

Nutritional Emulsifiers

A Sustainable and Feed Cost Saving Measure

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“The challenge for our industry is to secure the supply of high quality, balanced feeds and doing this by taking economics into account. All this whilst minimising the usage of limited natural resources, maintaining production efficiency and establishing an ever lower output in terms of pollution. The challenge is huge, to say the least!”

Attribution needed

Livestock farming is often seen as a major cause of pollution, producing a significant amount of greenhouse gasses, and for having an unreasonably high ecological footprint. It is therefore essential to find solutions to reduce the footprint of our industry, whilst taking into account the viability and economic reality of the business. Orffa, a leading company in the development and formulation of novel feed additives, offers solutions which enable feed producers to improve the sustainability of their feeds and simultaneously reduce feed cost.

Feed Sustainability Charter

The European compound feed industry, by means of its federation FEFAC, has issued a feed sustainability charter, highlighting five core ambitions that Orffa integrates in its sustainability policy. These ambitions are necessary to enable the transition of agriculture as is foreseen by the European Green Deal and the global Glasgow Climate Pact. Contributing to climate neutral production through feed and developing sustainable solutions based on improved resource and nutrient efficiency are the first two ambitions listed in the FEFAC charter, for which digestibility enhancers, such as nutritional emulsifiers, can be instrumental.

Nutritional emulsifiers are known for their effect on energy digestibility. Increased fat digestion is the main focus, but the digestibility of other nutrients (e.g. crude protein) is also positively influenced. A wide range of emulsifiers are available in the market, but only those with a high specific hydrophilic-lipophilic balance (HLB) will be efficient in the gastro-intestinal tract. Orffa Additives BV (The Netherlands) has been able, thanks to modern day engineering, to produce a nutritional emulsifier with a high specific HLB value. Numerous metabolic studies have shown increased energy digestibility by this additive as well as an increased digestibility of dry matter, crude fat and crude protein.

First LCA of a Nutritional Emulsifier Demonstrates its Contribution to Sustainability

The effect of Orffa's nutritional emulsifier (Excential Energy Plus) on the environmental footprint of both broiler and swine production was measured in a series of scientific trials. Blonk Consultants, a leading firm in the application of life cycle assessment (LCA) systematics related to agriculture, and the University of Wageningen, a leading institute in livestock sciences, performed the assessment. LCA is a technique to evaluate the environmental impact associated with the life of a product or service from cradle to grave. Product Environmental Footprint (PEF) guidelines of the European Union were applied as methodology for the calculations.



The objective of this study was to assess the footprint of broilers and swine fed both energy-reduced and standard diets with and without the addition of the nutritional emulsifier. In addition, several environmental impact categories: carbon footprint, eutrophication, acidification and land use were also considered. In terms of total effect on the carbon (CO₂) footprint, the effect was significant (Figure 1). The use of the nutritional emulsifier reduced the CO₂ footprint of broiler production by 0.12 kg of CO₂ eq./kg live weight. The application of the nutritional emulsifier in swine diets reduced the CO₂

footprint between 0.09 and 0.20 CO₂ eq./kg live weight, dependent on the geographical location of production, with West-European production having the lowest initial CO₂ footprint and reduction. The implementation of the nutritional emulsifier also reduced acidification, eutrophication and land use considerably. These positive effects are due to lower ammonia emissions and a shift in raw material composition of the diet.

Figure 1: Reduced environmental impact resulting from the supplementation of Orffa's nutritional emulsifier (Excential Energy Plus) in poultry and swine diets

	CO ₂ footprint (CO ₂ eq./kg live weight)
Broilers - Latin America	0.12 (4.20 -> 4.08)
Swine - Latin America	0.13 (4.81 -> 4.68)
Swine - South-East Asia	0.20 (4.27 -> 4.07)
Swine - West-Europe	0.09 (3.80 -> 3.71)

Applying this reduced environmental impact in practice allows a broiler company, producing about 100 million broilers per year (weighing about 2 kg at slaughter), to reduce its carbon footprint in terms of broiler production by about 20,000 metric tonne or 0.02 Megaton of CO₂ eq. per year. To put this into perspective, the climate agreement as adopted in the Netherlands is scheduled to lead to a reduction in CO₂ eq., exclusively by animal husbandry, of 1.20 Megaton per year by 2030. If all broilers produced in the Netherlands were to be fed with Excential Energy Plus, 10% of the climate objective would be reached.

High Feed Cost as an Opportunity

Agriculture commodity prices (e.g. corn and soy prices) are rising rapidly at a time of geopolitical tensions and rising fuel prices. Future heightened volatility can be expected. To improve competitiveness of animal production, it is of critical importance to reduce feed cost. Improving the digestibility of feed enables the production of energy diluted feeds without impacting animal performance. Using digestibility enhancers, such as nutritional emulsifiers, is therefore advised.

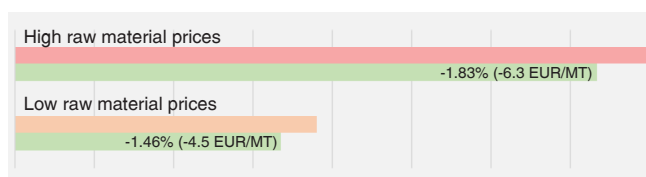


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Reformulation as the Way Forward

Orffa's nutritional emulsifier (Excential Energy Plus) is able to increase the digestibility of feed. By improving emulsification of fats inside the gastro-intestinal tract, it has a positive effect on their digestibility. Furthermore, improved crude protein and dry matter digestibility have been reported. By implementing Excential Energy Plus and its matrix value (energy and amino acids) in your feed formulation program, it is possible to produce energy reduced and cheaper diets without impacting performance. In light of increasing raw material prices, the effect of the nutritional emulsifier provides an opportunity to reduce the negative impact on feed prices. An exercise in Least Cost Formulation (LCF) shows that the benefit of implementation of Excential Energy Plus, in wheat-soy and corn-soy diets, increases at high raw material prices (Figure 2). Metabolic studies show that the increase in energy digestibility largely depends on the crude fat (CF) level in the feed. With a higher amount of total fat, a higher matrix value can be introduced into the feed formulation program and an even larger cost reduction can be achieved as a result.

Figure 2: Least Cost Formulation (LCF) learns that the benefit of implementation of Excential Energy Plus becomes even bigger at high raw material prices



Turning Sustainability into an Economic Benefit

Digestibility enhancers, such as nutritional emulsifiers, enable producers to hit two birds with one stone. Increasing the sustainability of feed and animal production does not mean, per se, a negative effect on the economic side of the business. With elegant solutions in the form of speciality feed additives both improved sustainability and feed cost reduction can be achieved. The application of Excential Energy Plus is supported by a wide range of scientific studies. Orffa, a leading company in the development and formulation of novel feed additives, offers solutions which enable feed producers to improve the sustainability of their feeds and simultaneously reduce feed cost.