# Emulsification: an elegant way to promote growth

Numerous studies have shown the benefit of nutritional emulsifiers in poultry. In order to better understand their effects and application in swine, four trials were carried out by Orffa in coordination with research institutes around the world.

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## Emulsifiers and their function

The global use of nutritional emulsifiers has been increasing fast in the animal feed industry due to their efficacy in improving energy and fat digestibility.

Their application, 'on top' or included in the formulation in energy reduced diets, has been extensively studied in poultry. Broiler feed is considered the largest market for nutritional emulsifiers today.

Although fat digestion and metabolism differ among animal species, the principle remains the same.

The key to absorption of fatty acids in monogastrics, ruminants and aquatic species is the formation of 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 nutrient digestibility and improve animal performance.

## 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. Four trials in fattening pigs were performed in coordination with research institutes worldwide.

The first trial (Meza et al. 2018) was performed in Lima, Peru, in collaboration with a local university. A total of 54 male pigs (Yorkshire x Landrace, 70 days old, 29.5kg), followed for 29 days, were divided into two groups (control and treatment) of six repetitions each. Diets were corn-soy-based with added soy crude oil (1.8%).

The diet in the treatment group was reduced by 50 kcal/kg (by taking out a portion of soy crude oil) and supplemented with a nutritional emulsifier (Excential Energy Plus). Results showed an increased performance when supplying the nutritional emulsifier.

The body weight (BW) in the treatment group significantly surpassed (+1.5%) the BW of the control ($p<0.05$) and the FCR was numerically reduced by four points. Although a rather conservative energy reduction was applied, the economical evaluation showed a 4.53% increase in profit per animal.

A second trial was performed under practical conditions in the Philippines. A total of 270 mix-sexed pigs (PIC CA25 x 410 sire, 63 days old, 17.4kg), followed for 77 days, were divided into two groups of six repetitions each. Diets were corn-soy-cassava-based with added palm oil.

In the Excential Energy Plus supplemented group, the final BW was significantly ($p=0.01$) increased by 6.65kg and the FCR was reduced by 22 points ($p=0.06$) compared to the control (2.44). The application 'on top' resulted in a big benefit to the farmer.

A third trial, in Belgium, focused on the effects of Excential Energy Plus applied 'on top' in West-European type diets (wheat/barley/soya).

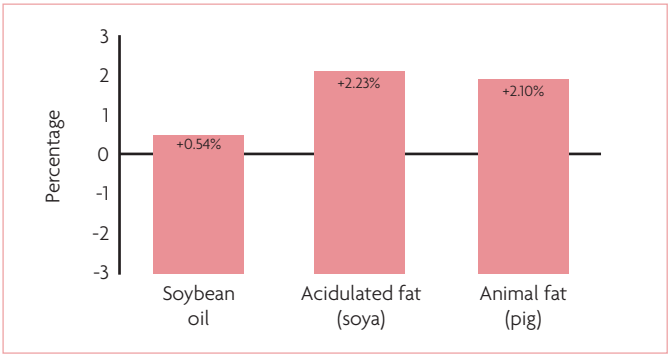
A total of 256 mix-sexed pigs (Danbred x Piétrain, 24kg), followed for four months, were divided into two groups of eight repetitions each. Diets were supplemented with animal fat (pig) and pure distilled fatty acids.

In the nutritional emulsifier treated group, the final BW was increased by 1.04kg and the FCR was reduced by 10 points compared to the control (2.67). The cold carcase weight of the animals in the treated group were, on average, 2.46kg bigger. When calculating the economical aspect, a return on investment of 5:1 could be noted. A fourth trial focused on the digestion of fats and energy. A metabolic, double Latin square design, study was performed in Mexico with four ileal cannulated barrows (25kg, four pigs x eight diets). The animals were fed a simple diet based on corn with the addition of soybean oil or acidulated fat or animal fat (pig).

For the treatment groups, Excential Energy Plus was added. After four days of adaptation, one day of sampling was applied. Analysis of the faeces revealed an increased fat digestion in the nutritional emulsifier groups for all fats applied.

Fat digestibility was increased by 0.54%, 2.23% and 2.10% for soybean oil, acidulated fat and animal fat (pig), respectively (Fig. 1).

**Fig. 1. Effect of a nutritional emulsifier on fat digestibility in swine (Mexico).**




## Emulsification as a way to move forward

The research project set up by Orffa shows that the positive effects of nutritional emulsifiers, extensively proven in poultry, can also be replicated in swine. Orffa dedicates itself to engineer your feed additives now and in the future, and is strongly committed to further increase knowledge on nutritional emulsifiers in different diets and different animal species. ■