U.S. Pork Center of Excellence
Swine Research & Education Experience (SREE)
FINAL REPORT

Project Title: Effect of adding coconut oil to sow diets during late gestation on piglet survival

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Keywords: fat, nutrition, piglet, sow, survival

Scientific Abstract: The objective of the study was to determine if supplementing coconut oil prefarrow enhances piglet survival. Research was completed at a 3,600 sow herd in North Carolina belonging to Purvis Farms. Sows (n=302) were allocated to one of three feeding levels of coconut oil starting at day 109 of gestation (control, .24 lbs. per day & .48 lbs. per day). Coconut oil was top dressed daily when sows were fed their normal ration. At birth, each piglet received an ear notch to represent the level of coconut oil fed to its mother during late gestation and litter sizes were recorded. At weaning, the number of piglets from each treatment were counted. Data was analyzed in SAS using Chi-Square analysis. Results showed as prefarrow coconut oil feeding level increased, piglet survival (number weaned ÷ total number born) increased (P=0.05). Sows fed 0.48 pounds of coconut oil per day had greater (P=0.05) piglet survival than control fed sows (80.7 vs. 77.8%). Results suggest feeding coconut oil prefarrow improves subsequent piglet survival.

Introduction: Preweaning mortality continues to be an issue for farmers throughout the world. In fact, the National Pork Board recognizes the issue of mortality throughout the production cycle and has recently made pig survival a top priority. Hence this project addresses a National Pork Board priority.

Knauer and Hostetler (2013) reported 77% of piglets survive from birth to weaning in the United States with most deaths occurring by day 3 of lactation (Putz et al. 2015). This is not only an animal well-being concern but a major economic loss for pig farmers. Hence cost effective strategies are needed to enhance piglet survival.

Pettigrew (1981) reviewed the literature of feeding fat in late gestation to enhance piglet survival. Piglets from sows supplemented with fat have been shown to have greater fat stores at birth (Pettigrew, 1981) and are more thermostable when exposed to cold stress (Seerley et al., 1974) when compared to controls. Pettigrew (1981) concluded that "supplemental dietary fat during late gestation and/or lactation increases milk production and the fat concentration of colostrum and milk. This increase in colostral and milk fat increases the survival rate among the piglets if the herd survival rate is relatively low (less than 80%) and the sow consumes at least 1,000 g of fat before farrowing". Hence with many sow herds today experiencing less than 80% piglet survival (number weaned ÷ total number born), revisiting fat feeding to sows makes sense.

Interest has been seen around feeding medium chain fatty acids in late gestation to enhance sow performance (Rosebrough et al., 1981; Newcomb et al., 1991; Azain, 1993; Jean and Chiang, 1999). Yet feeding coconut oil, which is high in medium chain fatty acids, may be a more cost effective strategy to deliver medium chain fatty acids to the sow (Jean and Chiang, 1999). Jean and Chiang (1999) reported sows fed coconut oil in late gestation had improved piglet survival when compared to control sows, especially in pigs weighing less than 1,100 grams (80 vs. 47.6%). Yet the study by Jean and Chiang (1999) only contained 51 total sows. Hence studies with a larger number of observational units are needed to validate the findings of Jean and Chiang (1999).

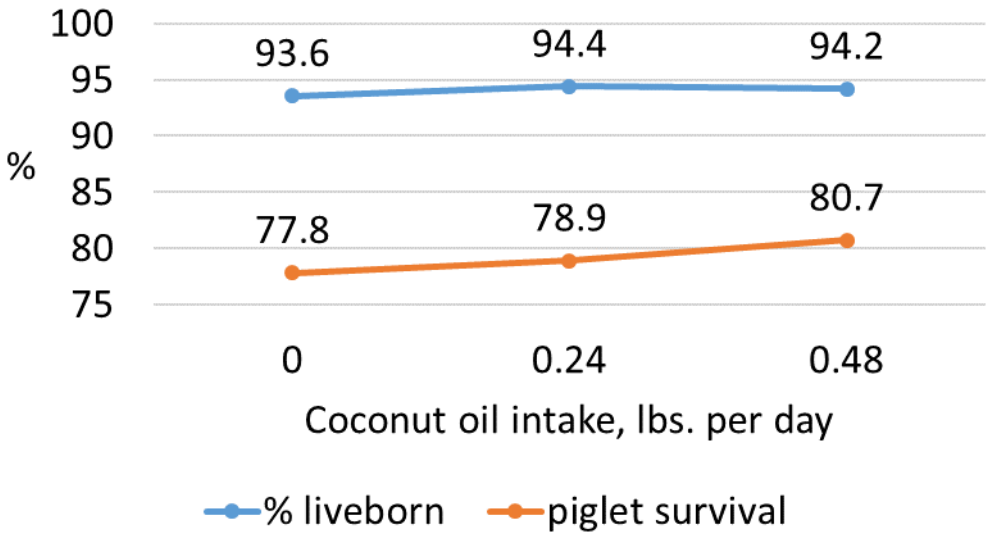
Objectives: The overall objective of the project is to identify strategies to enhance piglet survival. Specifically, does feeding coconut oil in late gestation enhance piglet survival?

Materials & Methods: Research was completed at a 3,600 sow herd in North Carolina belonging to Purvis Farms. Sows (n=302) were allocated to one of three feeding levels of coconut oil starting at day 109 of gestation (control, .24 lbs.

per day & .48 lbs. per day). Hence assuming a 115 day gestation length, total coconut oil consumed was on average 1.44 and 2.88 lbs. for each the .24 and .48 lbs. per day levels. Coconut oil was top dressed daily when sows were fed their normal ration. In gestation, sows were marked on the back with red, green and blue markings to represent the three dietary treatments. In lactation, flagging tape was used to further identify the treatment for each sow in addition to the paint markings. This was done to help farm staff cross-foster within treatment. At birth, each piglet received an ear notch to represent the level of coconut oil fed to its mother during late gestation. At weaning, the number of piglets from each treatment were counted.

Results: Results are shown in Figure 1. As coconut oil feeding level increased, piglet survival (number weaned ÷ total number born) increased (P=0.05). Sows fed 0.48 pounds of coconut oil per day had greater (P=0.05) piglet survival than control fed sows (80.7 vs. 77.8%).

Figure 1. Impact of coconut oil feeding level from day 109 of gestation until farrowing on percent liveborn piglets (number born alive ÷ total number born) and piglet survival (number weaned ÷ total number born).



Discussion: Explain your research results and include a summary of the results that is of immediate or future benefit to pork producers.

Assuming 14 total born, $25 weaned pig value and $1 per pound for coconut oil, the estimated return-on-investment for the high level of coconut oil is approximately 3.5:1 relative to the control. While these results are very promising, the researchers say they believe a larger study is needed to validate the results before farms implement feeding coconut oil, or another fat source, in late gestation to enhance piglet survival.

Results from this project were used to obtain a larger grant ($40,000) from the United Soybean Board. That study will evaluate the impact of both soybean oil and coconut oil on piglet survival. The project is scheduled to start this spring. Hence results from this pilot study (300 sows) were able to leverage funding for a much larger study (1,600 sows).

Student Statement:

I would think to sincerely thank the National Pork Board for this opportunity. Without question, this experience helped me obtain a graduate assistantship with the Dr. Michael Ellis lab at the University of Illinois where I am working on my M.S. in applied swine science. This project furthered my knowledge and comfort in collecting real world data within commercial swine farrowing facilities. Because of the experience, I now better understand commercial pig flows, I learned the importance of good communication skills with farm workers when conducting

commercial level research and I was able to see firsthand how complex preweaning survival is. Dr. Knauer watched me persevere through this project as I was on farm 28 days within a 30 day period.

While COVID helped limit the opportunities to present my research, I did present my results to the Ellis lab at the university of Illinois. Also, my research was featured in the December research issue of the National Hog Farmer. Therefore our results were distributed to thousands of producers throughout the United States.

Any publications, presentations or abstracts of the project results, need to recognize proper funding credit. A statement such as this would be sufficient: "Funding, wholly or in part, was provided by the National Pork Checkoff and the U.S. Pork Center of Excellence."

Thank you for your attention to these instructions. Please contact Chelsey Van Genderen (phone-515/223-2641 or E-mail: cvangenderen@usporkcenter.org if you have any questions.

FINAL REPORT DUE TO CHELSEY VAN GENDEREN BY DECEMBER 31, 2020