

Title: Enhancing Sow Welfare with High Fiber Diets and Frequent Feeding -
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Abstract: A study was conducted to determine the effects of feeding a corn-soybean meal (control) diet vs. a corn-soybean meal-soybean hulls (high fiber) diet and feeding frequency (once vs. twice daily) on the welfare of gestating sows. Two hundred thirty-nine mixed parity sows were assigned to a 2 x 2 factorial arrangement of treatments. Daily feed allowances were calculated to provide equal ME intake between dietary treatments. Sows fed once daily received their entire meal at 0730 h while sows fed twice daily received one half their allotment of feed at 0730 h and the other half at 1430 h. Behavior of 67 focal sows was observed on the day of weaning, day 40, and day 80 of gestation. Percentage of time standing, lying, sitting, feeding, inactive, and performing stereotypic behaviors was determined. Saliva samples were collected to determine cortisol concentration. Sow weight and backfat depth were determined on day 0, day 40 and day 80 of gestation, within 24 h of farrowing and at weaning. Litter size and piglet weight at birth and weaning were also recorded.

Sows fed the high fiber diet spent more time standing and less time lying ($P < .05$) than sows fed the control diet over a 24 h observation period. Feeding frequency had no effect on sow behavior measured over a 24 h period. Around mealtimes, sows fed the high fiber diet spent more time feeding ($P < .05$) than sows fed the control diet. Feeding the high fiber diet had no effect on stereotypic behavior measured over 24 h or around mealtimes. Neither diet nor feeding frequency affected salivary cortisol concentration. Sows fed the high fiber diet were lighter and had less backfat ($P < .05$) during gestation than sows fed the control diet. Similarly, during gestation, sows fed once daily were lighter and had less backfat ($P < .05$) than sows fed twice daily. Sows fed the high fiber diet had fewer pigs born ($P < .05$) compared to sows fed the control diet; however, litter size at weaning was not different between diets. Feeding frequency had no effect on litter size or weight gain. Feeding a high fiber diet utilizing soybean hulls did not enhance the welfare of sows by reducing stereotypic behaviors, influencing salivary cortisol, or improving reproductive performance. Soybean hulls may not be a useful source of fiber in gestating sow diets to improve litter size.

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