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The Peripartum Sow Marathon–Can a Sow Transition Feed Help?

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Short Communication

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ABSTRACT

The peripartum sow undergoes a marathon of physiological changes from late pregnancy through parturition in preparation for lactation and is a period of high stress and inflammation. A transition feed for peripartum sows provided from late pregnancy through early lactation can provide more precise targeted nutrition and ingredients known to attenuate the oxidative and inflammatory stress associated with parturition. Spray-Dried Plasma (SDP) in feed for pregnant mice attenuated uterine inflammation and in lactating sow feed improved feed intake and litter weight at weaning. A study using 452 sows at a commercial farm was done to determine the effects of 0, 0.5% or 2.5% SDP in transition feed on sow productivity and serology parameters when fed around parturition and to determine the long-term effects on sow productivity to the next parturition. Transition feed was offered at 3 kg/day from day of entry in maternity through day of parturition, then at 4.5 kg/day from day 1 to 5 of lactation. Thereafter sows were fed a common lactation diet to weaning and a common gestation diet from weaning to the next parturition. During the initial parturition sows fed transition diets with 0.5% or 2.5% SDP had a lower percentage and number of stillborn pigs per litter. Serum glutathione peroxidase activity in sows collected 2 days before and 4 days after parturition increased linearly with increased SDP in transition feed. Total and live born pigs per litter in the subsequent parturition of parity 1 and 2 sows increased linearly with increased SDP in transition feed. In conclusion providing highly prolific sows with transition feed containing SDP has merit for reducing stillborn pigs, possibly due to reduced oxidative stress around parturition, and can have a long-term benefit for increasing subsequent litter size of parity 1 and 2 sows.

ABOUT THE STUDY

The peripartum sow undergoes a marathon of physiological, endocrine, and metabolic changes that are highly stressful and inflammatory as she transitions from pregnancy through parturition and begins lactation. Over the past decade litter size of the modern sow has consistently increased creating higher nutrient needs for maintenance, uterine litter growth, mammary development, parturition, and postpartum recovery. In general, parturition time increases with higher litter size thus draining more energy from the sow and prolonging inflammation which can lead to higher incidence of metritis, mastitis and agalactia during the postpartum recovery period. Under sub-optimal health and environmental conditions peripartum stress can be more challenging leading to unwanted consequences of higher sow and piglet morbidity and mortality. During the highly stressful peripartum period it is crucial that sows receive special care, health management, good quality water and appropriate nutrition to support their recovery, welfare and longer-term productivity.

Most sow farms use only a single gestation feed and a single lactation feed to accommodate sow movement and management of feed delivery and storage capacity. Daily feed allowance for gestating sows is usually limited to prevent sows from becoming over-conditioned because obese sows have more parturition difficulties and consume less lactation feed which reduces milk production and piglet growth. Bump feeding in late gestation is often used to provide more nutrients to the sow but in commercial farms the benefits can be inconsistent [1]. A transition feed for peripartum sows provided from late pregnancy through early lactation could allow for more precise targeted nutrition versus bump feeding. The transition feed should contain ingredients known to help attenuate the oxidative and inflammatory stress associated with parturition and prepare the sow for ad libitum consumption of lactation feed to support milk production, litter growth and survival, and subsequent sow reproductive performance to the next parturition.

Spray-Dried Plasma (SDP) is a common ingredient in postweaning pig diets that improves performance and survival by modulation of the immune system to reduce overall systemic inflammation [2]. Lactating sows provided feed supplemented with SDP had higher feed intake and heavier litter weights at weaning with a reduced wean to estrus interval [3]. A study with pregnant mice under an activated immune response initiated by lipopolysaccharide treatment demonstrated that feed supplemented with SDP attenuated inflammation and lethargic behavior during late gestation [4].

Objectives

A study was conducted at a commercial sow farm in Spain to determine if three different transition diets containing either 0%, 0.5% or 2.5% SDP affected sow productivity and peripartum serology parameters while the transition feed was provided and to determine the long-term effects of feeding the transition diets on sow postweaning performance to the next parturition [5]. There were 452 sows used in the study with 426 sows completing their next parturition. Transition diets were provided from entry in maternity (d 109 of gestation) through day 5 of lactation (average 11.1 days). Sows were provided once daily 3.0 kg of transition feed from entry to the day of parturition, then 4.5 kg of transition feed from day 1 to 5 of lactation. Thereafter sows were fed a common lactation diet to weaning and a common gestation diet to the next litter using the farm standard feeding practices.

Initial parturition results

During the initial parturition there was a reduced (P<0.10) number (1.84, 1.40, 1.34) and percentage (11.8, 8.8, 9.3) of stillborn pigs for sows fed respective transition diets with 0%, 0.5% or 2.5% SDP along with a linear increase (P<0.01) in sow serum glutathione peroxidase activity (U/L) with increasing SDP in transition feed at 2 days before expected parturition (7382, 8188, 9055) and 4 days after parturition (7599, 8340, 8806). The increased serum glutathione peroxidase activity of sows fed transition diets with SDP indicates a better oxidation status which may result in reduced overall inflammation and possibly delivery time as well. More research is needed to refute or verify these possible relationships since delivery time was not recorded in this study.

Subsequent parturition results

The postweaning sow productivity indicators, such as wean-to-estrus interval or percentage of sows that completed their subsequent parturition (>94%) were not significantly different among the transition diets fed during their previous peripartum period. However, there was a parity by diet interaction (P=0.03) for total born pigs in the subsequent litter with sows previously fed transition diets with SDP having a higher number of total and live born pigs per litter. Therefore, litter size data for young sows (parity 1 and 2 sows; 65% of total sows) was analyzed separately from that of mature sows (parity 3 to 8; 35% of total sows). For young sows provided transition feed in their previous parturition there was a linear (P=0.02) increase in total born pigs per litter (14.1, 15.1, 15.5) and a linear (P=0.09) increase in live born pigs per litter (13.0, 13.6, 14.0) as SDP percentage in transition feed increased. There were no significant differences in litter size for mature sows previously fed the transition diets.

CONCLUSION

The impact of SDP in transition feed provided during the previous parturition on subsequent litter size of young parity sows may potentially be associated with less oxidative stress during the early postpartum period which could lead to enhanced uterine recovery and ovarian follicular recruitment and development. These potential relationships should be further studied.

In conclusion providing highly prolific sows with a specialized transition feed containing SDP has merit for reducing stillborn pigs possibly due to reduced oxidative stress around parturition and may have a long-term benefit for increasing subsequent litter size of parity 1 and 2 sows.

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