

Can sow diets enriched with extruded flaxseed replace antibiotics in starter feeds for piglets?

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When piglets are raised in a clean, high health status facility, there is no need to include antibiotics into the phase 1 diets post-weaning. Additionally, weaning piglets at three weeks of age may be more beneficial to the producer if they are able to produce piglets with the same nursery exit weights relative to pigs weaned at four weeks. Results from work at Prairie Swine Centre have shown that in a high health situation, the use of in-feed antibiotics post-weaning had no benefit, regardless of weaning age.

Weaning is a stressful time in a piglets' life. During this time, they are exposed to three major stressors (nutritional, environmental, and social). Combined, these can activate the immune response in the piglet, which in turn can have negative impacts on animal performance immediately post-weaning (low or no feed intake, reduced or negative growth rates).

In order to help combat the stress/immune response at the time of weaning, piglets are often fed a diet containing a low level of antibiotics (Ab). This helps the piglets cope

with any potential secondary infections which may be contracted while their immune system is vulnerable. In April 2015, Health Canada announced that the use of in-feed antibiotics will be phased out over the next three years. Finding alternate strategies to help piglets cope at the time of weaning is important, and nutritional modulation for this purpose is a growing area of interest.

Flaxseed is a rich source of omega-3 (n-3) fatty acids (FA), which are known to have many different health benefits, including anti-inflammatory properties. Omega-3's can be easily transferred to piglets via the milk when sows are fed diets containing a good quality source (Eastwood, 2014). Additionally, changing the FA profile of sow diets by adding n-3's can impact the inflammatory responses of their offspring (Eastwood et al., 2012). It is possible that by improving the health of piglets prior to weaning, through nutritional modulation of the sow, we can remove antibiotics in the nursery diets.



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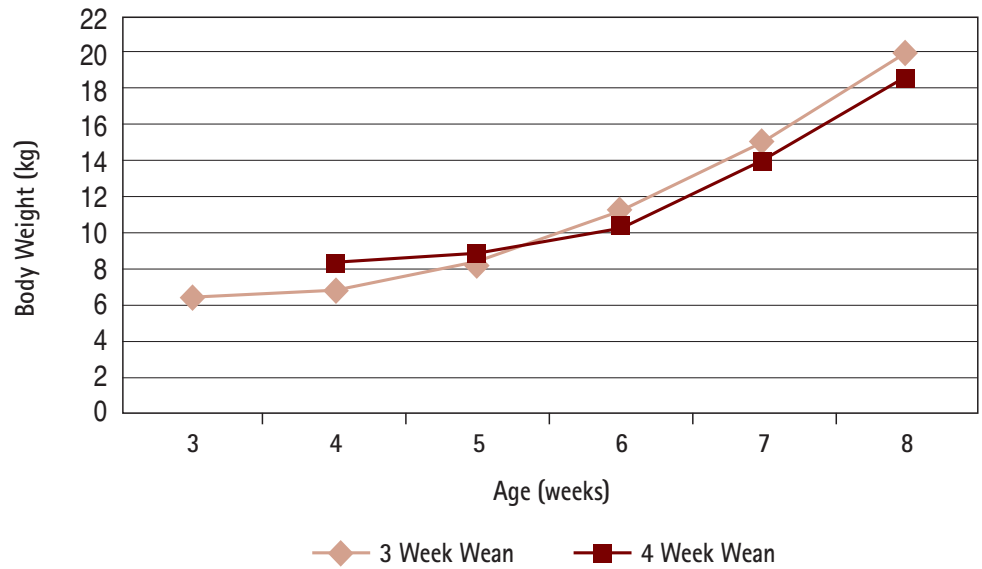
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Materials and Methods

A total of 103 sows were used for this trial, 52 weaned at four weeks of age and 51 at three weeks of age. Within each weaning group, sows were fed one of two diets (control or n-3) throughout lactation. At the time of weaning, 10 piglets from each litter were selected, moved to the nursery and housed in two groups of five piglets each (two nursery pens per litter). One half of the litter (one pen) was fed a starter diet containing antibiotics (LS20), and the other half received the same diet without antibiotics. After one week, all piglets were switched to a common phase two diet for the remainder of the study. Prior to weaning, nurseries skipped a single wash cycle, to ensure that each weaning cohort was immunologically challenged. Regardless of weaning age, all piglets completed the trial at 56 days of age.

Figure 1: Average body weight of piglets weaned at 3 or 4 weeks of age during the nursery phase of the experiment



Piglet performance was determined in both the farrowing and nursery rooms. Sow milk was collected during mid-lactation to determine the FA profile consumed by piglets. Piglet health was monitored by collecting blood for complete

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Table 1: Reproductive performance of sows fed diets with or without n-3 FA's and weaned at 3 or 4 weeks of age

	Sow Lactation Diets		Statistics	
	Control (- n-3)	Omega (+ n-3)	SEM	P Value
3 Week Wean¹				
Parity	2.50	2.20	0.394	0.560
Lactation length, d	19.35	19.36	0.368	0.979
ADFI, kg/d	6.01	5.81	0.262	0.589
Born alive, n	14.81	14.72	0.662	0.925
Born total, n	15.62	15.92	0.666	0.746
Weaned, n	11.15	11.24	0.310	0.844
Total litter gain, kg	54.17	52.89	2.255	0.685
Piglet ADG, kg/d	0.25	0.24	0.007	0.468
4 Week Wean¹				
Parity	2.11	2.12	0.279	0.982
Lactation length, d	26.22	26.56	0.393	0.538
ADFI, kg/d	7.55	7.66	0.249	0.747
Born alive, n	14.70	14.64	0.576	0.937
Born total, n	15.96	16.12	0.670	0.867
Weaned, n	11.56	11.88	0.267	0.386
Total litter gain, kg	77.21	77.94	2.151	0.795
Piglet ADG, kg/d	0.26	0.25	0.006	0.402

¹Litters were standardized to ~12 pigs each within the first 24 hr post-farrowing


blood cell count (CBC) and chemistry blood panels two days post-weaning. A total of 1,181 piglets completed the lactation portion of the trial. Of those, 1,021 piglets were used for the nursery portion.

Results and Discussion

There were no dietary effects (\pm n-3 FA's) on sow feed intake, numbers of piglets born, piglet growth or on the number of piglets weaned per litter ($P > 0.10$). As expected, sows fed a diet with added n-3 FA's had significantly more n-3's in their milk relative to control sows (5:1 vs. 8:1 n-6:n-3 ratio).

In the nursery, there was no impact of sow diet on ADG, ADFI, G:F or final body weight for piglets weaned at three or four weeks of age ($P > 0.10$). For piglets weaned at three weeks of age, ADFI was 20 g/d higher during the fourth week in the nursery for piglets who received no antibiotics in their phase 1 diet ($P = 0.028$); however, ADG and G:F were not affected ($P > 0.10$). Feed intake was not affected during any of the other weeks on trial for

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Symposium celebrates 38 years of presenting timely and relevant information and advances in pork production. We've included a stronger stockperson's component on Day 1 bringing together expert speakers who "get back to the basics" of raising pigs. Day 2 focuses on swine health and biosecurity, economics and the state of the pork industry plus dealing with aging production facilities.

Day 1 – November 17, 2015

Dr. Jennifer Brown, Prairie Swine Centre discusses novel management strategies for the farrowing sow and her piglets.

Dr. Shawn Davidson, Davidson Swine Health, shares the challenges and options available to producers with raised without antibiotics (RWA) pork operations.

Dr. Denise Beaulieu, Prairie Swine Centre addresses dealing with mycotoxins in the grow finish barn (where to feed and where not to).

Dr. Yolande Seddon, Prairie Swine Centre has practical information on enrichment and exercising swine.

Dr. Madonna Gemus Benjamin, Michigan State University offers perspectives on the stockperson.

Jennifer Woods, J. Woods Livestock Services examines a difficult component of animal production in the why, when and how of Euthanasia.

Dave Van Walleghem, Vetoquinol Canada gets back to basics with cleaning of barn/facilities and disinfection for enhancing biosecurity.

Concurrent Sessions - Afternoon

1. **Jean Poulin – PIC North America**
Batch Farrowing – Making it Work
2. **Dr. Denise Beaulieu, Prairie Swine Centre**
Nutrition and Nursery Pigs – Are My Pigs Eating?

Day 2 – November 18, 2015

Dr. Terry Fonstad, University of Saskatchewan and **Hubert Landry, PAMI**, update delegates on the status of the Transportation Biosecurity Project.

Murray Elliott, FGC Limited reviews methods for assessing the state of your production facilities and whether to renovate or rebuild.

Eric Spell, President, AgCareers.com focusses on human resources challenges and what it takes to build a great farm team!

Steve Meyer, Ph.D., Express Markets Inc. Analytics returns this year with economics and challenges for the North American pork industry.

Gregory Simpson, Hypor, A Hendrix Genetics Company determines the value of main production traits (mortalities, feed efficiency, etc.) and total system profitability.

Dr. Candido Pomar, Agriculture and Agri Food Canada discusses adapting new technology in your swine operation.

Mark Ferguson, Sask Pork helps assess our industry's competitive advantages.

Ben Woolley, Sunterra Farms will offer a practical approach to hog barn construction.

Sask Pork's Annual General Meeting will be held at the conclusion of Symposium on November 18th.

The Saskatoon Inn and Conference Centre 2002 Airport Drive, Saskatoon, SK is holding a block of rooms until October 16th. For reservations call 306-244-1440 or toll free 1-800-667-8789.

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these piglets. For piglets weaned at four weeks of age, ADG tended to be greater in piglets fed diets with antibiotics for week one of the trial ($P = 0.053$), which also led to improved G:F ratios during that week ($P = 0.042$). Growth and G:F were unaffected by the inclusion of antibiotics from weeks two to 4 in the nursery. Feed intake tended to be higher in antibiotic-fed piglets during week 3 ($P = 0.079$), and was significantly higher in week 4 ($P = 0.025$) relative to piglets who received no Ab's in the first week post-weaning (930 g/d vs. 900 g/d); however this did not impact G:F. We observed no dietary effects (sow diet or nursery diet) on the final body weight of piglets at nursery exit; however, regardless of dietary treatment, piglets weaned at three weeks of age were ~1.5 kg heavier than those weaned at four weeks ($P < 0.05$).

No effects were found in sows on the phase one diet on any of the blood measures taken when piglets were weaned at three weeks of age. When piglets were weaned at four weeks of age, piglets weaned from sows fed diets containing n-3 FA's had lower white blood cell counts relative to those weaned from sows fed the control diet ($P < 0.05$). White cell counts were unaffected by phase one diet, and neither

sow nor phase one diet affected any of the other blood parameters measured.

Regardless of diet, piglets weaned at three weeks of age had lower creatine kinase (CK), aspartate aminotransferase (AST) and white blood cell (WBC) counts relative to those weaned at four weeks. CK and AST are enzymes involved in muscle catabolism, which may be a factor in why pigs weaned at three weeks of age were heavier at the end of the trial.

Conclusion

Results from this trial have clearly shown that in a high health situation, the use of in-feed antibiotics post-weaning had no benefit, regardless of weaning age. This experiment has also shown that, at nursery exit (eight weeks old), piglets weaned at three weeks of age had heavier body weights than those weaned at four weeks of age, which in part may be due to the fact that piglets weaned at three weeks had lower WBC, CK and AST counts relative to those weaned at four weeks. ■

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