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Improving feed intake and reducing body weight loss of sows during lactation

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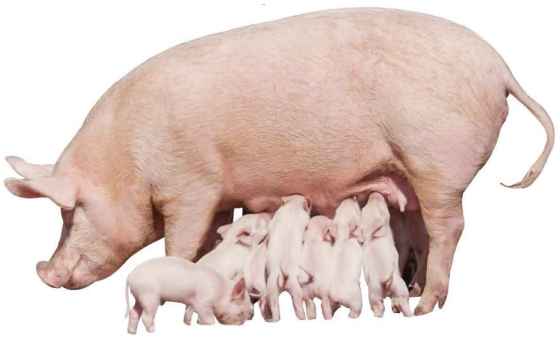
Reproduction in mammals is a cycle, what you do during lactation has impact on the future and what happens in the current cycle is impacted by the choices made before. In pig production, sow management during lactation is key as it will condition the ability of piglets to grow fast and healthy. Sow are facing many challenges, among them, the period between weaning and insemination is very short, therefore, lactation needs to be managed very carefully and first comes the feed.

Improving sow lactating digestible nutrient intake for heavier and healthier piglets

Sow lactation feed intake is important because sows are becoming more productive thanks to the continuous genetic improvement by pig breeding companies. This increase in litter size places a huge burden on the sow to feed her litter. For the sows, the objective is simple: supplying more milk - and for that purpose, they need to eat. First gestation is critical as it will prepare the gilt for her career. However, because these sows are still immature at their first parity, nutritional needs must support feeding her large litter and also her continued growth. If nutritional requirement is not met by adequate feed intake the negative energy balance of sows during lactation will result in body weight loss and poor performance. For gilts this can result in a short productive life on the unit leading to poorer unit productivity.



To understand clearly how feed intake is impacting the pig future performance, many studies have been conducted.

Among them, one is particularly interesting as it follows the piglet from birth to 69 days of age. The study was conducted by Sammy Hawe during spring 2019 and followed 71 sows and their litters. Selective cross fostering allowed 2,200 piglets to be divided into 2 groups of low and average birth weight. The sows were assigned to 2 groups, one of restricted feed intake to a maximum of 7. 5kg for the entire 28-day lactation period and the other ad libitum feed intake. Each sow was allocated a litter of 14 piglets. The key outcomes of the study are:

1. Increased sow feed intake increased the weaning weight of the pigs, regardless of whether those pigs were small or whether those pigs were large;
2. Increased feed intake cut preweaning death loss in the small pigs by almost half
3. Heavier pigs grew faster than small pigs after weaning and
4. More pig weight due to more sow feed intake was maintained at 69 days of age (Hawe et al., 2020).

Factors affecting feed intake

Factors affecting feed intake can be split in four: animal, environment, feed and water factors. Focusing first on the animal, it is known that sows that are not healthy do not eat well. Stage of lactation, parity, genotypes also influence feed intake. Gilts do not eat as much feed as second parity sows. It is also seen that older parity sows in particular 6-7-8 parity sows may eat less as well. Environment is an important parameter, it is complex and affected by many factors: temperature, humidity, evaporative cooling, floor types, etc. The more heat stress that the sow is subjected to the less feed that she is going to eat. Time of day is also an interesting parameter in sow feeding behaviour. Sows will eat more in the mornings and the evenings than they will in the middle of the day, and particularly when it is hot. It is therefore important that we make sure that we have feed available to the sow at the right time of day so that she can be able to take advantage of consuming feed when she needs it.

Water quality and availability is often the forgotten nutrient. If sows do not drink, they will not eat. Constipation and stool quality are another contributing factor, because if sows are constipated, then they will not eat as well. It takes a little bit of extra management, but wet/dry feeders can be an opportunity to improve feed intake. If the feed quality is not good, feed intake can be negatively affected.

For instance, mycotoxins can dramatically reduce feed intake and also have an impact on other factors affecting the health and wellness of the sow. Mouldy feed, or anything unpalatable for the sow will reduce her intake. Nutrient composition is also a factor; the balance of some amino acids and the level of salt and fibre can influence feed intake.

Managing feed intake at the farm level

At the farm level, we would like to raise the attention on two topics: the importance of knowing how much lactating sows are eating and the perils of too much gestation feed.

Today, many of our systems have an ad libitum feeder, with a feeder tube that is delivering feed to the feeder. The tube is feeding the sow, not the farmer, therefore, it is not known how much sows are eating. Often the only way of monitoring feed intake is how much feed the truck delivered and how often it delivered it. Barn caretakers may not know which sow is eating well and which ones might need help. Identifying sows that are not eating the first few days after farrowing is a priority, but we must also try to avoid limiting early feed intake.

Feeding too much gestation feed to the sow is energetically inefficient and leads to lower feed intake at the lactation stage. A study conducted by Bill Weldon illustrates this point. About 40 days before farrowing, gilts were split into two groups. One group was restricted to a little under 2 kg of feed intake per day, while the other group could eat ad libitum. Feed intake over the entire period was not different.

Restricted sows ate almost 2 times more feed during lactation. Anything that sows overeat during the gestation period, they are not going to eat during the lactation period. It is energetically inefficient to put weight on and to take it off for milk production. Also, when that feed intake is not maximised during lactation then sow productivity in terms of piglet gain is lost (Weldon et al, 1994).

Adisseo technologies to increase sow lactating digestible nutrient feed intake

Adisseo has developed two technologies to support lactating sows. The first one, Krave® AP is based on increasing feed intake. The second one, Rovabio®, is a great tool to increase digestibility. All together, these technologies allow the sow to increase her digestible nutrient intake.

Professor Bruno Silva, few years back, looked at sow feed intake and particularly at very productive sows in hot temperatures in Brazil. This study involved 296 Danbred sows. Treatments were including a control diet and then, Krave® AP to that diet in two concentrations: one at 250 g/MT and one at 500 g/MT. There were three replicates of the study and the average sow parity in the group was 2.45 – young sows were preferably chosen for this study. During the 23-day lactation there was no creep feed offered. Control sows consumed about 5 kg per day. We had about a 20% increase in feed intake above the control for the 250 g/MT level of Krave® AP, and then an additional 10% improvement for the 500 g/MT treatment.

Overall, feed intake went up to a 29% improvement in lactation feed intake over the control sows - a huge increase in lactation feed intake. Sow weight loss was not affected in this study; sow gave it to the pigs. Sows were nursing almost 15 pigs at the initiation of the study. Additional feed intake improved number of piglets weaned with 13 piglets from the control group versus almost 13.5 piglets at the highest level. This means a 4% increase in the number of piglets weaned and a positive impact on pre-weaning mortality. This is similar to the response in Dr. Hawe's study.

This study has been successfully replicated in other climate conditions with other genetics. On average, the feed intake improvement is 18.9% above control diets. In conclusion, Krave® AP drives sows to consume larger meals, which allows them to give more milk yield and improve piglets weight gain. When the sow is raising large litters, it may also improve the pre-weaning mortality (Silva et al, 2018).

Table 1 - Krave® AP effect on lactating sows and piglets during summer
(adapted from Silva et al, 2018)

	Control	Control + KRAVE® 250 g/t	Control + KRAVE® 500 g/t	Diff.	P<0,05
Number of sows	99	99	98		
Average days lactation	23.3	23.4	23.5		ns
Average parity	2.45	2.44	2.45		ns
Average daily feed intake, kg	5.08c	6.02b	6.60a	**+29%**	*
Weight lost, %	-7.80	-8.29	-7.68		ns
Average Nº piglets per litter (after cross fostering)	14.83	14.82	14.80		ns
Average piglet weight at a birth (kg)	1.394	1.369	1.335		ns
Nº piglets weaned	12.95b	13.07ab	13.45a	**+4%**	*
Average weight weaning, kg	5.86c	6.16b	7.00a	**+19%**	*
Average litter weight at weaning, kg	75.88	80.51	94.15	**+24%**	*

After the review of how lead sows to eat more, it is important to focus on the ability for them to digest what they fed to take full advantage of the intake.

One option to increase digestibility then subsequently the absorption of nutrients is to use enzymes. A meta-analysis (Cozannet and al. 2018) was conducted on 8 trials made with Rovabio®, a multi carbohydrase complex. Nearly 1000 sows were followed in stations in Europe, Canada and Brazil. Rovabio® was used mostly on top and sometimes with reformulation and in one trial, digestibility was calculated using markers.

First outcome: Rovabio® does not change feed consumption (in average 5.6 kg/d for control vs 5.5 kg/d for Rovabio®).

Second outcome: Rovabio® helps to decrease the sow weight loss, particularly for gilts.

Third outcome: Rovabio® contributes to increase the litter weight gain, especially for older sows, up to 5 kg more.
To summarize, Rovabio® helps gilts to preserve their body weight (and their future career) and older sows to give more to their piglets.

Another study (Pelissari, P.H. et al., 2016) provided some highlight on the level of digestibility of sows fed diets with and without Rovabio, In Sao Paulo, the sows (120) started to receive Rovabio® 38 days before farrowing and then, during 21 days of lactation. Rovabio®-fed sows farrowed 0.5 pigs more per litter and the litters were 10.9% heavier at birth and 7.5% heavier at weaning. This was made possible by the increase of sow efficiency regarding nutrient absorption. In different digestibility trials conducted at Prairie Swine Centre with lactating and non-lactating sows, Rovabio® dramatically improved feed digestibility.

Figure 1 - Rovabio® effect on body weight loss
(Cozannet et al, 2018)

In summary, genetic selection for increased litter size has seen greathowever brings a requirement for more mothers' milk to get them growing quickly and healthily. Ensuring optimum lactation feed intake and nutrient availability is more important than ever to ensure both the performance of the litter and the future fertility of the sow. Krave® AP and Rovabio® technologies are demonstrating very efficient to improve sow lactation feed intake and feed digestibility to make sure the sow receives the best out of the feed.

We look forward to discussing individually with you about your lactating sow challenges in the future!

References
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