Joosten
young animal nutrition

We care for the little ones

Omega 3, an essential ingredient in piglet feeding

Already for years the protein concentrates FMR Ω 3 and JPC 56 are successfully used in young animal nutrition. Both products are focusing strongly on young animal health, due to their shared gut health promoting characteristics like excellent protein digestibility, 100% safety, palatability and villi-boosting glutamine. The addition of omega 3 fatty acids (EPA/DHA) in FMR Ω 3 makes the product highly suitable to replace fish meal.

Recently Joosten - young animal nutrition developed a new version of the FMR Omega 3 -> FMR Omega 3 Double. This version contains twice as much omega 3 fatty acids as the regular version.

Tabel 1. Comparison nutrients FMR Omega 3 with FMR Omega 3 Double.

		FMR Omega 3	FMR Omega 3 Double
Crude protein	%	58	54
Digestibility protein*	%	96,3	96,3
Crude fat	%	6,0	8,5
Omega 3 fatty acids**	%	**10,9**	**21,8**

* In vivo research University of Illinois

** As part of total fat

The fish oil used in the FMR Omega 3 is a stable fat source. In the product is a mix of different antioxidants to prevent the oil is getting rancid.
Omega 3 fatty acids are known as polyunsaturated fatty acids (PUFA's). Polyunsaturated oils can be one of two kinds: omega 6 and omega 3. Much has been written about these fatty acids; about the potential dangers of omega 6 and the benefits of omega 3. But, as always in nutrition, it is not that black and white. We both need them, but in the right balance. Omega 3 and 6 are both directly influencing blood pressure, but also inflammation in the body and intestinal tract. For this, the optimal balance is crucial, where omega 6 produces pro-inflammatory cytokines and omega 3 forms anti-inflammatory substances (Figure 1).

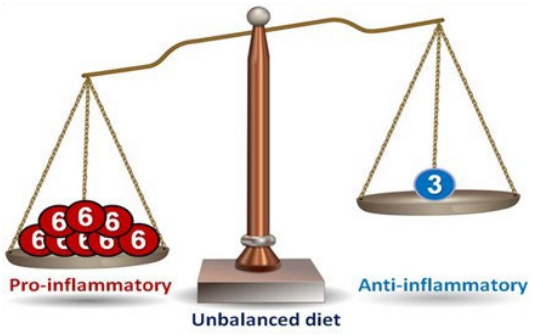

Figure 1. Inflammatory effects of omega 3 and omega 6 in the diet.

In human, but also in commercial animal diets, there is an abundance in linoleic acid LA (Ω6, precursor for AA), mainly found in grains, soya and animal products (other than fish). Resulting in a Ω6:Ω3 ratio of 20:1 or even 30:1. As decreasing omega 6 is not feasible (Gerrits, 2009), the only option left is to add omega 3 to the diet, as a 4:1 ratio is preferred.

Omega 3 sources

The three most commonly known Ω3 fatty acids are EPA (Eicosapentaenoic Acid), DHA (Docosahexaenoic Acid) and ALA (Alpha Linolenic Acid).

- EPA (C20:5) and DHA (C22:6) are primarily found in fatty fish, other seafood, algae (mainly DHA) and fish oil. These fatty acids have many essential functions. Most importantly, they are used to form eicosanoids and lipid mediators, leading to a reduced inflammation (Siriwardhana et al., 2012).

- ALA (C18:3) is found in high-fat plant ingredients, especially flaxseeds, chia seeds, rapeseed, linseed and walnuts. Despite being the most common omega 3 fat in the diet, ALA is not very active in the body. It needs to be converted into EPA and DHA in order to become active (Burdge, 2006). Unfortunately, this process is highly inefficient, especially in young animals as the conversion occurs in liver and brains. In mature animals, only about 5% gets converted into EPA, and as little as 0.5% get converted into DHA (Plourde and Cunnane, 2007). The same enzymes are used for the formation of omega 6 fatty acids, so there is a competition in this. For this reason, ALA should never be relied on as the sole omega 3 source. Most of the ALA will simply be used for energy. Bottom line, there are three main types of omega 3 fatty acids. EPA and DHA are found in fish and algae, while ALA is mostly found in high fat plant material. However, the physiological active essential omega 3 fatty acids in human and animal are EPA and DHA. Therefore, plant omega 3's are tremendously less effective than fish omega 3's (Gerster, 1998).

Mode of action omega 3 in piglets

Dietary omega 3 will support the maturation of the piglet's intestine (De Quelen et al., 2011), but will also decrease the inflammatory response induced by an environmental challenge (as weaning, poor sanitary, stress etc.). This has been shown in a study of Shin et al., (2017), where they investigated the effect of reducing the Ω6:Ω3 ratio (20:1, 10:1, 4:1) by adding EPA/DHA to the diet of weaning piglets (21 days weaning till 2 weeks post weaning). Positive effects in villi height, crypt depth, inflammatory responses, FCR and diarrhea incidence were found. When switching from a 20:1 ratio to 4:1 ratio, diarrhea incidence1 decreased from 25.3% to 8.0% and FCR improved from 1.82 to 1.63. Summarizing, omega 3 helps to recover the damage in the intestines (Figure 2), improving the barrier function and nutrient absorption, resulting in better piglet performance.

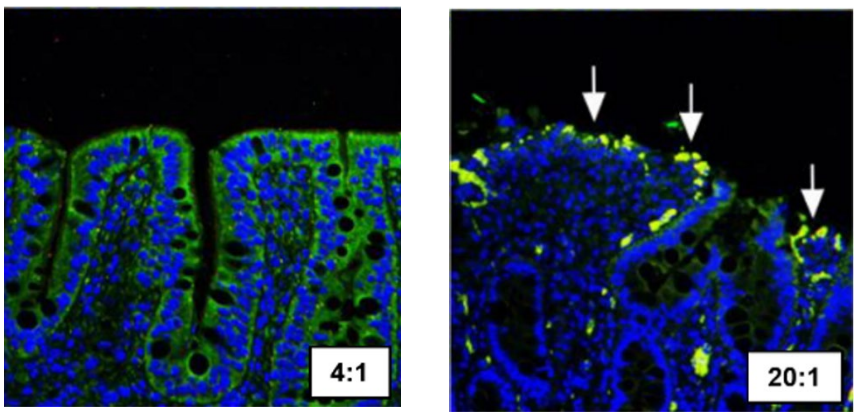

Figure 2. Effect of dietary Ω6:Ω3 ratios on localization of tight junctions (occluding) in the ileum of weaned pigs visualized using immune-fluorescence technique (green). Disruptive patterns are indicated with the white arrows.

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FMR Ω 3 designed to benefit young piglets

Based on this knowledge, Joosten designed FMR Ω 3 and recently FMR Ω 3 Double. The supply of EPA and DHA contributes to an increased anti-inflammatory capacity. This premium product results in an improved gut integrity and health, more efficient nutrient use and significant increased growth performance. Better gut health and development in early life strongly contributes to a better profit for a lifetime.

References:

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