

# New concept makes fat highly digestible for young piglets

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Energy is the most important nutrient in piglet diets. Worldwide nutritionists use net energy (NE) or metabolic energy (ME) to predict the quality of the diet and the performance of the pigs. Energy can be provided by starch, sugar, lactose, fats and to some extent by non-starch carbohydrates.

Compared to carbohydrates, 100g of fat contains 2-3 times more net energy. The digestibility of fats is important. In sow milk 38% of the dry matter is fat. This fat is digestible due to the fat particles and high content of emulsifiers like specific proteins and phospholipids.

## Intake after weaning

Especially in the early stages of life and in the period after weaning, optimal feed intake is a dominant factor for pig gut health.

After weaning, piglets suffer from stress, due to separation from their mother and changes in environment or feeding system, resulting in lower feed intake.

This reduced intake results in an energy deficiency and atrophy of the microvilli in

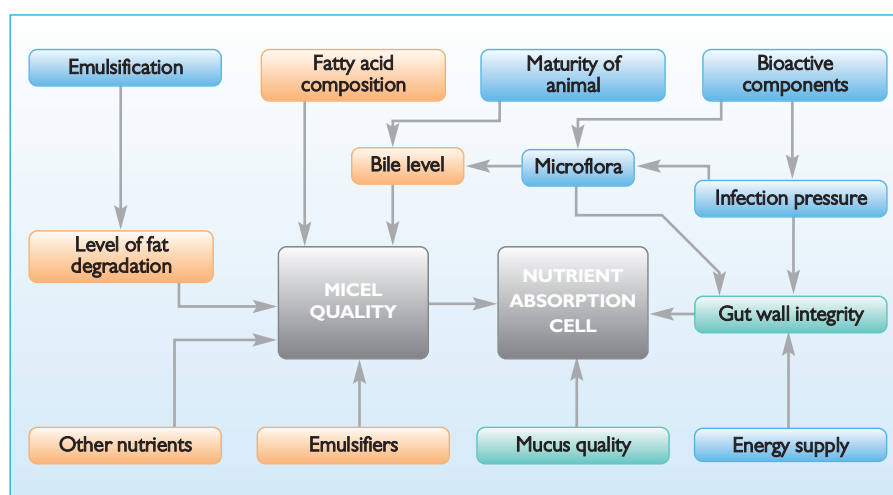


Fig. 2. Factors affecting fat absorption (orange/green = direct; blue = indirect).

the intestines. Lactose is known to stimulate the feed intake after weaning.

Fat can partially compensate for this lower intake, but the fat should be highly digestible.

Fig. 1 shows the different steps of the complex fat digestion process and this is influenced by many different factors as shown in Fig. 2.

● Medium to short chain fatty acids can be absorbed directly without emulsification.

● Mono-glycerides contribute to emulsification, but free fatty acids are not easy to emulsify.

● Long chain-saturated fatty acids are lower in digestibility than unsaturated ones.

● The micro-flora can de-conjugate the bile and reduce the fat digestibility.

● The age of the piglet and the size of the droplets are important factors as well.

## Fat digestion capacity

In young piglets the production of lipase is often limited (Fig. 3). Another aspect is that the production of bile and the acidity of the

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Fig. 3. Lipase activity slowly develops (Liu et al., 2001).

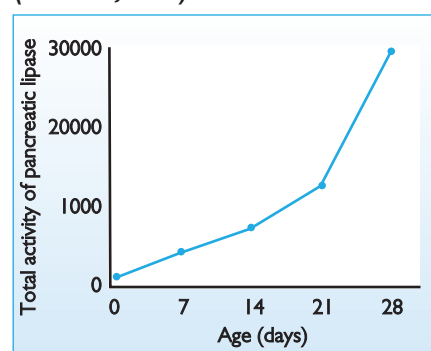
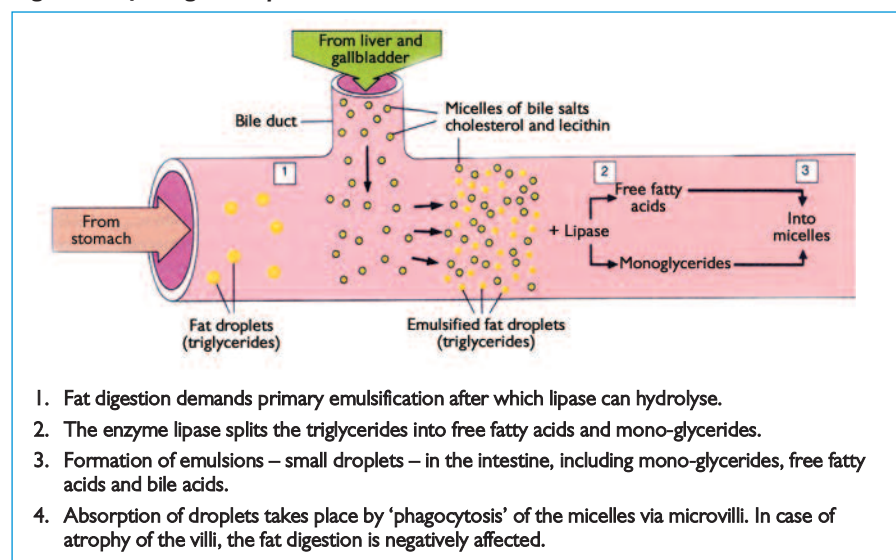


Fig. 1. The fat digestion process.



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stomach can be limiting factors. Very important is the fact that piglets often show some atrophy of the villi in the first days after weaning.

Smaller fat particles

Research on fat particle size indicates that smaller fat particles in the feed result in better fat digestion. Due to the smaller particles in the feed, more specific surface is provided, resulting in more efficient hydrolysis by lipase.  
The emulsifiers in the feed that contribute to smaller particles also contribute to better

	Normal milk	Large particles	Small particles
Size (µm)	3.9	6.7	1.8
Surface	1.6	1	3.5
Efficiency lipase	100	60	300

**Table 1 Comparison of different sized milk fat globules (Berton, 2012).**  
emulsification in the intestines (Table 1). Joosten Products has developed a new product, TecnoLat, which takes into account the effect of fatty acid composition, effect of emulsifiers, and the processing of fats.

**Table 2. In this trial the TecnoLat diet resulted in better growth performance and more profit compared to the diet with the fat-filled whey.**

Practical trial Asia	Control feed	Trial feed TecnoLat	Difference
Number of piglets	100	100	
Initial weight (kg) (42 days)	10.42	10.13	-0.29
Final weight (kg) (72 days)	21.31	22.97	1.66
Daily feed intake (kg)	0.81	0.85	0.04
Daily weight gain (kg)	0.36	0.43	0.07
FCR	2.25	1.98	-0.27

In combination with powerful emulsifiers, the fats are highly digestible and suitable for young piglets. TecnoLat is more economic than most of the commercial fat-filled whey products.  
TecnoLat is a product with 22% protein, 35% lactose and 15% fat. This high fat specialty has well balanced fats and emulsifiers included. This new TecnoLat concept was tested in a field trial with young piglets and compared with a commercial fat-filled whey. The results are shown in Table 2.

Summary

For the digestibility of fats by young piglets good emulsification is important. It enables efficient hydrolysis of fats by lipase and stimulates the formation of small droplets that can be absorbed by the villi.  
Normally, long chain fatty acids are more difficult to be absorbed. In sow milk high levels of saturated fatty acids are present.  
The good digestibility of this milk fat is due to emulsifiers, like proteins, phospholipids and small particles.  
With this in mind Joosten Products optimised TecnoLat by selecting good fatty acids and emulsifiers in order to provide a complete supplement for piglet diets.  
In the field trial that was carried out, TecnoLat was shown to improve performance and profit.