CCPA GROUP

Whitepaper

Nutrition, phytogenic and digital expertise for more sustainable and profitable dairy production

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The ruminant sector at the heart of the « *Farm to Fork* » strategy

The combination of formulating optimal rations, the application of natural feed solutions and the use of digital tools helps dairy producers to future proof their operations, boosting sustainability and profitability This approach is the backbone of CCPA's strategy to innovate and grow and help their customers with the challenges of today

The European objective, set out in the Farm to Fork strategy, is to reduce greenhouse gas (emissions by 55 by 2030 and achieve carbon neutrality by 2050 These ambitious goals can only be reached when all stakeholders participate and take action The potential for the ruminant industry to be part of the solution is huge, considering that ruminants, while eating part of grass, are indirectly storing quantities of carbon, and actively participate in the circular economy by recycling co products from the food industry into high quality animal protein The sector also benefits from the increased knowledge and research on precision nutrition and formulation It has better and more access to innovative feed additives and digital tools.

It is the combination of innovative digital tools, expertise and knowledge on nutrition and health that can take dairy farming to the next level and help reach the sustainability targets. And the dairy industry has taken huge steps already, based on the continuous improvements in milk yield per cow and other direct and indirect measures taken on-farm. For example, the carbon footprint of raw milk in the Netherlands decreased by 35% in less than 30 years, as a result of continuous improvement in a number of agricultural practices (increased milk and roughage yields, more efficient grazing systems, improved feed efficiency and decreased nitrogen application).

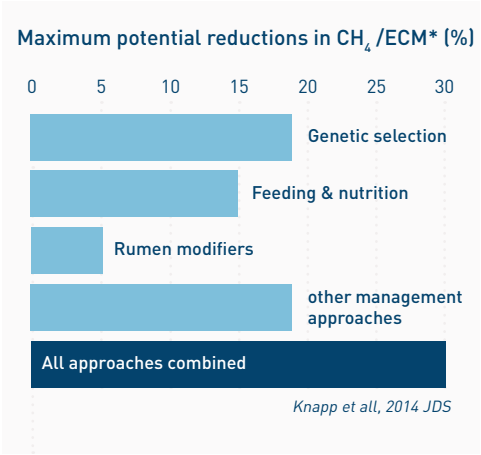
KEY MESSAGE
The ruminant sector has to take action to reduce environmental impact.

Holistic approach needed for optimal results

While the environmental impact of milk is based on a variety of parameters, methane is one of the most important ones to focus on in ruminants. Methane is a very strong GHG and produced by cows via enteric fermentations. Methane is widely regarded as the second most important GHG, after carbon dioxide (CO2). However, methane is about 200 times less abundant in the atmosphere and lasts there for only about a decade on average, while CO2 can last for centuries. Reducing methane on farm level therefore has a direct and fast effect on the accumulation of methane in the atmosphere.

Over the last years, we have seen an increased use of enteric methane-inhibiting feed additives (derived from chemistry). Adding these supplements to the ration can lead to a large reduction in methane at farm level. This is a simple and fast approach, but can also be a costly one, because the reduction in methane production is not always complemented by an improvement in animal health and milk performance.

Figure 1 - Impact of different measure on the maximum potential to reduce methane (Knapp *et al,* 2014).



Some other feed additives do increase health and performance of the animals, which in turn also lead to higher efficiencies and less emissions. We also know that dietary factors such as type of carbohydrate, fat inclusion, processing and quality of forages can influence methane emission in cattle.

Research showed that a combination of different measures, nutritional and management, is as effective and makes it possible to reduce methane emissions up to 30% (Figure 1). Management measures include dry cow management, calf rearing practices, and increasing the longevity of the cows for example.

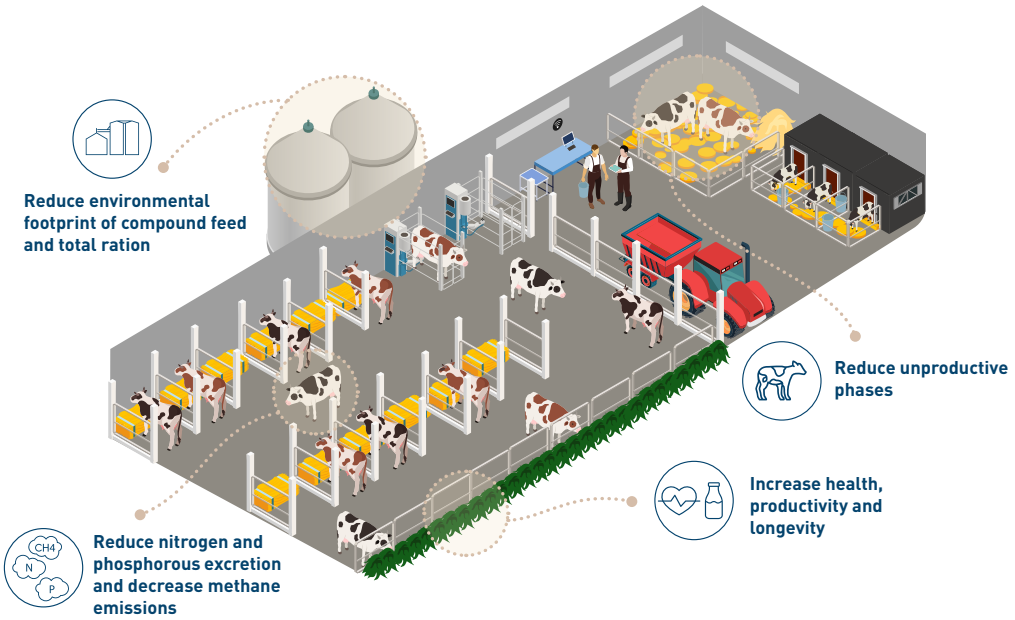
KEY MESSAGE
Reducing the environmental impact of milk requires a multitude of actions.

CCPA : Nutrition and management approaches

CCPA Group supports farmers and feed mills looking to make a successful transition to more sustainable production The company's approach is based on three pillars Expertise in nutrition, expertise in natural ingredients phyto expertise) and expertise in digital tools Figure 2 shows how this approach translates into four key areas Using APS Footprint (developed by Blonk CCPA has quantified the impact of different strategies when CCPA's nutritional strategies were used.

1. Reduce unproductive phases
2. Reduce the environmental footprint of compound feed and total ration
3. Increase health, productivity and longevity
4. Reduce nitrogen and phosphorous excretion and decrease methane emissions

Figure 2 - Key areas to work on reducing environmental impact of milk production on farm.



Reduce unproductive phases

If the age at first calving can be reduced, the cow becomes productive sooner This is not only more economical, but also more sustainable When the heifer is considered fit for breeding is often dependent on weight (in combination with morphology) So, if we can make sure the calf reaches the desired weight sooner, the age at first calving can also be reduced.

By using the program Morphostar that combines Morphobaby nutritional supplement and Morphojunior adjuvant, daily weight gain in calves can be increased by 9 at four months of age, due to very early development of the volume and functionality of the digestive tract This allows for healthier animals and faster growth, translating into a reduction of one month of age at first calving.

Trials with the same program in dairy goats showed an increased concentrate feed intake, an increased bodyweight gain in early life and higher fertility rates later in life CCPA's digital tool Morphoscore can be used to better monitor the growth of heifers and predict the effect on milk potential, future income and environmental impact To be able to do this, CCPA carried out different surveys, spread over several years on a large number of heifers, to be able to build solid correlations between morphology and future career of the cow.

Impact Morphostar

- Reduction of 0.9% in kg CO2 eq / liter FCM.
- Saving of 45 Euro per calf

Reduce the environmental footprint of compound feed and complete ration

A large part of the total environmental impact of milk comes from the feed Protein or fat sources from a region with significant deforestation issues can lead to a high environmental footprint of that particular raw material To support feed manufacturers to make the right choices based on nutritional value, costs and environmental impact, CCPA has enriched its formulation matrix with GFLI data on the environmental impact of different raw materials and feed additives Some specific CCPA criteria permitted to select raw materials with lower environmental impact regarding the nutritional values (ruminal and by pass protein)

By using V ivactiv '® a range of Phytogenic feed solution from CCPA, the energy and protein digestibility of raw materials is improved, giving formulators and nutritionists greater flexibility in the composition of their feeds This is more economical and reduces the environmental footprint of the compound feed To illustrate this with a usual dairy feed 27 CP) using formulation matrix, the carbon footprint as estimated by GFLI is 1160 kg CO 2 eq/t A reduction of 3 5 40 kg CO 2 eq/t) costs around 20 Euro/t With Vivactiv '® we can reduce the CO 2 eq/t by 11 with no extra cost This is made possible by increasing the digestibility of local raw materials and by products, replacing part of the soybean meal On the farm side, nutritionists and managers need tools to help strike the best balance between animal performance and income CCPA developed a rationing software Chorus®, with a user friendly interface and specific nutrients to find the best solution with the forages available on the farm.

Digital expertise: Morphoscore

In this screenshot from the Morphoscore tool taken from a real case, we can see that some heifers are within the weight target, but practically none are within the size target.

Impact Vivactiv'®

Reduction of 11% in kg CO2 eq / T of feed (= reduction of 1.2% in kg CO2 equivalent liter FCM). Reduction of 1-1.5 percentage points in the total protein in the diet, resulting in a saving of 10-20 Euro/ tone of feed

Digital expertise : Chorus® Ruminants

Chorus® Ruminants is compatible with different international feeding systems.

Increase health, productivity and longevity

Health, productivity and longevity are very much interlinked. Research shows that the environmental impact of milk decreases when the cows are longer in production due to the increase of lifetime daily yield. In addition, extending dairy cow longevity is regarded as an important animal welfare indicator, reflecting better health management practices.

The use of Feedstim® Dairy, a Scutellaria Baicalensis based feed solution (patented by CCPA), enhances animal resilience and improves milk production by 6.5% on average. By using the digital tool "Feedstim®Dairy Predict", the effect on production and profitability can be accurately simulated and predicted for each farm situation. On average, the increase in production results due to this feed additive leads to a 5% reduction in total GHG emissions per kilo of milk produced.

Reduce nitrogen and phosphorous excretion and decrease methane emissions

The emission of methane, nitrogen and phosphorus by the animal can be reduced by changing the consistency of the diet, specifically by adjusting the level of target nutrients (to avoid overfeeding NDF, protein, or phosphorus, for example), but also by increasing feed efficiency. By using Vivactiv'® in the formulation, CCPA demonstrated that we can contribute to the reduction of methane production (-6.3% of methane per kilo of milk with Turboviv'), acting directly on the rumen flora.

To evaluate the global impact of Turboviv'® (part of the Vivactiv'® range) - including changes in the feed or diet and the impact in the animals - CCPA conducted an LCA with an independent consulting firm. This analysis showed a reduction of 6.43% kg CO2 equivalent / kg FCM.

Impact Feedstim®

Reduction of 5% kg CO2 eq /kg of FCM. Gain of 80 Euro per cow per year on feed.

Impact Turboviv®

Reduction of methane by 6.3% per kilogram of milk, reduction of ammonia by 10% per cow per day. Reduction of 6.43% kg CO2 equivalent / kg FCM.

Digital expertise : Feedstim®Dairy Predict

Feedstim®Dairy Predict calculates the effect of the supplement used on production and profitability.

Digital expertise : Chorus® Ruminants

Chorus® Ruminants helps formulators and nutritionists to optimize the ration for performance, economics. Specific screens highlight environmental impact of the diet.

CCPA PROVIDES HIGH-LEVEL EXPERTISE IN NUTRITION, PHYTOGENIC AND DIGITAL TOOLS

French feed millers successfully reduce environmental impact of ruminant compound feed

In 2022, CCPA closely worked with a group of French feed millers in their quest to reduce the carbon footprint of the compound feed by adding Vivactiv'®.

By using this natural feed solution, the feed mill was able to reduce the use of imported raw materials and use more local raw materials. It also made possible a reduction in the crude protein level in the diet.

Thanks to the use of Vivactiv'® the group saved more than 50,000 T of imported soybean meal and reduced GHG emissions by 122,243 T in CO2 eq.

Investing in sustainability and improving profitability

The combination of management practices and nutritional strategies from CCPA have the potential for 15% reduction of kg CO2 eq/kg of milk while improving profitability by 180€ per cow per year. This holistic approach is very much focused on improving efficiency, performance and health of the cows. Investing in these key areas is the backbone for better farm profitability and reaching the sustainability targets set by the farmer, the dairy processor, retailer and or government.

Being able to produce milk in a more sustainable way adds value to the work and end products of dairy farmers. It also makes dairy production more future proof, as consumers ask for more sustainable produce, but are often not willing to pay extra for it. Sustainability choices for farmers should therefore not incur extra production costs. Instead, investing in sustainability measures can decrease the production costs, alongside the reduction in environmental impact of milk.

CCPA stands for a total approach when it comes to sustainability, combining zootechnical expertise for livestock management and using natural feed additives that both reduce GHG emissions and improve animal performance and farm economics. This requires innovation and expertise, both of which must be made accessible and useful for feed producers and dairy farmers. CCPA has over 30 years of experience in the use of natural ingredients and offers a broad range of different products withing its natural feed solution portfolio. By combining this expertise, along with nutritional knowledge, rationing software and new digital tools, CCPA paves the way for the dairy industry to become the solution for decarbonation of livestock systems.

1. **The ruminant sector has to take action to reduce environmental impact**
2. **Reducing the environmental impact of milk requires a multitude of actions**
3. **Trials and LCA calculations showed that phytogenics reduce emissions and save money**
4. **CCPA provides customers high-level expertise in nutrition, phytogenic and digital tools**
5. **CCPA helps to turn ruminant challenges into sustainable solutions and opportunities**

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