Using the power of nature to support piglet performance

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Successful breeding programs are guided by the market and have to adjust their selection traits accordingly. Apart from performance objectives (growth rate and feed efficiency) an important target, if not the most crucial one, is represented by the number of uniformly grown, weaned piglets per sow per year.

Good and consistent weaning weights are crucial for further growth performance in order to realise the full potential of growing/finishing pigs until reaching their market body weight.

However, the course for the later performance of the piglets is already set early on, even before piglets are separated from their mothers at weaning.

Optimal feeding strategies

The pre- and post-weaning period and the weaning process itself represent very important consequences in the life of a pig, and therefore careful consideration should be given, ensuring long term productivity, hence profitability in pig production. This of course also emphasises the importance of optimal feeding strategies for the sow during gestation and lactation.

In view of feeding strategies, plant derived feed additives, so called phytogenic feed additives (PFAs), i.e. natural plant-derived actives, have proven antioxidant, anti-inflammatory and antibacterial effects, supporting sow and litter performance in stressful periods.

Focusing on post-weaning

Though weaning and post-weaning phases seem rather critical phases in the piglet's life, at which a lot of attention is paid to reduce mortality and improve litter homogeneity, focusing on the sow at the very beginning of the reproduction cycle will pay off as well.

High nutrient intake and utilisation post-farrowing is of great importance, as this will not only affect the sow's overall condition, with consequences on her productivity.

Increasing feed intake and therewith rising nutrient content of milk will benefit piglet performance as well, but also decreases pre-weaning mortality rates. According to Pluske, 2015, "The major determinants of immediate post-weaning performance are age and weight of pigs at weaning or, by interference, at birth".

The same author remarked on the relevance of focusing on the periods immediately after birth and weaning as key intervention points for the manipulation of growth and production performance.

A widely observed consequence of increased litter sizes is reduced piglet weight and lower litter uniformity at birth and an increased number of piglets below the critical body weight of 1kg at birth.

Low uniformity at birth generally results in increased mortality of the smaller piglets and therefore measures to increase uniformity might even be more important than just increasing average live weight at weaning.

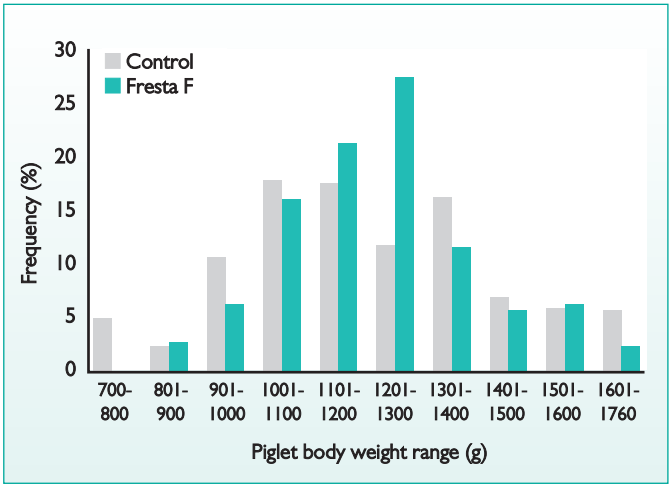

Fig. 1. Piglet body weight distribution on day one (at birth). Comparison of Fresta F (300ppm) versus control lactation diets fed from day 90 of gestation.

Proven strategy

Many phytogenic components, i.e. natural plant-derived actives, have proven antioxidant, anti-inflammatory and antibacterial effects.

Blending the right actives into a final product created a feed additive, known as Fresta F, that alleviates the consequences of stress in swine.

Based on caraway and lemon essential oils, it is a fully natural product, without any nature-identical (i.e. chemical) ingredients and is approved for use as a performance enhancer in weaned piglets.

Fresta F was the first phytogenic feed additive that received a zootechnical registration by the EU for a 100% pure phytogenic product.

Table 1 summarises the data from the five studies used to support its efficacy in weaned piglets, and indicating improvements in the order of 4-5%.

Table 1. Zootechnical efficacy of Fresta F in piglets – meta-analysis of five studies.

Parameter	Control	Fresta F	SEM	P	Difference (%)
Mortality, 28-70 days (%)	6.2	4.6	1.16	0.299	
Live weight, 28 days (kg)	7.55	7.56	0.05	0.938	
Live weight, 70 days (kg)	23.4	24.2	0.19	0.002	+3.6
Daily gain, 28-70 days (g/day)	378	398	4.63	0.002	+5.2
Feed intake 28-70 days (g/day)	553	575	6.22	0.009	+4.0
Feed:gain, 28-70 days	1.47	1.44	0.01	0.204	

SEM = standard error of the mean; P = probability

The new focus

In a study performed at Sichuan Agricultural University, China, by Zhong et al., 2011, it was shown that sows fed lactation diets supplemented with Fresta F (400ppm) had higher feed intake during lactation and higher litter weaning weight ($P<0.05$) compared to the control and Fresta F 200ppm group.

At farrowing, the glucose level in

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Fresta F 400ppm sows was higher than the control. On day seven of lactation, serum urea nitrogen content was lower in response to supplementation compared to the control ($P<0.05$). The levels of milk lactose and IgG were also increased in the supplemented groups ($P<0.05$). It was concluded that Fresta F improved sow and litter performance, serum metabolite concentrations, IgG level and lysozyme activity at postpartum and milk quality. The positive effects of feed intake and nutrients concentration in the milk results in improved litter weight and uniformity.

German trials

In a trial performed at Freie Universität (FU) Berlin (unpublished), the effects of supplementing late gestation (from day 90 to farrowing) and lactation diets with Fresta F (300ppm) were evaluated in a herd of 75 sows (average parity 3) compared to a control.

The individual sow and piglet body weights were measured at day one post farrowing and weaning (day 25). In addition, milk composition was determined at day 20.

Milk dry matter content was increased ($P<0.05$) in the treatment. The overall piglet body weight increased ($p<0.001$) and the body weight gain of piglets from birth to weaning at day 25 of age was significantly increased by 4.2% (Fresta F) compared to litter performance of sows fed without phytogenic additives (Table 2).

Importantly, the litter uniformity increased, showing reduced standard deviation (SD) in litters from sows that received the phytogenic treatment. The improvement in piglet uniformity was visible both at day 1 and day 25 post farrowing (Figs. 1 and 2).

The number of piglets with low body weight at birth (≤1.0kg) was reduced from 18% to 9% in the supplemented group, compared to the control.

The results of the FU Berlin study suggested that the recommended dose of 300ppm of Fresta F can be used to significantly improve body weight gains of piglets when supplementing lactation diets from day 90 of gestation to day 25 postpartum. The significant improvement was already recorded within the first week post farrowing.

Fresta F supplemented to lactation diets improves piglet uniformity at weaning in field conditions. The effects is strong in parity 1 sows.

The improvement of piglet uniformity has been recently validated in a commercial trial at Asmussen Agro GmbH, Germany.

The average piglet body weight at weaning (day 25) was slightly increased in Fresta F treatment compared to control (Fig. 3), but effects were very pronounced in piglet uniformity, and more strongly in parity 1 sows.

In parity 1 sows, the number of piglets with low body weight (≤5kg) at weaning (day 25) was reduced from 27% to 11% in the treatment, compared to the control. In addition, the coefficient of variation in piglet weight was reduced from 29 to 21% (Table 3).

Conclusions

Today, there is increasing interest in raising piglet body weight at weaning and in ensuring piglet uniformity, as this seems to represent a major determinant of the future pig performance on its way to the desired market body weight.

However, several factors (for example the growth and development of the gut), occurring in early life (prenatal, postnatal, post weaning) may have far-reaching influence on further performance hence production.

Optimal feeding and management strategies for the sows, already starting in the gestation period, are the key to success and long term profitability in pig production.

In this regard, phytogenic (plant-derived) feed additives like Fresta F, as they contribute to increased nutrient concentration of sow milk, higher piglet body weight at birth, improved litter uniformity with lower number of piglets with BW below 1kg, and raise piglet weight at weaning, when being fed from late gestation to lactating sows.

Relating to the proven beneficial characteristics, PFAs are foreseen to have the potential to become a new generation of substances for innovative swine nutrition and welfare and thus being able to contribute to a profitable pig production, being a tool to support piglet performance from the very beginning. ■

References are available on request from the author

Variable	Control		Fresta F		P-values
	Mean	SD	Mean	SD	
Body weight (g)					
Day 1	1,215.1	220.5	1,232.8	168.6	0.2947
Day 7	2,381.9	249.6	2,441.4	170.7	0.0014
Day 25	7,724.3	959.9	8,008.4	737.1	0.0023
Body weight gain (g)					
Day 1-7	1,165.9	160.9	1,206.1	140.8	0.0002
Day 8-25	5,338.2	862.7	5,567.5	692.8	0.0009
Day 9-25	6,503.2	915.4	6,773.4	677.8	0.0001

Table 2. Litter performance of sows being fed a phytogenic feed additive (Fresta F), compared to control.

Parity 1	Control	Fresta F (400ppm)
STDEV[1]	1.769	1.470
Average BW (kg)	6.06	6.92
CV[2] (%)	29.2	21.3

[1] STDEV = standard deviation, [2] CV = coefficient of variation

Table 3. Effects of Fresta F during the lactation period on piglet uniformity at weaning (d25).

Fig. 2. Piglet body weight distribution on day 25 (at weaning). Comparison of Fresta F (300ppm) supplementation versus control in lactation diets fed during gestation (day 90-farrowing) to weaning (day 25).

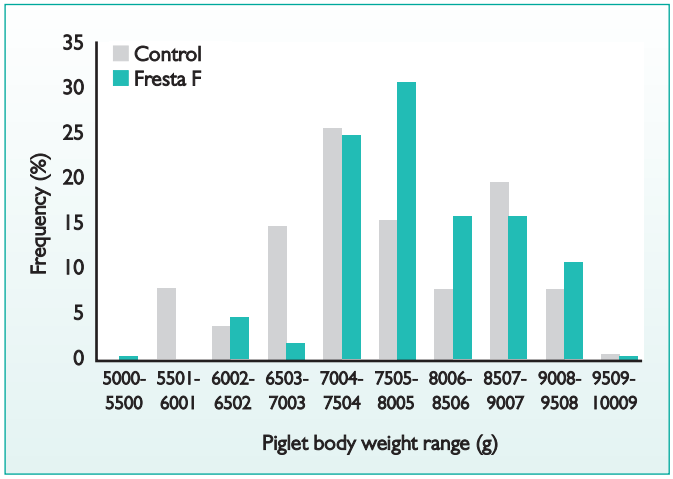

Fig. 3. Piglet body weight distribution on day 25 (at weaning). Comparison of Fresta F (400ppm) versus control diets during the lactation period.