Group sow housing – what about precision feeding for gestating sows?

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Are you soon planning to modify your farm buildings for sow group housing? Do you have questions about which feeding system is the most appropriate? Are you wondering what advantages precision feeding may have? If so, read below to learn about our initial findings on this subject.

The team at CDPQ is currently carrying out a project to evaluate the impact that precision feeding for gestating group-housed sows may have on feed cost and sow performance. A first evaluation was performed by simulation and is now being validated in a commercial setting. The results presented in this article are those delivered from the simulation phase, while results from the commercial trials will be published next winter.

What is involved exactly in precision feeding for gestating group-housed sows?

Precision feeding for gestating sows involves using two different feed ingredients (one rich in nutrients, while the other is low) that are mixed in different proportions in order to meet the individual needs of each sow. The application of precision feeding for gestating sows housed in groups requires the use of an electronic sow feeder-type (ESF) feeding system or a free-access ESF stall, which allows the sows to be monitored individually as well as 2 feeds to be used simultaneously. The period of applying this feeding strategy covers the interval of time where the sows are housed in groups. This period begins when sows are transferred from the breeding room to the

gestation area (between the 28th and 35th day of gestation). The period ends when these same sows are transferred to the farrowing rooms (around the 110th day of gestation).

The simulations in this project were carried out with the help of a database that analyzed performance data of more than 2000 gestating sows. The types of data that were analyzed include body weight and backfat thickness at breeding time and at farrowing, the total number of births, litter weight, etc. This allowed us to evaluate the potential impact that a precision feeding strategy may have on feed costs as well as the ability of this strategy to better feed gestating sows.

What are the benefits?

The results of the simulations indicate that precision feeding allows lysine requirements in sows to be better targeted. This is especially true at the end of gestation and for gilts in

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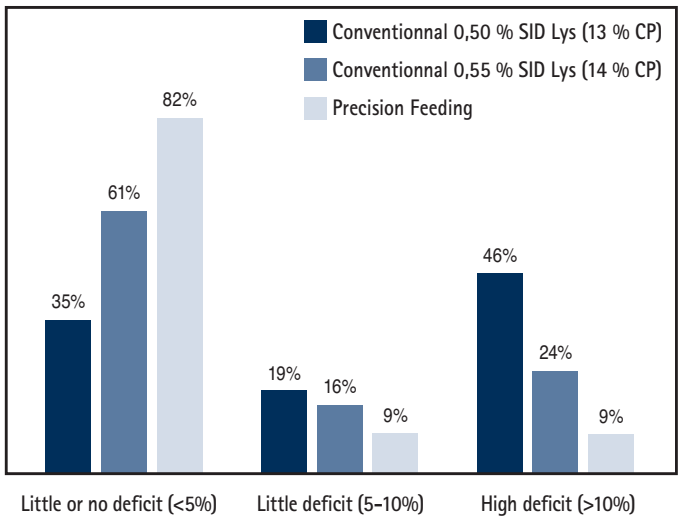
particular. In fact, considering that gilts are still growing and the needs of the fetus is more significant towards the end of gestation, conventional feeding strategies do not completely fulfill the gilt's or the fetus' requirements at this stage of gestation (Figure 1).

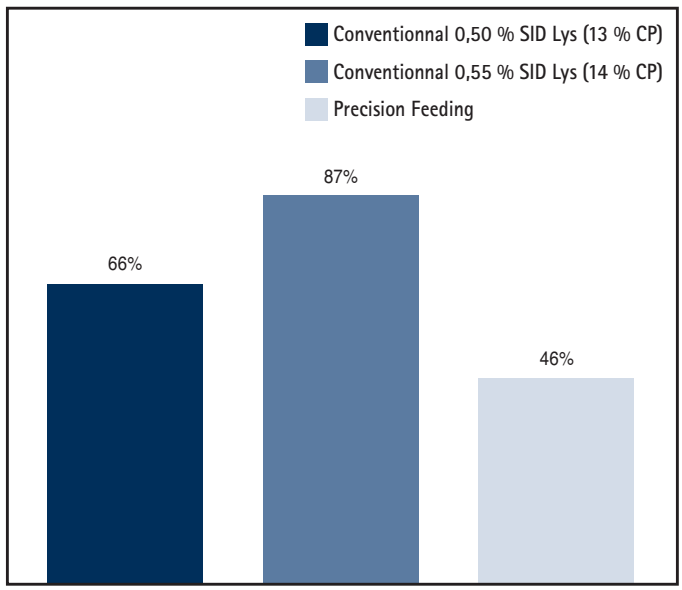
Figure 1 : Proportion of gilts according to 1) accumulated deficits in daily SID Lys at the end of gestation (days 91 to 110) and 2) according to feeding strategy used.



Conventional feed that has 0.50 % and 0.55 % of standardized ileal digestible (SID) lysine (Lys) corresponds respectively to feed containing approximately 13 % and 14 % of crude protein.

Figure 1 shows that precision feeding better meets gilts' requirements for SID Lys at the end of gestation. This is especially true when compared to conventional feeding strategies where a single feed ingredient is used during the gestation period. The proportion of sows presenting little or no deficit in SID Lys is significantly higher for sows being fed more precisely compared to sows conventionally fed. In fact, 82 % of sows have shown less than a 5 % deficit in Lys with precision feeding, compared to 35 % of sows fed with a conventionally 0.50 % SID Lys feeding. This means that precision feeding allows Lys requirements to be met in 47 % more sows in the herd. This strategy equally allows the proportion of gilts receiving a surplus of SID Lys to be reduced (Figure 2).

Figure 2: Proportion of gilts whose daily SID Lys surplus accumulated during the group gestation period (days 35 to 110) exceeds more than 10 % of necessary requirements, according to feeding strategy



And what about multiparous sows?

For multiparous sows, the principal advantage of precision feeding is the ability to reduce the overfeeding of sows as well as to better feed them at the end of gestation. The potential of this strategy for reducing feed costs depends on the efficiency to reduce any excess Lys ingested by multiparous sows, particularly during the two first trimesters of gestation. The effects on sow performance, as much for multiparous sows as for gilts, still needs to be verified.

Are there any economic benefits?

An evaluation of the effect that this feeding strategy may have on sow performance has not yet been completed. There-

fore, the economic benefits associated with precision feeding is focused on feed costs for the moment. The precision feeding strategy has been compared to two concentrations of SID Lys conventionally used by different feeding companies to feed gestating sows, being 0.50 % (feed $C_{0,50}$) and 0.55 % (feed $C_{0,55}$). Regarding the feed used in precision feeding, concentrations in SID Lys for Feed A et B were at 0.65 % et 0.35 % respectively. Results are shown in Table 1.

Table 1: Feed cost savings in precision feeding compared to conventional feeding (C0,50 et C0,55) for the period when sows are housed in groups (35th to 110th day of gestation).

Annual criteria basis		$C_{0,50}$	$C_{0,55}$
Average feed price (2016)	$/mT	-5,40	-7,10
Feed cost	$/sow	-2,62	-3,42

Based on average prices in 2016, annual feed cost is reduced by **2.62 $/sow** and **3.42 $/sow** respectively when comparing precision feeding strategies to conventional feeding $C_{0,50}$ et $_{C0,55}$.

Savings over time

As feed prices vary over time, a sensitivity analysis was conducted on the price of maize and soybean meal, two major feed components. Thus, considering the minimum and maximum prices ($/ton) observed between January 2012 and January 2017, the precision feeding strategy holds an absolute economic advantage over conventional feeding, with annual savings ranging from $0.60 to $5.00/sow.

And what about the time spent in the breeding rooms (day 1 to 35 of gestation)?

Knowing that sows' requirements for Lys are lower in early gestation, there would be an economic benefit in applying the precision feeding strategy on Day 1 of gestation or, at least, a feed could be formulated that is poorer than the conventional feed normally distributed during this period. Applying a precision feeding strategy during the first 35 days (in the breeding room) would save an additional $2.10 to

$2.45 per sow per year when compared to conventional feeding $C_{0,50}$ et $C_{0,55}$ respectively.

Conclusion

Precision feeding for gestating sows would be particularly **beneficial for sows in late gestation and for young sows still growing**, as the requirement for lysine is significant during these times of the reproductive cycle of sows and that it is difficult to meet these sows' requirement with conventional feeding methods. Precision feeding would therefore make it possible to better feed the sows while **minimizing overfeeding**. By reducing excess nutrients given to sows, there is a reduction in the cost of feed that fluctuates around **$3 per sow per year**.

The commercial field trial of this project is currently underway at the Ferme Ste-Catherine Nord of La Coop Seigneurie in Quebec and will validate the effects of precision feeding on the performance of more than 300 gestating sows during two gestation cycles and lactation. Results will be available in the winter of 2018.

Financial partners

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