

# Looking to lower feed costs? Focus on optimal nutrient absorption

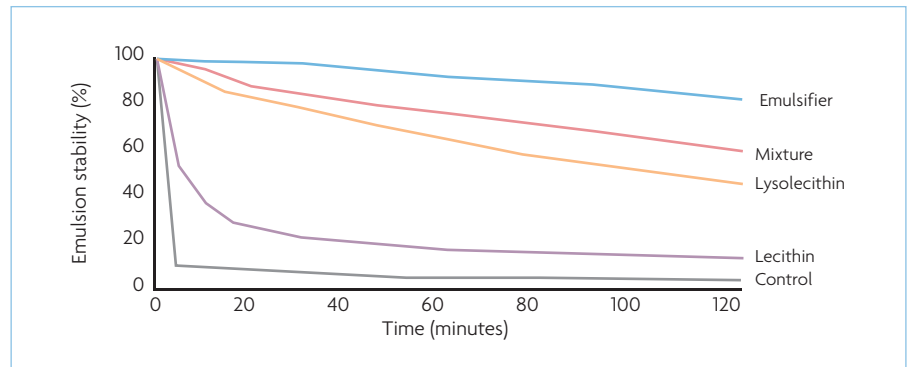
Feed still represents the majority of costs in poultry production at around 60-70%. With the rise in raw material prices, adopting a sustainable, effective nutritional strategy to manage diet costs, while ensuring optimal feed efficiency, is all the more important to maintain a healthy and profitable business.

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The use of a lysolecithin-based nutrient absorption enhancer (NAE) can offer a potential tool. By maximising the bioavailability of energy and essential nutrients, the inclusion of crude fat and protein in the diet can be reduced, significantly increasing production profitability.

For nutrients to be fully utilised by birds, they first need to be digested in the gastrointestinal lumen and absorbed through the cells of the small intestinal wall. To improve nutrient digestion, the use of exogenous enzymes has become standard in many regions across the globe.

Tools to enhance the absorption of nutrients on the other hand, must look into increasing the available surface area for absorption by improved development of the



**Fig. 1. In vitro study showing emulsification capabilities of different single components compared to a mixture of LLC, monoglycerides and a synthetic emulsifier (Kemin Internal Research).**

gut wall. To control this properly however, one must also take into account the interactions between different nutrients and the different steps in the digestion and subsequent absorption process.

Lysolecithins (LLC) have been studied intensively as an active component to increase efficiency of nutrient absorption via improving the digestion of lipids in livestock diets. Previous research in broilers has demonstrated LLC can promote a better weight gain, feed conversion ratio (FCR) and increase the apparent metabolisable energy (AME) available for the bird.

These effects can be partly attributed to the ability of LLC to enhance the emulsification of fats, creating smaller

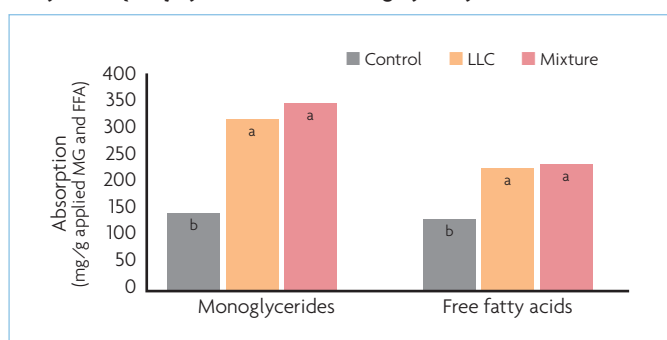
droplet sizes to allow for more efficient lipase activity. LLC exhibit additional activities such as support in ion exchanges and thus the fluidity and permeability of the intestinal cell wall membrane can positively impact gut microbiota, integrity and gene expression.

## Emulsification and hydrolysis - key steps in fat digestion

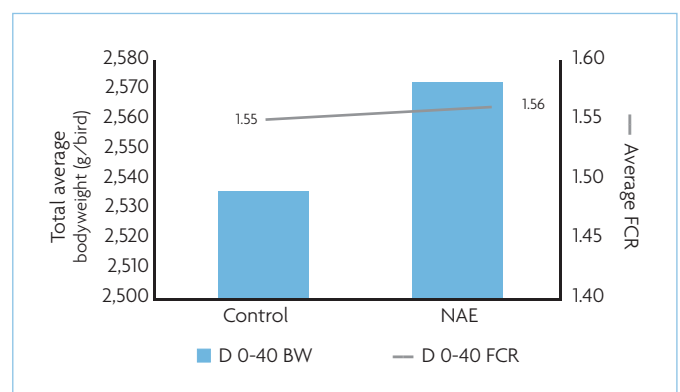
Due to the aqueous environment of the gastrointestinal tract, emulsification is the first critical step in the digestion of the dietary fat matrix. An emulsion of oil in

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**Fig. 2. In vitro study showing capabilities of different single components compared to a mixture of LLC, monoglycerides and a synthetic emulsifier in generating absorption of MG and free fatty acids (FFA) by CaCo2 cells during hydrolysis of animal fat**



**Fig. 3. Birds achieve a higher bodyweight at slaughter at a more efficient feed utilisation when being fed with an NAE.**



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water is however most stable when a combination of a synthetic emulsifier, monoglycerides (MG) and lysolecithin is applied (Mixture) (Fig. 1).

In the next step, hydrolysis starts to release lipid components. Free fatty acid release rate is the highest if a mixture is used, compared to pure synthetic emulsifiers, lysolecithin or lecithin only.

When finally comparing the rate of absorption in vitro, both monoglycerides and free fatty acid absorption increase ( $p < 0,05$ ) by more than 70% with the addition of the lysolecithin mixture (Fig. 2).

### Keeping up high performance standards while reducing costs

LYSOFORTE EXTEND is a unique NAE which combines the benefits of these three active ingredients, lysophospholipids, monoglycerides and a synthetic emulsifier, in a well defined synergistic ratio.

It is specifically designed to improve the accessibility of dietary nutrients by increasing the emulsification process of the dietary fat matrix. In this way it accelerates the essential further hydrolysis and ultimate absorption of fatty acids and other valuable nutrients, to get more potential from your feed.

Promoting these three key steps is particularly important in the early rearing period, where the gastrointestinal tract is still developing and the secretion of enzymes and bile salts have not yet reached their maximum level of contribution to optimise the process for maximum growth.

Applying the NAE further in growing and fattening life enables the feed to be reformulated at reduced cost, with less crude protein and crude fat content.

This results in significant cost savings, while still achieving optimal production results.

A commercial broiler trial at a large feed producer has confirmed the benefits of this dual approach: the 'on top' supplementation of this NAE in starter feed resulted in a significantly higher growth and numerically improved FCR of the chicks during their first 10 days (274g/bird for the NAE vs 261g/birds for the control group respectively,  $p < 0,05$ ).

A subsequent reformulation of the feed in growers and finishers resulted at slaughter in a higher final body weight and similar FCR compared to the non-supplemented control birds, with an European Production Efficiency Factor in favour of the NAE programme (408 vs 403 for the control birds).

The economic benefit of this nutritional strategy is not only driven by the improved performance part, an important contribution

	Control	NAE
Income (€/1000 bird)	1,775	1,800
Feed cost (€/1000 bird)	1,153	1,147
Net profit (€/1000/bird)	622	655
Net profit difference (€/1000 bird)	-	33
ROI	-	4

**Table 2. Applying an NAE in a broiler diet results in a higher net profit.**

lays in the realisation of a significant reduction in total feed costs.

This trial provided an overall €9.3/t saving compared to the standard diet because of the reformulated grower and finisher diets with lesser oil (between -1.39 and -1.43%), crude protein (between -0.25 and -0.35%) and AMEn (-kcal/kg).

Together, including weighed averages corrected for feed consumption, average EU feed prices and live weight prices of broilers at the time of the trial, an increase of more than 5% in net income per bird was realised compared to non-supplemented birds (Table 2). These findings confirm that, through a unique approach to nutrient digestion and absorption, LYSOFORTE EXTEND can be a valuable tool for integrators and feed producers to reduce feed costs while maintaining high performance standards, to ensure production profitability especially in today's high and volatile commodity price conditions in the market. ■

**Table 1. Calculated nutrient analysis of diets.**

	Grower 1		Grower 2		Finisher	
	Control	NAE	Control	NAE	Control	NAE
Added soybean oil (%)	2.74	1.31	3.25	1.81	2.76	1.37
crude protein (%)	20.41	20.16	19.55	19.21	18.50	18.16
AMEn (kcal/kg)	3,175	3,102	3,230	3,157	3,230	3,157

References are available from the author on request