

# Increasing sow milk yield and piglet growth via low-cost feeding and management strategies during gestation and/or lactation

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Sow mammary glands.

Source: Sherbrooke Research and Development Centre, AAFC

## Results of this study demonstrated that:

- Including oat straw (preferably processed) into sow diets during late gestation improved indicators of satiety in sows and piglet growth rates before weaning.
- Achieving a certain backfat thickness of gilts at the end of gestation by applying appropriate feeding strategies during gestation promoted mammary development.

## Why was this study done?

Pork producers restrict feed intake of gestating sows to prevent excessive body weight gain and the associated negative consequences on

farrowing, post-partum feed intake, reproductive performances, and locomotion. Aggression associated with restricted feeding is a welfare concern, and can become a greater problem when sows are housed in groups.

Another challenge is that sows do not produce enough milk to sustain optimal growth of their piglets. This is a problem that has been amplified in recent years due to the use of hyperprolific sow lines. Therefore, researchers worked on developing low-cost feeding and management strategies for gestating sows as a way to reduce aggression, maintain optimum production and increase sow milk yield during lactation.

What was done and what was the outcome?

**Reducing aggression**

In order to reduce aggression and maintain optimum production in gestating sows, researchers investigated if processing straw into feed can improve its satiating effect by altering its fibre content and structure.

Two initial experiments demonstrated that using heat and moisture to process straw changed its fermentability and net energy content. Based on these results, a feeding trial with gestating sows was conducted. Gestating sows were fed with diets supplemented with wheat or oat straw processed and compressed using a “briquette maker” from day 85 of gestation to farrowing. These animals were compared to one group of sows that were not fed straw along with sows fed unprocessed straw.

Supplementing with oat straw, processed or not, improved indicators of satiety in sows and piglet weight gain before weaning. Also, processing straw demonstrated some additional improvements. There is also some potential in using the straw “briquettes” as environmental enrichment for sows during gestation.

**Maximizing mammary development**

A series of studies focusing on mammary development were conducted to improve milk yield and piglet growth. Researchers focused on two main areas that may impact mammary development:

**1 Gilt body condition**

The following results were obtained from two studies involving gilts:

- At the end of gestation, gilts that are too thin (backfat thickness of 15 mm and below) will have less-developed mammary glands.
- Adequate feeding during gestation is critical to achieve optimal mammary development in late gestation and maximize future potential milk yield.
- Gestation feeding appears more important than backfat at mating for mammary development in late gestation.

Briquette maker used for processing and compressing straw. Source: University of Saskatchewan



Straw briquettes coming out of the briquette maker. Source: University of Saskatchewan

**2 Use of the phytoestrogen genistein**

A study was carried out to see if providing genistein to late-pregnant sows could stimulate fetal growth and mammary development.

For this study, sows were divided in two groups: a control group and a group receiving two intra-muscular injections of 220 mg of genistein daily (from day 90 of gestation until farrowing).

Even if there was an increase in the carcass fat content of neonatal piglets when using genistein in gestation, the overall results did not support the use of such a treatment in commercial swine units to improve sow and piglet performance.

**Collaborators**

<b>Jennifer Brown</b>	Prairie Swine Centre
<b>Jérôme Lapointe</b>	Sherbrooke Research and Development Centre, AAFC
<b>Marie-France Palin</b>	Development Centre, AAFC

Newborn piglets. Source: Sherbrooke Research and Development Centre, AAFC



# Additional project information

Click on the links below for further information on this project

*Links were last updated in 2022*

## Farmscape Interviews:

- [Acidification and Fermentation Improve Low Quality Feed Grains](#)  
- May 1, 2018
- [Researchers Look to Straw Based Feed to Reduce Aggression Among Group Housed Sows](#)  
- April 7, 2017
- [Feeding Trials of Straw Based Feed Supplement for Gestating Sows Now Underway](#)  
- March 15, 2017
- [Progress Reported in Efforts to Process Straw Fibre for Inclusion in Sow Diets](#)  
- March 10, 2017
- [Scientists Examine Value of Straw Sourced Fibre in Gestating Sow Diets](#)  
- July 12, 2016
- [Increased Sow Mammary Cell Development Offers Potential Improved Milk Yields for Piglets](#)  
- June 7, 2016
- [Feeding Trials to Show How Feed Can Be Used More Efficiently](#)  
- June 8, 2015
- [Increased Sow Milk Yields Offer Potential Improved Piglet Growth](#)  
- March 2, 2015
- [Research Shows Body Condition will Impact Sow Milk Production](#)  
- January 28, 2015
- [Inclusion of Soluble Fibre in Gestating Swine Diets Offers Several Advantages](#)  
- January 5, 2015
- [Improving Sow Milk Yields and Quality Expected to Increase Performance of Offspring](#)  
- January 2, 2015
- [Inclusion of Fibre In Sow Diets Expected to Improve Piglet Performance](#)  
- November 12, 2014
- [Researchers Hope to Boost Piglet Performance by Increasing Sow Milk Production](#)  
- November 6, 2014

## Peer-reviewed articles and abstracts:

2017

- Farmer C., Lapointe J, Cormier I. (2017) [Providing the plant extract silymarin to lactating sows: effects on litter performance and oxidative stress in sows](#). Article. *Animal*, 11: pp. 405-410.  
Retrieved from <https://www.cambridge.org/core/journals/animal>

2017

- Farmer C., Martineau J-P, Méthot S, Bussi eres D. (2017) [Comparative study on the relations between backfat thickness in late-pregnant gilts, mammary development and piglet growth](#). Article. *Animal*, 1: pp. 154-159  
DOI: <https://doi.org/10.2527/tas2017.0018>

2016

- Farmer C., Duarte C., Vignola M., Palin M.-F. (2016) [Body condition of gilts at the end of gestation affects their mammary development](#). Article. *Journal of Animal Science*, 94: pp. 1897-1905.  
Retrieved from <https://academic.oup.com/jas/article>
- Farmer C., Robertson P., Xiao C.W., Rehfeldt C, Kalbe C. (2016) [Exogenous genistein in late gestation: effects on fetal development and sow and piglet performance](#). Article. *Translational Animal Science*, 10: pp. 1423-1430.  
Retrieved from <https://www.cambridge.org/core/journals/animal>
- Farmer C., Comi M., Duarte C.R.A., Vignola M., Charagu P., Palin M.-F. (2016) [Differences in body condition of gilts that are maintained from mating to the end of gestation affect mammary development](#). Article. *Journal of Animal Science*, 94: pp. 3206-3214.  
Retrieved from <https://academic.oup.com/jas/article>
- Farmer, C., Comi, M., Vignola, M., Charagu, P., Duarte, C., Palin, M.-F. (2016) [Differences in body condition of gilts that are maintained from mating to the end of gestation affect their mammary development](#). Abstract. *Journal of Animal Science*, 94 (Suppl. 5): p. 413.  
Retrieved from <https://academic.oup.com/jas/article>

## Additional Resources:

2018

- Agriculture and Agri-Food Canada (2018) Solving milk-production issues at hog farms. Online Newsletter. *Agri-info Newsletter—March 2018*.  
Retrieved from: <http://www.agr.gc.ca/eng/home/>

2017

- Martineau JP, Wilson ME, Bussi eres D, Farmer C, Guay F. (2017) [Partial substitution by organic trace minerals on gilt growth, production and longevity and progeny growth performance](#). Abstract from proceedings. *Advances in Pork Production (Banff Pork Seminar), Vol 28, Abstract 9*. Retrieved from: <https://www.banffpork.ca/proceedings/search>
- Farmer, C., Palin, M.-F. (2017) [Being too thin in late pregnancy is not a good thing for mammary development](#). Article. *Canadian Hog Journal*. Fall 2017: pp. 48-49.  
Retrieved from: <https://www.albertapork.com/alberta-pork-home/canadian-hog-journal/>

2015

- Farmer, C., Palin, M.-F., and Vignola, M. (2015) [Body condition of gilts at the end of gestation affects their mammary development](#). Abstract from oral presentation. *Journal of Animal Science*, 93 (Suppl. s3): p. 218.  
Retrieved from: [https://www.jtmtg.org/jam/2015/abstracts/JAM2015\\_full\\_abstracts\\_book.pdf](https://www.jtmtg.org/jam/2015/abstracts/JAM2015_full_abstracts_book.pdf)
- Farmer, C., Hurley, W.L. (2015) [Mammary development](#). In: Farmer, C. (ed.), *The gestating and lactating sow*, Wageningen Academic Publishers. eSBN: 978-90-8686-803-2  
Available for purchase at: <https://doi.org/10.3920/978-90-8686-803-2>

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