

Nutritional emulsifier effect on various animal species

Several trials have shown the benefit of nutritional emulsifiers in broilers. In order to better understand the effect in other animal species, an extensive research project was set up by Orffa. A total of 8 trials were set up around the world, in coordination with several research institutes, to investigate the effects and applications in laying hens, turkeys, growing-fattening pigs and fish

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The global usage of nutritional emulsifiers has been increasing fast due to the fact that these feed additives are being well perceived by the industry as effectively improving energy and fat digestibility.

Their application (on top or in energy reduced diets) has been extensively studied in broilers. Broiler feed production is therefore considered to be the largest market for nutritional emulsifiers today. Although fat digestion and metabolism differ between animal species, the principle remains the same. The key to absorption of fatty acids in both monogastric, ruminant and aquatic species is the formation of complexes (micelles) in the intestine which are being stabilised, among others, by bile salts (which are natural emulsifiers). As the digestion of fat and other nutrients is never complete and a remnant can be found in the faeces, the addition of a nutritional emulsifier is therefore of interest to enhance the utilisation of fat and other nutrients by the animal and improve their performance (Table 1).

Effects in laying hens and turkeys

Increasing energy utilisation by means of applying a nutritional emulsifier provides an interesting tool to improve performance in laying hens. Next to that, this practice provides an opportunity to improve the (nutritional) quality of their eggs. In turkeys, it is interesting to pursue a feed cost saving effect by applying a nutritional emulsifier in energy reduced diets or an improved performance by applying the product on top.

Two recent trials executed in commercial laying hen units in the Philippines showed improved egg performance when applying a specific nutritional emulsifier (Excential Energy Plus).

- The first trial focused on the early laying phase (week 19 – week 25)
- The second trial focused on older laying hens (week 50 – week 72, week 79 – week 98).

The cost of feed per egg laid was 3.4% (Trial 1) and 2.77% (Trial 2) lower in the treatment group. This can be linked to the observed big increase in egg production (Figure 1).

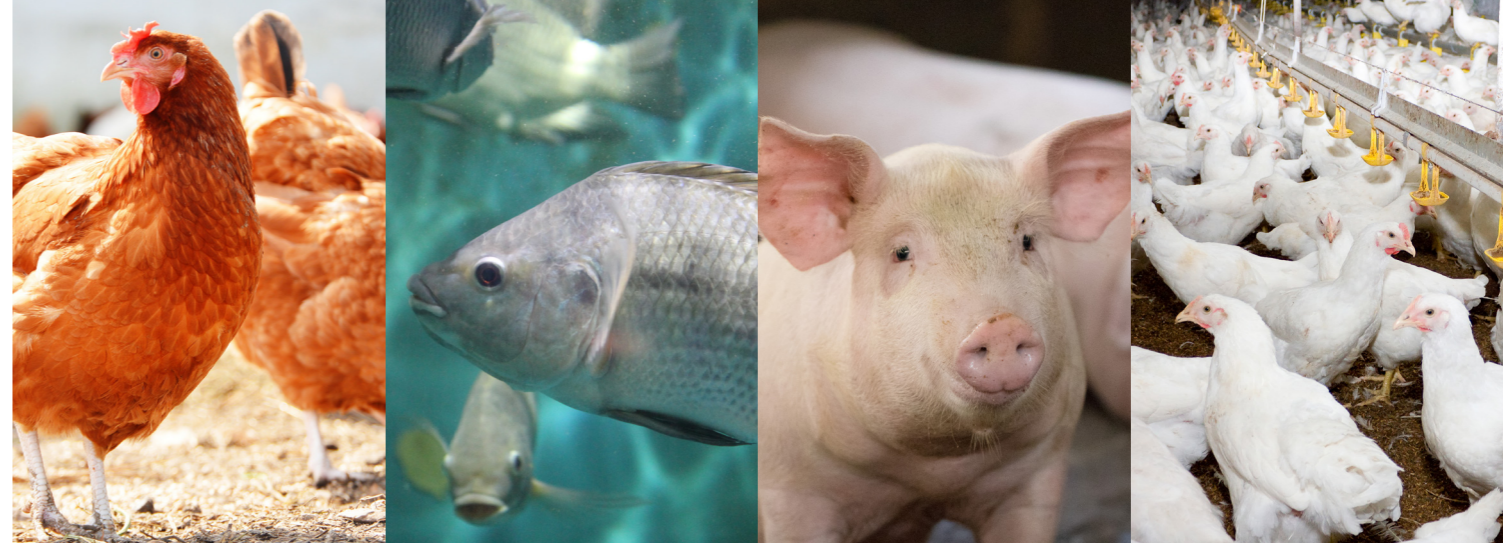
Third trial in laying hens

A third trial in laying hens showed the effect of the specific nutritional emulsifier on the egg yolk colour. It was shown, via analyses of the CIE (Commission Internationale de l'Eclairage) parameters of the egg yolk (brightness, yellowness, saturation of the colour and the hue angle), that the additive was able to increase the colour depth of the egg yolk. This observation could be linked to a better adsorption of the fat-soluble compound canthaxanthin. Other fat-soluble compounds (e.g. vitamin A & E) were not analysed in this trial but literature indicates that their deposition can be positively influenced by the addition of a nutritional emulsifier.

Trial in Poland with turkeys

A recent university trial in Poland with turkeys showed an interesting cost saving effect when the nutritional emulsifier was supplied in energy reduced diets. These diets were reformulated by taking out a certain percentage of oil. The addition of a nutritional emulsifier (Excential Energy Plus) helped to maintain standard performance.

A positive effect on foot pad dermatitis and fat content in liver (-70%) was also observed. This effect can be interesting to avoid fatty liver syndrome (hepatic lipidosis) in poultry species. The dry matter content in faeces was also improved (-0.70%).



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Trial in Canada

Next to this trial, a practical trial in Canada showed the potential of the additive when applied on top. Here, the market weight of the turkeys was increased by 240 grams or 1.51% and the FCR was reduced by 2.29%.

The other monogastric, the pig Swine have a similar digestion as poultry as they are both monogastric, and therefore a similar positive effect of the nutritional emulsifier can be expected.

2 trials in growing-fattening pigs were performed

1. A first trial was performed in Lima (Peru) in collaboration with a local university. Results showed an increased performance when supplying the nutritional emulsifier in an energy reduced (-50 kcal/kg) diet (corn-soy, soybean oil). The body weight (BW) in the treatment group significantly surpassed (+1.52%) the BW of the control and the FCR was numerically improved. Although a rather conservative energy reduction was applied, the economical evaluation showed a 4.53% increase in profit per animal.
2. A second trial was performed under practical conditions in The Philippines. Here, results showed the benefit of putting the nutritional emulsifier on top. The final weight (at day 140) was significantly ($p < 0.01$) increased by 6.65 kg and the FCR was reduced to 2.22 compared to the control (2.44), resulting in a big benefit for the farm owner.

Aquatic species, focus on tilapia

Focusing on improvement of the fat and nutrient digestibility of fish species a trial was executed at the Mahasarakham University (Thailand) on Nile tilapia. Results showed that the supplementation of the nutritional emulsifier improved body weight gain ($p < 0.05$) and feed conversion ratio ($p < 0.05$). The liver malondialdehyde (MDA) content, a measure of oxidative stress, was significantly decreased ($P < 0.05$) in the treatment group. The tested nutritional emulsifier improved metabolisable energy (AMEn) and fat digestibility in fish diets. There was a correlation with the oil level in the diet. These results suggest that dietary nutritional emulsifier supplementation can improve the digestion and absorption capacity of lipids, which might be the reason for the observed improvement in growth performance.

Positive effects of nutritional emulsifiers

The positive effect of nutritional emulsifiers has been well established in broilers, both in practice and in scientific literature. The extensive research project set up by Orffa shows also the positive effects of the nutritional emulsifier, Excential Energy Plus, in other animal species. Looking at the economical side of things, the following return-on-investment (ROI) can be seen for laying hens (3:1), turkeys (3:1) and growing-fattening pigs (7:1). Orffa is committed to further increase the knowledge on their nutritional emulsifier, Excential Energy Plus, in different diets and different animal species.

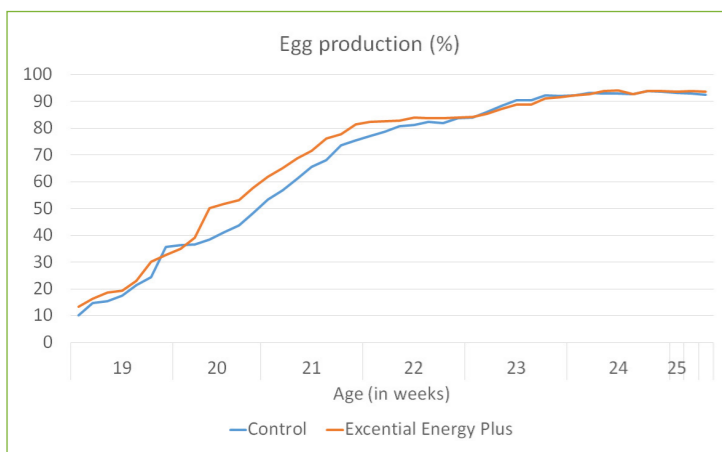


Table 1 – Observed effects in different animal species after supplementing diets with a specific nutritional emulsifier (Excential Energy Plus, Orffa, The Netherlands)

Animal specie	Application type (Nutritional emulsifier)	Effects observed
Laying hens	On top	Improved egg production, early laying phase
Laying hens	On top	Improved egg production, older hens (+50 weeks)
Laying hens	On top	Improved egg yolk colour
Turkeys	Energy reduced	Reduced feed cost (ROI = 3:1), improved dry matter feces, positive effect on foot pad dermatitis and fat content in liver
Turkeys	On top	Improved performance
Growing-fattening pigs	Energy reduced	Improved performance, increased profit per animal
Growing-fattening pigs	On top	Improved performance
Fish (Nile tilapia)	On top	Improved performance, reduced oxidative stress (liver)