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IJBLS 2025

International Journal of BioLife Sciences

Abstract

Effects of Maternal Protein Level during Early Gestation on Reproductive Performance in Multiparous Sows

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Abstract

Background and Aim: Early pregnancy is a critical period for embryo implantation and rapid placental development. Dietary protein plays a key role in sow reproductive efficiency. This study aimed to evaluate the effects of different dietary protein levels during early pregnancy on reproductive performance, oxidative stress, and placental nutrient transport in multiparous sows.

Materials and Methods: A total of 45 multiparous Landrace × Large White sows were randomly assigned to three groups. From day 0 to day 30 of gestation, the sows were fed 2.5kg/d diets containing 12% (low protein, LP), 13.5% (medium protein, MP), or 15% (high protein, HP) crude protein. After that, all sows were fed the same gestation diet. Blood samples were collected from sows at day 30 of gestation (GD 30), and placentas were collected at farrowing. Total litter size, number of live piglets, and number of mummified fetuses were recorded.

Results: The results showed no significant effect on total litter size, number of live piglets, number of mummified fetuses or survival rate. And there has no effect on serum hormone level. However, sows in HP group exhibited certain hepatic stress and increased oxidative stress on GD 30. Serum amino acid profiling revealed higher levels of valine, isoleucine, leucine, tryptophan, and phenylalanine in HP group. Moreover, maternal protein intake during early pregnancy did not affect placental nutrient transport function.

Conclusion: In summary, maternal protein level of 12%-15% in early gestation didn't affect the reproductive performance in multiparous sows. However, higher protein intake during early pregnancy may disturb maternal metabolism and redox balance on GD 30, whereas lower protein levels observed better maternal metabolic health and oxidative homeostasis.

Keywords: *maternal protein, early pregnancy, reproductive performance, oxidative stress, nutrient transport, sow*

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