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Phytase opportunity in making every tonne of dairy feed work harder

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IFF's RubÃ©n Garcia Gonzalez explains how advances in phytase technology could improve nutrient utilisation, strengthen feed economics and reduce nitrogen and phosphorus losses in modern dairy production



Dairy nutrition is approaching a critical inflection point: the next gains in productivity may come not from feeding more nutrients, but from unlocking the nutritional value of what is already in the ration. Phytate degradation, long assumed to be adequately addressed by rumen microorganisms, is emerging as an important but underexplored determinant of nutrient availability in modern dairy systems. In this exclusive AgroSpectrum interview, **Rubén Garcia Gonzalez, Ruminant Innovation Platform Lead at IFF**, examines how phytase technology could challenge conventional approaches to protein, phosphorus and mineral utilisation. He discusses the implications for feed economics, ration formulation and the management of nitrogen and phosphorus losses, while explaining the commercial considerations that will shape adoption across Asia-

Pacific, the Middle East and Africa. The conversation also explores whether precision enzyme technologies can help dairy producers move beyond volume-led feeding towards measurable improvements in nutrient-use efficiency. Ultimately, the question confronting the industry is not simply how to produce more milk, but how to extract greater biological and economic value from every tonne of feed.

Dairy producers are being asked to increase milk output while simultaneously controlling feed costs and reducing nutrient losses. Where do you see the biggest untapped efficiency gap in dairy nutrition today, and why has the industry struggled to address it?

We believe one of the biggest opportunities is helping cows make better use of the nutrients already present in the diet. The efficiency gap is often not the amount of nutrients supplied, but the proportion of nutrients the cow can actually utilize. Phytate, found in grains and protein meals, can limit the availability of protein, phosphorus and other minerals. Historically, the industry assumed that rumen microorganisms largely resolved this issue. However, under modern feeding conditions, phytate degradation in the rumen can be incomplete, leading to valuable nutrients being lost rather than being used by the animal. Addressing this gap can improve feed value and reduce nutrient losses without simply adding more costly nutritional inputs.

Phytase has been a mature technology in poultry and swine for decades, yet its application in dairy cattle has remained limited. What did your research reveal about the fundamental differences in how ruminants utilise phytate—and what had the industry previously misunderstood?

Until now, phytase development has focused mainly on poultry and swine, which lack endogenous phytase capacity. In ruminants, the assumption has been that rumen microorganisms completely degrade dietary phytate, making exogenous phytase unnecessary. However, our research and other recent evidence show that phytate degradation in the rumen is variable and can be incomplete. Modern dairy cows have higher feed intakes and their diets contain more concentrates and rumen-protected ingredients – causing feed to pass through the rumen more rapidly. This means that rumen microorganisms have less time to degrade phytate, allowing some of it to continue along the digestive tract and restrict nutrient availability.

The proposition is essentially to extract more nutritional value from the same tonne of feed. How significant can that shift be economically for a dairy producer, and what would determine whether the technology delivers a meaningful return on investment at farm level?

Feed is one of the largest costs in dairy production, so even incremental improvements in nutrient utilization can create value. The economic opportunity comes from obtaining more value from existing ingredients, reducing unnecessary supplementation and creating greater flexibility in ration formulation. Depending on the ration, this may include opportunities to optimize the use of higher-cost protein inputs, amino acids or inorganic phosphorus. The actual return will depend on the diet (i.e., feed ingredient and supplement costs), phytate levels and how the nutritionist accounts for the released nutrient value. It should therefore be evaluated within each farm's feeding program rather than through a single general calculation.

Your research indicates that phytate breakdown in dairy cattle can be incomplete, with the technology reducing undegraded phytate in the abomasum by about 70 per cent in one study. What does this finding change about the way nutritionists should think about phosphorus, protein and mineral availability in dairy diets?

This finding highlights that nutrient supply on paper does not necessarily equal nutrient availability to the cow. If phytate reaches the abomasum, it can continue to interact with protein and certain minerals. Therefore, nutritionists need to consider not only how much protein or phosphorus is included in the ration, but also how effectively those nutrients are released for digestion and absorption. In one product development study, Omni-Bos PHY reduced undegraded phytate in the abomasum by about 70% compared with the untreated control. This demonstrates that natural rumen degradation may not fully address phytate under all feeding conditions, creating an opportunity to recover additional nutrient value further along the digestive tract through the use of this new technology.

Feed efficiency is increasingly becoming both a profitability metric and a sustainability metric. How do you see improved nutrient utilisation changing the economics of nitrogen and phosphorus management—and potentially the environmental footprint of dairy production?

Improved nutrient utilization connects productivity and sustainability. When more dietary nitrogen and phosphorus are captured and used by the animal, fewer of these nutrients are excreted in manure. Research with Omni-Bos PHY has demonstrated improvements in crude protein and phytate-phosphorus digestibility, alongside reductions in nutrient excretion. This can help producers obtain greater value from purchased feed while supporting more efficient nutrient management at farm level. Over time, reducing nitrogen and phosphorus losses from the animal may also help lessen the potential environmental burden associated with manure management and agricultural runoff.

If dairy producers can unlock more of the protein, phosphorus and minerals already present in feed, does this fundamentally change how nutritionists formulate rations, particularly their reliance on supplemental phosphorus, protected amino acids and conventional protein sources?

This technology can provide nutritionists with greater formulation flexibility. By improving access to nutrients already present in the ration, there may be opportunities to reduce supplemental inorganic phosphorus, optimize the use of protected amino acids and consider a wider range of protein ingredients, including more cost-effective options where appropriate. Reformulation should remain evidence-based and adapted to the specific ration and production objectives. The goal is to formulate more precisely around the nutrients the cow can actually utilize.

The initial launch is focused on the Middle East, Africa and Asia-Pacific. What characteristics of these markets make them strategically important, and how will you adapt the commercial proposition to dairy systems that differ significantly in feed composition, farm scale and production economics?

These regions include dynamic and growing dairy markets where feed cost, ingredient availability and supply chain resilience are important priorities. Many production systems depend on imported or purchased grains, protein meals and feed additives. As such, it’s crucial to make better use of existing feed nutrients, especially when supply chains or ingredient prices are volatile. At the same time, dairy systems vary considerably across and within these markets. Omni-Bos PHY can be incorporated through common feeding approaches, including concentrates and total mixed rations, but our commercial proposition must remain locally relevant. This is why we work with nutritionists and producers to adapt the use of the technology to the diet, production level, ingredient prices and farm objectives.

Dairy nutrition is moving from a volume-driven model towards precision around nutrient utilisation and animal outcomes. Do you see enzyme technologies such as this becoming a mainstream component of ration formulation, or will adoption remain dependent on proving highly specific economic benefits for individual farms ?

Enzymes have the potential to become an integral part of dairy cow nutrition, similar to the role enzyme technologies have come to play in poultry and swine nutrition. Enzyme technologies fit with the industry's move from simply adding nutrients toward improving the precision with which nutrients are released and utilized. However, widespread adoption will depend on combining strong science with clear practical value. Producers and nutritionists need confidence that an enzyme works under commercial conditions and that its nutrient contribution can be translated into a measurable formulation or performance benefit. Therefore, the future is not enzymes as isolated additives, but enzymes integrated into more precise ration formulations.

Looking beyond this launch, where is the next frontier for animal nutrition research: extracting more value from existing feed ingredients, reducing dependence on externally sourced nutrients, improving animal productivity, or redesigning the economics of sustainable dairy production altogether?

These objectives are all closely connected. The next frontier is understanding nutrients not only in terms of what is present in feed, but in terms of what becomes biologically available and contributes to production. Better use of existing ingredients can reduce nutrient losses, improve formulation flexibility and lessen dependence on externally sourced inputs. This shifts innovation from an 'add more' model toward extracting more value from every ton of feed. Ultimately, animal nutrition must deliver productivity, economic resilience and sustainability together rather than treating them as separate goals.

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