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New Research Supports Fatty Acid Supplementation in the High-Producing Sow

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Through changes in genetics and management, the swine industry has made stunning improvements in the efficiency of pig production in the last decade, particularly in reproduction and growth rate. Litter size in the U.S. has increased from 9.6 pigs weaned per litter in 2010 to 10.7 pigs in 2019 – USDA National Agricultural Statistics Service 3/28/19. As a result of the increase in reproduction efficiency, the nutritional needs of sows are being re-assessed.

Supplementation of lipids in the lactation diet to meet energy and nutrient demands has been a common practice in many successful sow operations. Essential fatty acids (EFAs), such as linoleic, α-linolenic, arachidonic acid and eicosapentaenoic acid are known for their numerous health benefits in animals, as well as, humans. EFAs cannot be produced in vivo due to the absence of certain enzymes, therefore, dietary supplementation is the only way that the benefits of these nutrients can be derived.

Reproductive performance is one of the leading factors impacting profitability. However, the summer months can have a negative impact on a sow's performance. Sows are under metabolic and oxidative stress during the summer which leads to reduced feed intake, resulting in the depletion of body reserves that are now used to aid in milk production. The mobilization of these nutrient reserves has a negative effect on the subsequent reproductive performance of the sows.

Studies have found that the addition of EFAs in a sow's diet during the summer can help to increase her reproductive efficiency. This enables producers to avoid seasonal lows in production and increase their margins by taking advantage of strong market prices for pigs marketed in the early summer months.

Rosero and colleagues initiated a series of innovative studies on EFA needs of sows in 2015. The initial balance studies found that lactation diets without supplemental EFA resulted in a pronounced negative balance (intake minus milk output) of linoleic and α-linolenic acid; which compromised sow fertility by reducing farrowing rate, increasing culling rates, and lower numbers of pigs born in the subsequent litter. The net effect of supplemental EFA during lactation created a positive EFA balance and increased the subsequent reproduction of sows. Based on the minimum amount of linoleic acid secreted in milk, the paper recommends that a diet with at least 100 g/d of linoleic acid will ensure adequate consumption to prevent negative balance during lactation. In addition, adequate linoleic acid intake improved subsequent farrowing rate.

In 2016, Rosero et al., in collaboration with an industry partner, conducted a larger study in commercial production (n=480) to evaluate reproductive responses to linoleic and α-linolenic fatty acid supplementation in high producing sows. The research reported a near maximum response in subsequent reproductive performance was achieved when sows consumed a minimum of 125 g/d of linoleic acid and 10 g/d of α-linolenic acid during lactation. The effect of inadequate intake may be even more pronounced in the aging sows due to a continued depletion of essential fatty acid reserves over successive lactations.

Another control study with similar number of sows was done in Australia (Dr. van Wettere, 2016). The study evaluated the subsequent reproductive response to EFA supplementation in summer and winter. The supplementation of lactation diets with linoleic and α-linolenic acid was provided at slightly higher levels than Rosero (0.27% α-linolenic and 1.8%-2.0% linoleic acid). The study led to findings that supplementation increased pigs born alive (>100 more pigs per 100 weaned sows) in subsequent farrowings.

Becker et al. presented another controlled study evaluating a proprietary balanced source of essential fatty acids at the Midwest Animal Science meetings in March, 2019. The study of 100 sows per treatment consisted of a control diet supplemented with a vegetable oil source of lipid and Feed Energy's BuildR2™ product added at 3.2% of the diet during lactation (Fig. 1). Data was collected during lactation and reproductive data was captured in the subsequent farrowing. BuildR2 sows had 9% higher feed intake and +0.75 total pigs born in the subsequent farrowing than sows fed the control diet.

The December 13th announcement on the Phase One U.S.-China trade agreement is very welcome news. Finally, U.S. hog producers should be able to take advantage of the increased demand for pork in China due to the African swine fever. The China agreement, combined with the ratification of the U.S.-Mexico-Canada Agreement (USMCA), had an immediate positive impact on hog prices. On the day of the announcement lean hog futures contracts for 2020 went up to over $68 per hundredweight with June through August trading at over $87 per hundredweight.

U.S. pork producers should capitalize on these improved export opportunities. Reproductive performance in sows is one of the leading factors impacting profitability for pork producers. The findings from the studies sited above support the importance of EFAs in a sow's diet to help increase her reproductive efficiency. With the optimistic market prices forecasted for 2020 the reproductive benefits of EFAs in your sow's diet should deliver excellent returns on your investment.

For over thirty-three years, **Feed Energy** has been innovating in the lipid and animal nutrition business. With plants in Des Moines and Sioux City we are literally located in the middle of one of earth's major food baskets. Every day throughout the Midwest hundreds of thousands of turkeys, laying hens and pigs are fed our lipid based nutrition solutions to help improve performance and profitability.

Sow Information	Control	R2	Change, %
N, Weight, Parity	100, 585, 2.7	100, 588, 2.7	
ADFI, lbs*	13.00	14.13	**+8.7%**
Sow Caliper, in/out	2.36/1.93	2.36/2.07	+7.8%
Pigs weaned/sow	11.28	11.44	+1.4%
Subsequent farrowing			
Total Born per Litter, n	15.51	16.26	**+4.8%**

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