From calf to cow: Building performance on microbial stability and mycotoxin control

Behind every liter of milk and every kilogram of growth lies a complex ecosystem, one that must work in harmony to transform feed into performance. In ruminants, this ecosystem begins developing long before animals reach production. The microbial communities that colonize the young rumen set the tone for lifetime efficiency, longevity and resilience.

However, this delicate balance can easily be disturbed. Modern ruminant nutrition therefore faces a dual challenge: protecting the microbiome from disturbances and guiding its development from the earliest stages. Strategic utilization of feed additives creates the conditions for stable, predictable performance throughout the production cycle.

Protecting the foundation: Managing mycotoxin risk

Mycotoxins such as aflatoxins, deoxynivalenol (DON), zearalenone (ZEN), fumonisins, and ochratoxin A are frequently detected in silage, grains, and compound feeds. These toxins are produced by fungi including Aspergillus, Fusarium, and Penicillium species, Ruminants such as cattle, sheep and goats possess a degree of natural defense against mycotoxins. Microorganisms in the rumen can partially detoxify some mycotoxins to a certain extent. However, this protection is limited.

In dairy cows, mycotoxins can impair immune function, reduce feed intake, and lower milk yield. For example, DON has been shown to cause anorexia and gastrointestinal disturbances, while ZEN disrupts reproductive function by mimicking estrogen. Aflatoxins, particularly aflatoxin B1, are metabolized in the liver and excreted in milk as aflatoxin M1, endangering the human food chain. The rumen microbiota can partially detoxify some mycotoxins, but this capacity is often overstated. Ruminal detoxification of mycotoxins is limited and varies with diet, speed of passage of feed, microbial composition, and toxin load.

When the rumen microbiome is disturbed by toxins, the population of beneficial fiber-degrading bacteria declines. Fiber digestion slows, volatile fatty acid production drops and milk fat synthesis suffers. The intestinal barrier can become inflamed and more permeable (“leaky gut”), favoring the growth of opportunistic pathogens. Chronic mycotoxin exposure leads to reduced milk yield, elevated somatic cell

counts, compromised immunity, fertility problems and in fattening to impaired growth because of increased metabolic stress.

A multi-component mycotoxin management tool (MYCORAID) provides targeted support to protect this foundation. It contains highly potent mineral absorbents and biological components that target specific feed contaminants. Yeast cell wall components like mannan oligosaccharides (MOS) and β-glucans support immune function. Additionally, MYCORAID includes plant-based extracts which contribute to liver detoxification. By stabilizing the rumen, enhancing liver function, and supporting the immune system, the multi-component supplement helps dairy cows maintain feed intake, milk production, and overall resilience during periods of nutritional challenges.

Shaping the microbiome – eubiotic lignocellulose in calf nutrition

In dairy cows the foundation of rumen performance is laid long before milk production begins. The early-life phase is decisive in calf rearing. During this time, the digestive system transitions from a simple monogastric structure to a complex, fully functional rumen. This transformation is not automatic, it depends heavily on how the young animal is fed. Diet composition and especially the type of fiber provided, determines how quickly and efficiently rumen tissue, motility and microbial communities mature.

While traditional starter feeds focus on high-energy ingredients such as grain and milk replacer, these formulations often lack sufficient structural fiber. Without it, calves tend to develop smaller rumen papillae, irregular fermentation patterns and a microbial population leaning towards easily fermentable substrates. The result can be reduced feed intake stability, impaired digestion or slower adaption to solid feed, that may persist beyond the weaning period.

Eubiotic lignocellulose offers an advanced approach to fiber management in early-life nutrition. Lignocellulose is a clean, concentrated source of dietary fiber originating from wood. In addition to providing the structural benefits of classic lignocellulose, eubiotic lignocellulose contains fermentable fractions that selectively nourish beneficial microbes, including butyrate-producing species. This dual mode of action, physical and microbial modulation, supports the synchronized development of rumen morphology and microbiota. To benefit from these effects from the start, specialized, ultra-finely granulated versions of eubiotic lignocellulose can be included in milk replacers, to then be carried on in the solid starter feed and provide a continuous microbiome support. Studies show that including eubiotic lignocellulose in calf starter diets promotes earlier rumen development and smoother weaning transitions.

Calves show improved feed intake and conversion, more stable growth curves and fewer digestive disorders (bloating or diarrhea).

Promoting a physiological rumen microbiome in early life is the foundation for a successful and healthy dairy cow. To keep assisting the carefully established microbiome and ruminal function throughout the productive life, lactating cows also benefit from eubiotic lignocellulose. It regulates the speed ruminal starch fermentation and prevents low-pH peaks in the rumen. As Fig. 1 shows, the inclusion of eubiotic lignocellulose regulates the pH curve in the rumen and prevents it from falling below the value of pH 5.8, the limit for subacute rumen acidosis (SARA).

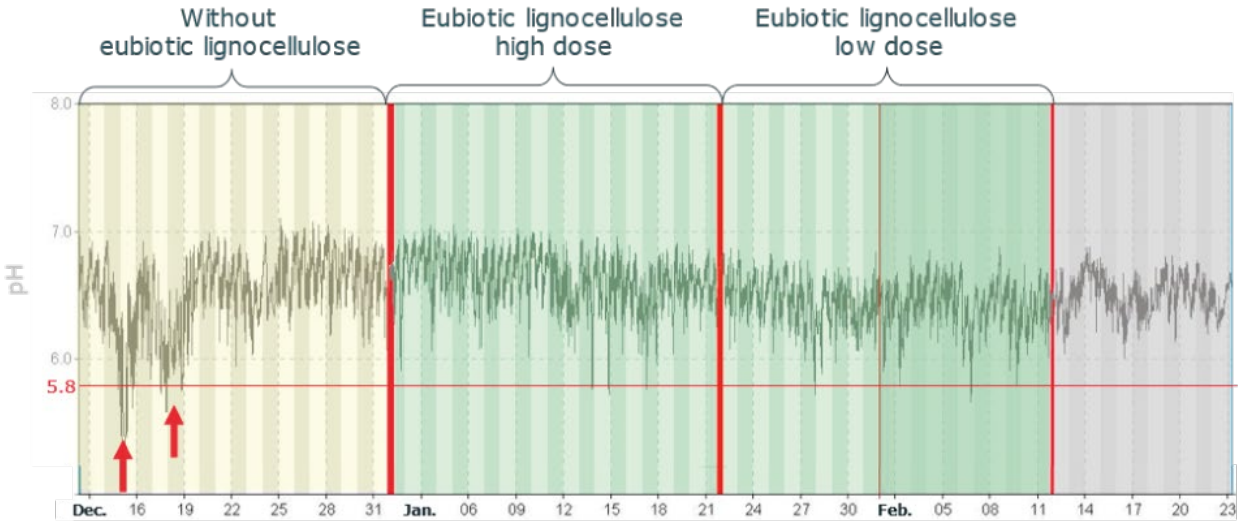

Fig. 1: Ruminal pH curve in dairy cows without and with inclusion of eubiotic lignocellulose

Conclusion: a new era in animal nutrition

Feed additives such as mycotoxin deactivators and lignocellulose-based, eubiotic fiber concentrates are indispensable tools in modern ruminant nutrition. Their strategic use not only protects animal health but also unlocks performance potential across all life stages, from neonatal calves to high-producing adults. Yet, their true value lies in how they complement each other throughout the production cycle.

When both nutritional strategies are aligned, they create a continuum of protection and optimization, from first weeks of life through peak production. This integrated approach ensures that animals are better equipped to handle dietary and environmental challenges without compromising performance.

A&P Nutrition's feed technologies represent more than preventive tools, they are enablers of sustainable production. By integrating mycotoxin control and eubiotic fiber supplementation into tailored feeding programs, producers can build robust and

long-term economic stability. Managing the microbiome means managing performance and in the future of ruminant production, these strategies will remain essential to meeting both biological and economic demands of modern agriculture.

A&P Nutrition, the newly unified brand born from the strategic alliance of PATENT CO. and agromed under the RWA (Raiffeisen Ware Austria) umbrella, is redefining the future of animal nutrition. With decades of expertise now consolidated into a single, robust portfolio. At the heart of this transformation lies a clear mission: **Improving animal performance.** This is more than a slogan—it's a customer-centric promise backed by innovation, transparency, and a deep understanding of species-specific needs.

By addressing external factors before they become challenges and providing advanced solutions to resolve the threats quickly and efficiently**, A&P Nutrition** benefits animal farming businesses by increasing their productivity while maintaining cost efficiency.