The power of additives in feed cutting emissions and boosting business

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Pressure on farmers to reduce emissions is growing at a time when they already face a host of other challenges. It's become a daily battle to survive in an industry threatened by economic uncertainty, changing consumer habits and geopolitical and environmental concerns.

The fight against emissions begins before the animals have even left the farm gate. Research shows that animal feed highly contributes to carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) of meat, milk and egg. Indeed, animal feed contributes to more than 50 percent of carbon emissions of processors and retailers. Hence the pressing need for the industry as a whole to reduce its carbon footprint.

Depending on the region, there has been a 50-100 percent increase in diet cost globally since 2020. With the price volatility and high emissions of animal feed, farmers might think they are facing a losing battle. But, as the saying goes, knowledge is power.

Data might not seem like an obvious friend of the farmer but bringing decades of AB Vista scientific research and experience to the farm table has proven not only to cut emissions but to increase productivity, the outcome being getting more from less. Technologists from our Emissions Reporting Service identify, quantify and mitigate feed-related emissions, searching for the right formula to free up farmers to concentrate on their business. We help them achieve the right balance between cost, productivity and performance, while reducing emissions.

Improving performance

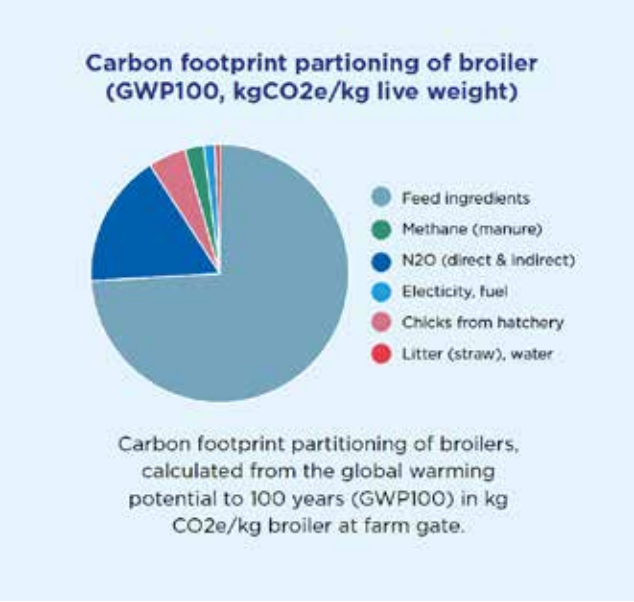
Whatever the animal – ruminant, swine or poultry – the ingredients that go into feed, and their quantity, can have a significant impact on cost and emissions. So, the first step in our feed strategy is to define a list of ingredients, taking into account cost, location and availability. Sourcing alternative ingredients and making the best use of them without compromising on performance, comes back to costs of production – with price remaining the primary driving force for farmers.

Ingredients are the main contributor to emissions when it comes to feed, usually accounting for more than 70 percent of the carbon footprint at farm gate. Other elements of feed production –transportation, fuel, energy and water use from manufacturing – are responsible for a comparatively minor level of emissions.

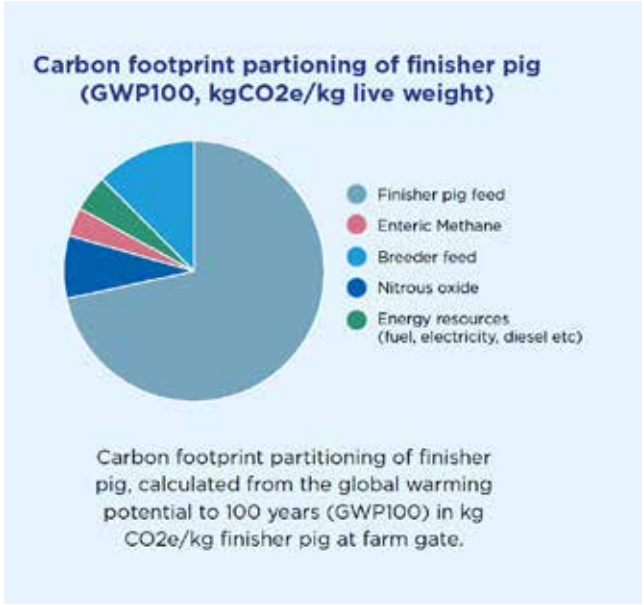
Revisiting formulations and assessing feed additive combinations both help farmers maintain performance and remain competitive. By looking at feed additives and the different roles they can play, carbon footprint can be reduced by ensuring the best use of nutrient utilisation, thereby reducing waste and excretion.

As well as providing a nutritional value to feed formulation, the great advantage of enzymes is that, at specific target levels, they can improve general animal health, resilience, and welfare, therefore improving sustainability and overall herd performance consistency.

For example, in recent years the rising cost of non-organic phosphorous has reinforced the need to use a phytase feed additive to break down the phytate found in ingredients such as soybean meal, corn and wheat, making more phosphorus available to the animal. Additionally, high levels of phytase are being widely adopted to optimise feed formulation to a greater



Carbon footprint partitioning of broilers, calculated from the global warming potential to 100 years (GWP100) in kg CO2e/kg broiler at farm gate.



Carbon footprint partitioning of finisher pig, calculated from the global warming potential to 100 years (GWP100) in kg CO2e/kg finisher pig at farm gate.

extent by maximising amino acids and energy utilisation, therefore reducing CO_2 emissions and N_2O excretion in the environment.

The science bit

Let us invite you into our offices and laboratories for a moment, where our teams of experts work to build a picture of a farm's individual emissions and how to reduce them.

It's not a one-size-fits-all approach; we do the groundwork, analysing and benchmarking data to identify areas within the live animal production system with a high emissions rate, to tailor specific solutions aligned with the medium- to long-term farmer objectives – thus enabling the farmer to apply sustainable solutions while running their business efficiently and profitably.

Our Emissions Reporting Service (ERS) allows farmers to calculate the carbon footprint, and the nitrogen and phosphorus excretion at farm gate. Our experts then recommend mitigation strategies in line with farmer objectives. These recommendations are based on 'what-if' scenarios which explore the benefits technologies and management strategies can deliver to an individual farm.

For instance, a reduction in carbon emissions may be quantified when formulating diets with additives, such as our VistaPre-T fermentation extract, which increases fibre degradation. A report is then delivered in person to the farm, arming the farmer with the knowledge they need to boost productivity and, ultimately, their bottom line.

Through the emissions service, created in partnership with our sister company Intellync, customers can gain robust insight into their carbon emissions, enabling more responsible decisions and reduction in their impact. It can be applied to swine, broiler chickens, laying hens, dairy cows, beef and lamb.

Intellync also developed the world's first on-farm carbon footprint assessment tool, delivering data insights to inform improvement strategies. We have completed thousands of farm-level carbon footprints and currently support a range of retailers and food processors in their efforts to reduce scope three emissions.

In addition, our comprehensive NIR Service, built on decades of expertise in NIR spectroscopy, can provide the farm with accurate predictions of the nutritional components of feed ingredients and forages to help optimise feed formulation.

The service can evaluate the energy uplift possible from forage when pre-treated with VistaPre-T and calculate the potential reduction in costs of feed, while our portable NIR technology allows for manure composition to be measured on farm to validate the effectiveness of feeding strategies.

Combining our NIR solutions with the emissions services means we are well equipped to support our customers in doing more from less in a sustainable way.

Poultry and swine

The challenge of rising ingredient prices and pressure to reduce environmental impact while optimising production costs can be mitigated by using a higher dose of phytase and non-starch polysaccharide degrading enzymes (NSPases), using a full amino acid and energy matrix.

Our enzyme expertise and research and development capabilities have enabled us to work with farmers to create the optimum combination of feed ingredients for their specific needs.

Our Maximum Matrix Nutrition (MMN) approach has been developed based on AB Vista's knowledge of substrates and their nutritional impact, while our feed intelligence approach gives nutritionists confidence that they can achieve the necessary nutrient release to maintain performance.

Adopting an MMN strategy to save feed costs without affecting animal performance has been proven in seven trials across both grower/finisher pigs and broilers. Looking at today's market prices and carbon footprint calculation of feed formulations in different regions, we have seen:

- a 4 percent cost saving in broilers and 9 percent kgCO2e saving/tonne of feed when using Quantum Blue 1,500 FTU/kg full matrix + Econase XT 16,000 BXU/kg
- a 4 percent feed cost saving in laying hens and 9.5 percent kgCO2e saving/tonne of feed when using Quantum Blue 1,200 FTU/kg + Econase XT 12,000 BXU/kg
- for swine, a 3 percent reduction in costs and a 14.6 percent kgCO2e saving/tonne of feed when using Quantum Blue (2,000 FTU/kg) + Econase XT (16,000 BXU/kg).

Ruminants

Approximately 40 percent of cow carbon emissions are associated with the production of feed. This means that changes to feed formulation can have a large impact on producers' carbon footprint.

Methane inhibitors are a potential way of reducing enteric methane emissions from ruminants and could play a large role in reducing the climate change impact, since methane is responsible for 44 percent of livestock-related carbon emissions. But such inhibitors are not yet widely used, and so there may be future opportunities to develop this solution.

A fermentation extract from trichoderma reesei, a revolutionary feed technology that directly impacts fibre usage, is the first of its kind to enter the ruminant market. It's a pre-treatment that can be formulated into the total ration to get more energy from home grown forage.

VistaPre-T improves fibre use, improving digestion and providing a rumen-friendly source of energy to help increase overall animal productivity. It helps maximise forage and reduces the need for using expensive concentrates, resulting in lower feed-costs, improved performance, reduced emissions and ultimately profitability. This means less pressure on the pocket – and less pressure on the environment too.

A 44-day trial in 2021 of adding VistaPre-T to dairy diets, taking an energy matrix approach, resulted in a significant 15 percent reduction in methane emissions; and a 65-day trial of VistaPre-T in beef led to a 4 percent reduction in carbon emissions per kg of carcass.

Conclusion

Sustainability is about being economically profitable, as well as socially and environmentally responsible. There is a clear and pressing need for the livestock sector to reduce its environmental footprint, given its impact on greenhouse gas emissions. Together with the right management strategy, the use of feed additives to improve nutrient utilisation efficiency offers a way for farmers to cut their emissions.

Through the Emissions Reporting Service and our holistic approach, we can support farmers on their sustainability journey by capturing and analysing data and applying our relevant products and services to cut greenhouse gas emissions at farm gate, as well as improving general farm management while remaining competitive.

We are proud to bring to farmers our technical and nutritional expertise alongside innovative solutions which allow them to measure the sustainability of their production system, while also raising awareness among the public of the responsible initiatives being adopted by livestock producers in climate change stewardship.