A new approach to improve margins and save feed costs

Today's dairy farmers are permanently facing variations in feed crop and concentrate prices and fluctuations in milk prices that affect production costs.

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Thus, nutrient use efficiency is generally considered a crucial factor influencing farm profitability in modern dairy farms. Moreover, feed efficiency and cost management are major tools in modern dairy production.

Due to the war in Ukraine, raw material prices have increased dramatically after several years of stability.

Fortunately, this feed cost increase is followed by a milk price and a meat price increase. However, in many cases, it is not enough to maintain the margin at the farm level, and the feed mill companies have difficulties buying enough raw material (sunflower meal, urea, non-GMO raw materials).

Delacon proposes a new approach to helping farmers and feed mill companies save feed costs and flexibility for formula and diet optimisation.

Protein efficiency

Ruminant animals have interesting physiology regarding protein metabolism. The rumen microflora can synthesise microbial proteins from the rumen degradable protein (RDP), non-protein nitrogen, and fermentable energy.

The amino acid profile of these microbial proteins is relatively stable and does not deviate too much from milk casein.

Some rumen bacteria can degrade proteins in ammonia (NH3) (protein hydrolysation), and some may synthesise amino acids from ammonia and the carbon chain.

This yield is relatively low (about 80%); it also depends on the nutrient level (fermentable organic matter, minerals, vitamins), synchronicity between degradable proteins, and fermentable organic matter rumen.

These microbial proteins will be digested in the abomasum and small intestine. Due to the yield in the rumen, the percentage of true protein, and the percentage of digestibility, we only reach between 50% and 60% of the metabolised yield.

In parallel, the rumen undegraded proteins (RUP) or bypass proteins are digested in the abomasum and the small intestine thanks to an acidic pH.

In this case, the digestibility and the amino acid profile depend on the raw material characteristics.

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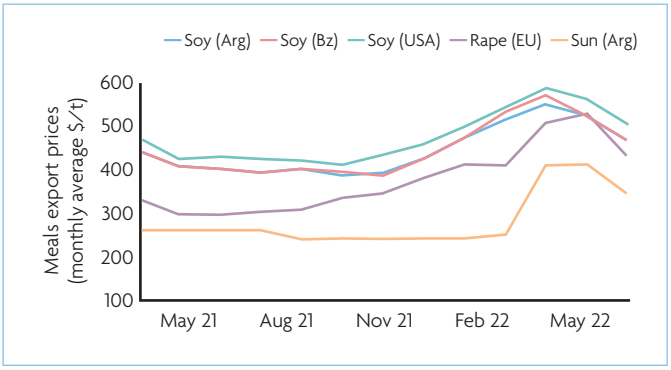
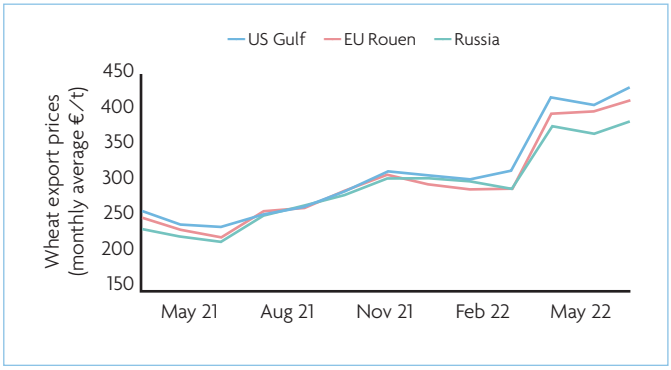
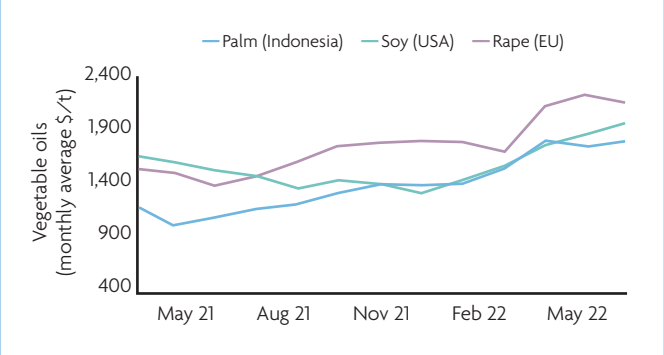
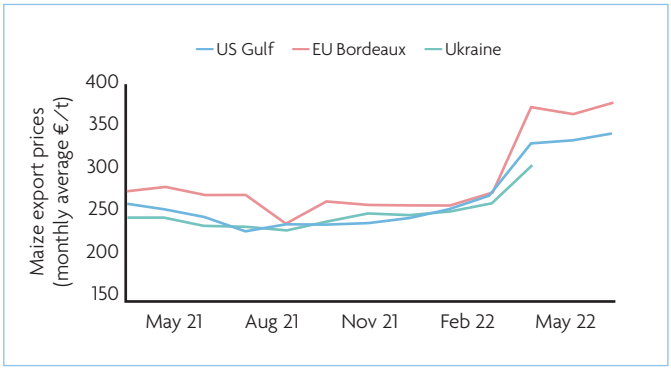
Fig. 1. Evolution of cost of raw materials (DG-Agri Dashboard, May 2022 and DG Agri, Oilseeds dashboard, 29th April, 2022).









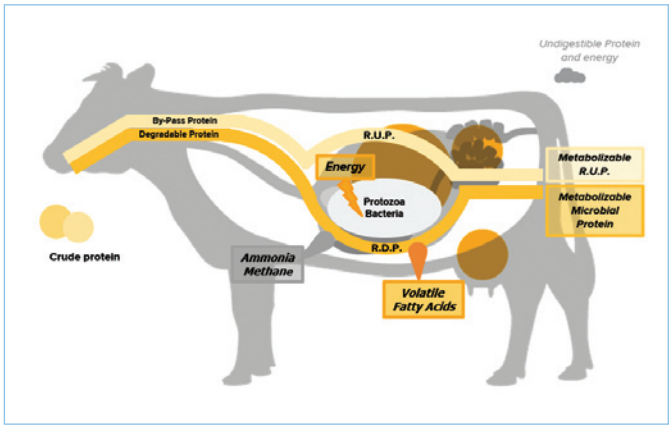


Fig. 2. Protein metabolism in dairy cows (Delacon).

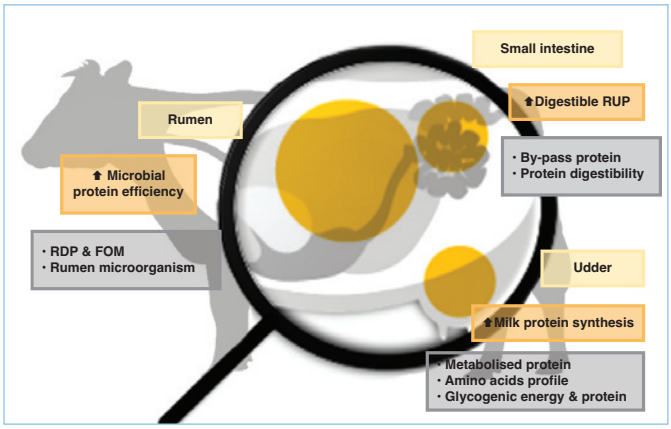


Fig. 3. Protein metabolism yield improvement in cows (Delacon).

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In the end, the yield of metabolised protein is generally higher compared to microbial protein (between 75% and 85% in the diet) and is directly linked with the protein digestibility of the raw materials.

Together, these two types of proteins will be metabolised in the small intestine to be used for milk protein synthesis and the non-productive requirements.

To improve the metabolised yield (or efficiency), we have different ways:

- Improved bypass proteins: we will have a higher metabolised yield thanks to a better usage compared to degradable proteins.
- Microbial protein efficiency stimulation.
- Small intestinal protein digestibility increase.
- Amino acid balance in relation to the casein structure.

Improving nitrogen efficiency in dairy cows

Delacon has selected plant extracts (aldehydic EO, spices, tannins, and saponins) in Actifor to enhance the efficacy of metabolised proteins in dairy cows.

The Actifor products for dairy cows act on three levels:

- In the rumen: they improve the rumen function by increasing the fermentable organic matter, leading to greater efficiency in microbial protein production. As a result, we reduce the NH4 losses from the rumen into the urine (transformed in urea).
- With a reduction of the degradation of the protein in the rumen: we increase the level of bypass protein. In this case, we have fewer protein losses in urine.
- They ensure better protein digestibility in the small intestine and reduce protein losses in the faeces.

In an in vivo trial, Actifor Pro reduced protein losses in urine and faeces, meaning that the diet's nitrogen was used for milk production and maintenance. The protein efficiency was improved by 2.7%.

Performizer application

When applied, Actifor products increase milk production (+1.7 L/day), milk protein content (+0.5g/kg), and reduce protein losses (-8.6% milk urea). Actifor products increase the yield of metabolised protein, and they improve performance and protein efficiency for the same nutrient level (crude protein).

Therefore, Delacon proposes another way for the Actifor products: the Performizer application. In this case, we want to obtain the same performance with a nutrient level reduction.

With the Performizer application, we can

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Fig. 6. Actifor products utilisation in diets (Delacon).

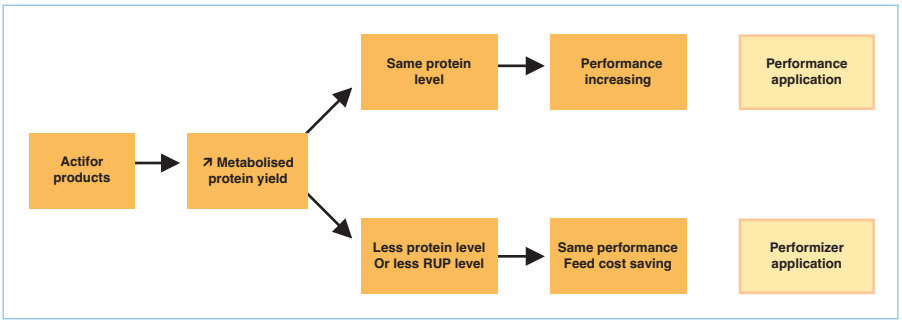


Fig. 4. Protein efficiency measurement in in vivo trials (Delacon, 2015).

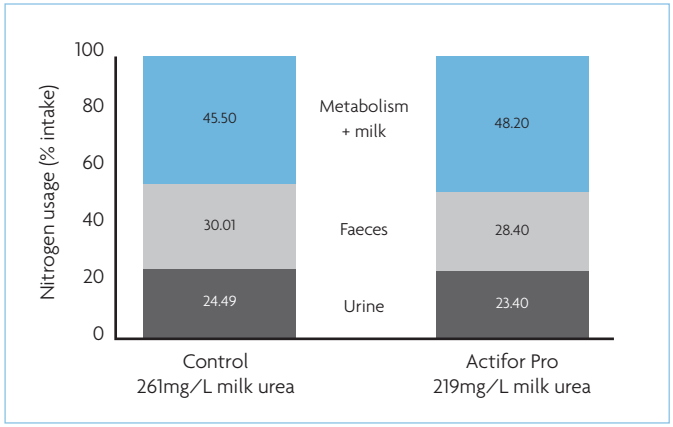
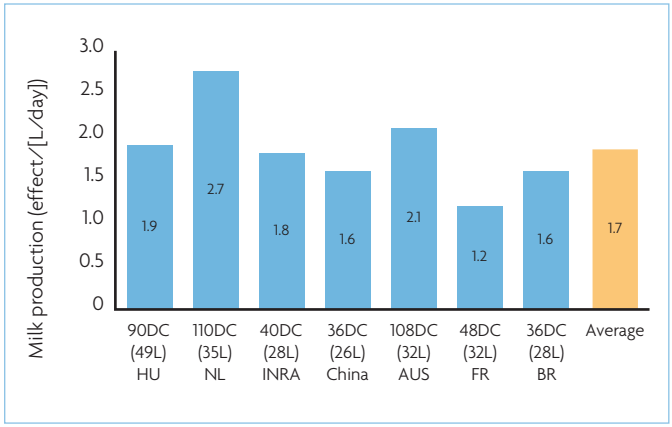


Fig. 5. Performance effect of Actifor products in dairy cows (Delacon).



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reduce the dietary protein level; in this case, we will keep the same performance with a reduction in feed costs.

We can reduce the crude protein level by approximately 0.5%.

Another possibility is to use this concept with a diet adjustment around the protein balance: in this case, we can reduce the bypass protein level (less RUP) by 0.5-1.0%, and we can increase the degradable protein level (more RDP).

For this second option, we can replace bypass protein sources (for example protected soybean meal) with regular protein sources (regular soybean meal) or regular protein meal with non-protein nitrogen sources (urea, vinasses).

With this Performizer application, Actifor products reduce feed cost according to the situation by an equivalent of 1.0 L of milk with an average increase of 0.8 L of the milk production.

In parallel, this diet modification (crude protein reduction or bypass protein reduction) with Actifor product inclusion reduces protein emissions in the environment thanks to this higher protein efficiency.

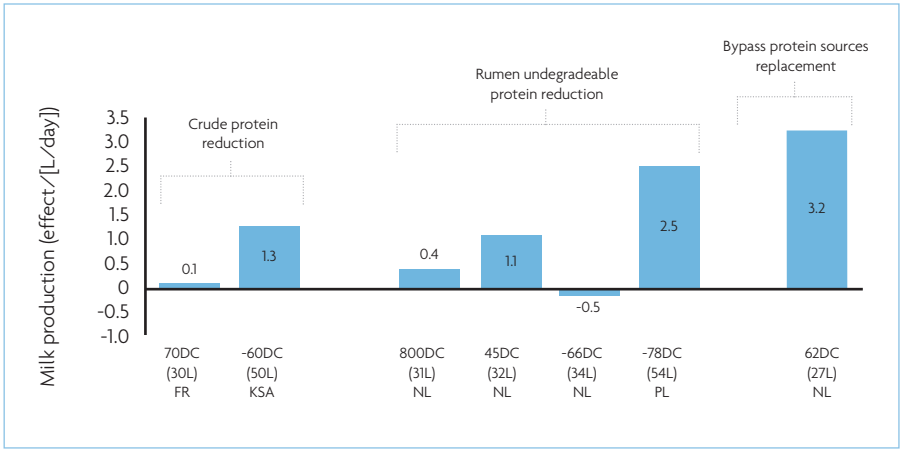
With this new approach, for compound feed and the diet design, the use of Actifor products will increase the flexibility in terms of raw material:

- For example, we can reduce soybean meal or corn grain dependency by using secondary raw materials or byproducts.
- We can replace protected soybean or protected rapeseed meals with non-protected raw materials.
- In GMO-free or organic milk production, GMO-free soybean meal or organic protein sources are more expensive because of a lack of availability.
- Cheaper, non-protein nitrogen raw materials can also be used: urea and vinasses (a byproduct of molasses).

In conclusion, the Performizer application is an excellent tool to reduce costs in livestock, with, at minimum, the same performance and greater flexibility to design the diet and the compound feed.

Additionally, thanks to a reduced nutrient level, this application of Actifor products reduces protein emissions in the environment and decreases the carbon footprint impact. ■

Fig. 7. Performance improvement in dairy cows with Actifor products, including feed cost savings (Performizer) (Delacon).



References are available from the author on request