

Effects of Dietary Supplementation with Fermented Feed Mulberry(*Morus alba L.*) on Reproductive Performance and Fecal Micro Biota of Pregnant Sows

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Abstract : Supplying dietary fiber during gestation is known to improve the welfare of feed-restricted sows. However, whether high fiber supplementation during pregnancy can improve the performance of sows and their offspring depends on the type, amount, source, etc., in which the solubility plays a key important role. Insoluble fibers have been shown to increase feed intake of sows in lactation, meet the needs of sows for milk production, reduce sow's weight and backfat loss, and thus improve the performance of sows and their offspring. In this study, we investigated the effect of the addition of fermented feed mulberry (FFM), rich in insoluble fiber, during the whole gestation on the performance of sows and their offspring and explored possible mechanisms by determining serum hormones and fecal microbiota. The FFM-diet contained 25.5% FFM (on dry matter basis) and was compared with the control-diet (CON, corn, and soybean meal diet). The insoluble fiber content of the FFM and CON diet are respectively 29.3% and 19.1%. both groups were allocated 20 multiparous sows, and they are fed different feed allowance to make sure all the sows get the same digestible energy for each day. After farrowing, all sows were fed the same lactation diet ad libitum. The serum estradiol, progesterone concentration, blood glucose, and insulin levels at gestation day 0, 20, and 60 were tested. And also, the composition and differences fecal microbiota at day 60 of gestation were analyzed. Fecal consistency was determined with Bristol stool scale method, those with a score below 3 were counted as constipation. The results showed that there was no impact of the FFM treatment on sows' backfat, bodyweight changes, blood glucose, serum estradiol, and progesterone concentration, litter size, and performance of the offspring ($p > 0.05$), Except significant decrease in the concentration of insulin in sows' serum at 60 days of gestation were observed in the FFM group compare to the CON group ($P < 0.01$). FFM diet also significantly increased feed intake on the first, third, and 21st days of sow lactation. ($p < 0.01$); The α - and β - diversity and abundance of the microbiota were significant increased ($p < 0.01$) compared with the CON group, The abundance of Firmicutes and Bacteroidetes were significantly increased, meanwhile the abundances of Spirochetes, Proteobacteria, and Euryarchaeota, were significantly reduced in the feces of the FFM group. We also analyzed the fecal microbiota of constipated sows vs non-constipated sows and found that the diversity and abundance did also differ between these two groups. FFM and CON group (< 0.01). The relationship between sow's constipation and microbiota merits further investigation.

Keywords : fermented feed mulberry, reproductive performance, fecal flora, sow

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