact on feed intake, nutrient digestibility and calf growth. Therefore, feeding a balanced nutrition program that supports rumen development is essential to ensure that your calves reach their full genetic potential and maximize their performance once they join the lactating herd.

Rumen Development

During the first 12 weeks of life, a calf transforms from being a monogastric, where nutrients are absorbed through enzymatic digestion in the abomasum or true stomach, to developing a functional rumen where nutrients are fermented and potentially absorbed by the rumen papillae prior to reaching the abomasum. The offering of grains in the form of a calf starter is the key element in calf nutrition that allows for the gradual development and growth of the rumen papillae through the production of the volatile fatty acids, butyrate and propionate. Greater papillae growth means higher surface area for nutrient absorption. When calves are only provided forages with limited grains, the level of butyrate production is not sufficient to promote adequate papillae growth.

Calf Starter Quality and Feeding

Manufacturing a consistent, superior quality calf starter requires the inclusion of high-quality ingredients, precision feed formulation, advanced manufacturing equipment and a superior knowledge of calf nutrient requirements. The ideal calf starter has many characteristics, including being a palatable, complete feed (Table 1).

NextGen 22% Calf Starter is a pelletized starter feed formulated with high quality protein and energy ingredients for improved nutrient digestibility. It is

Table 1: Ideal Characteristics of a Calf Starter

Complete Feed	Meets All Calf Nutrient Requirements
Minimum protein content of 18%	Adequate to meet calf requirements for growth
Superior quality ingredients	Improves nutrient digestibility
Flavor inclusion and palatability	Encourage feed intakes from an early age to stimulate rumen growth
High fiber level	Reduce the risk of acidosis and promote rumen development

also flavor enhanced for increased palatability as well as fortified with vitamins and minerals to meet the calf requirements. New-Life Mills recommends feeding small amounts of free choice NextGen 22% Calf Starter at 3 days of age, and gradually increase access to the pellet until the calves are weaned at 7-8 weeks of age and consume at least 1kg of starter per day. Remember to change the calf starter daily as palatability will be reduced when the starter feed becomes stale. Continuously monitor starter intakes and increase the amount offered if all is consumed daily. At 3 weeks of age, a small amount of forage, chopped hay or straw, can begin to be offered to the calves. However, it is important to not offer to much forage at the start, as during the first 3 months, the starter consumption is the most important. It is critical to remember to provide access to clean, fresh water at all times, as it has been proven that calves with limited access to water consume less starter, which impairs proper and efficient calf growth and rumen development.

Pelleted versus Textured Calf Starters

Calf starter feeds can either be pelleted, where all ingredients are included within a pellet, or texturized where they are prepared with a grain (either corn or barley), molasses and a protein pellet. When these two starter forms have been compared in research trials, there have been no significant differences in final weight or early development in dairy calves. Therefore, pelleted starters can offer several advantages over conventional texturized starters:

1. Ingredient processing increases digestibility
2. Controlled starch concentration and intake
3. Ability to include a high level of digestible fiber sources
4. Reduced sorting resulting in consistent nutrient intake
5. Increased feed conversion efficiency
6. Lower cost and economic advantage

Conclusion

The right blend of nutrients, ingredients and additives is one of the main determining factors to ensure your replacement heifers become strong additions to your operation. Contact your New-Life Mills representative to discuss calf feeding options.

Meet: Urs Nievergelt!

Nutrition and Production Consultant

I grew up on a dairy farm and have always enjoyed being around cows. Several years ago, we had to make the difficult decision to sell our family farm which led to a number of jobs unrelated to agriculture. I got a commercial helicopter pilots license and my 1A truck license along the way. I also worked for a residential housing construction company which gave me the chance to build the house that we currently live in. However, agriculture was in my blood and none of these jobs seemed to be the right fit.

In 2016, I got the opportunity to start working for New-Life Mills which meant returning to ag and cows. Nutrition work always intrigued me when I was dairy farming. Now I get to spend my days taking feed samples and building rations for my customers and their cows. Currently, I'm the only ruminant rep for New-Life Mills in Saskatchewan, keeping me quite busy.

When I'm not working, I can be found spending quality time with my wife and two sons. We enjoy anything that involves the outdoors in summer such as swimming, gardening, and hobby beekeeping. We also have a very energetic dog that keeps us active.

Prevalent Mycotoxins, Effects and Control

Written by: Sylvia Borucki, Ruminant Nutritionist, PhD

Mycotoxins are small molecules produced by fungi that elicit a toxic response when ingested. The effects of mycotoxin ingestion are mainly chronic, with hidden disorders that produce refusals, reduce animal growth, impair fertility, and decrease overall animal performance. In Canada, the most common are Fusarium derived mycotoxins.

Signs and Effects from Fusarium Derived Mycotoxins

Deoxynivalenol or DON is considered the most prevailing mycotoxin in grains, silage, and by-product feeds. Clinical signs of ingestion include gastrointestinal problems, soft stools, and diarrhea, which leads to a decrease in performance. Evidence shows that DON's mode of action is through influencing rumen fermentation, depressing fiber-fermenting bacteria, altering rumen pH, and interfering with microbial protein synthesis. If DON reaches the small intestine, it affects permeability and absorption, drastically altering the immune response.

T-2 and HT-2 mycotoxins and their analogues are considered less toxic than DON. Studies show effects on the gastrointestinal tract, where hemorrhages and lesions were observed. This directly alters the nutrient absorption and metabolism while impairing normal hormonal function and immune response. Another important mycotoxin of this group is **Zearalenone or ZEN**, which has been found to impact the reproductive system, causing false oestrus, embryo mortality, and inflammation or malformation of the uterine tissues.

Mechanisms of Control

Rumen detoxification. Rumen microorganisms and particles present within the rumen compartment may be effective in the degradation, deactivation, and binding of these toxic molecules, thus protecting the animals. However, DON is more stable in the rumen environment when compared with other mycotoxins, and thus more likely to cause antimicrobial activity in the rumen and reach the intestine with toxic effects.

Control at the field level. Different steps can be effective in preventing fungal infestation and consequently mycotoxin formation during crop production. Among field actions, the most important are crop rotation, tillage, soil fertilizers, planting date, crop hybrid/variety selection, chemical/biological control of infestation, crop removal, insect and weed controls.

Control during harvest and storage. Management strategies at harvest and storage are critical to ensure optimal grain and forage conservation. Grains should be preserved for physical integrity and properly stored, with a moisture content lower than 13% and at low temperatures. For ensiled forages, most fungi can be eliminated during the ensiling process. Silage packing density, adequate particle length, timely silo filling, mass sealing and compression, will promote pH drop and air removal. This stops the proliferation of undesirable mycotoxigenic fungi, and the production of their toxins. Lactic acid bacteria in high quality silages, are effective in hindering any mold growth under anaerobic conditions. However, a small raise in the oxygen concentration due to air spots or feed-out inhibits the lactic acid production bacterias ability to control mold growth. Alternative ways for improving the aerobic stability of silages consists of applying acid-based additives. The application of beneficial microbial inoculants in the silages before ensiling not only improves control of the fermentation process stability during storage, but also promotes the aerobic stability at feed out.

Table 1

MYCOTOXIN CONCENTRATION RISK				
		Dry Matter Basis		
		Part Per Billion (ppb)		
Mycotoxin	**Group**	**Low**	**Medium**	**High**
DON +analogues	Calves	<250	250-750	>1,000
	Dairy	<1,000	1,000-1,500	>1,500
	Beef	<1,000	1,000-2,000	>2,000
ZEN	Dairy	<100	100 -200	>200
	Calves	<100	100- 250	>250
	Beef	<150	150 -300	>300
T-2 /HT-2	Dairy – Calves - Beef	<50	50-100	>100
	Calves	<150	150-400	>400
	Dairy - Beef	<300	300-800	>800
				Note: 1,000 ppb = 1 ppm

Adisseo Reference, Biomin Reference

Feeding strategies. If mycotoxin contamination is suspected, it is important to take a representative sample of the feed(s) and send to an accredited lab that uses the most accurate techniques to detect a wide range of mycotoxins and their analogues. Once the feed in question is confirmed with mycotoxins and if concentrations are of concern (see Table 1), a strategy should be determined for: (a) removing that feed from the diet, (b) reduce its portion in the total mixed ration or TMR and (c) include a toxin binder. It is important to remove the moldy areas in the silo, without including them in the TMR, as there is a potential of toxin load in these portions of the silage.

The use of toxin binders. Adsorption, biotransformation, and protection are the key operation modes of a toxin binder. Adsorption by organic agents such as yeast cell walls have effect on the control of ZEN. However, for Fusarium derived mycotoxins, the most effective mode of action of the toxin binder is biotransformation. Components derived from bacteria and yeasts are included in the toxin binder, components derived from bacteria or yeasts are included, which can react and alter the mycotoxins into a non-toxic metabolite that is then excreted from the gut. Toxin binders also provide antioxidants and prebiotics that protect and promote the growth of beneficial microflora in the intestine of the ruminants.

Conclusions

Mycotoxins are difficult to eradicate but they can be controlled in the farm system. Ruminants can partially detoxify them, but under high concentrations or conditions of stress, toxin binders are required to fortify the response against this challenge. The most effective way of controlling the mycotoxins is the management of crops in the field, at harvest and during storage. Discuss with your New-Life Mills Ruminant Representative the ways to monitor and control mycotoxins on your farm.