

Effects of Dietary Arginine Supplementation During Whole Pregnancy on The Reproductive Performance and Plasma Biochemical Parameters of Rabbit Does

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ABSTRACT

The effect of dietary arginine supplementation during whole pregnancy (from d 0 to 31 of gestation) on the reproductive performance and plasma biochemical parameters of rabbit does was studied. A total of 223 good body condition Hyla parent rabbit does with body weights of 4268 ± 206 g were assigned randomly into three groups based on body weight, representing the control, 0.4% Arg treatment, and 0.8% Arg treatment. The control rabbits were fed a basal diet, the 0.4% Arg rabbits were fed a basal diet supplemented with 0.4% L-arginine, and the 0.8% Arg rabbits were fed a basal diet supplemented with 0.8% L-arginine. Reproductive performance, feed intake and body weight changes in the rabbits, as well as plasma amino acids, urea, NO, T-NOS concentration on d 0, 10, 20 of gestation were measured. The results showed that dietary supplementation with L-arginine during the whole pregnancy markedly enhanced the reproductive performance of rabbit does. Compared with the control group, 0.4% Arg supplementation increased live-born kits by 1.28 per litter ($P>0.05$), litter birth weight of all kits born alive by 78.4 g per litter ($P>0.05$), litter birth weight of all kits born by 39.17 g per litter ($P>0.05$); For rabbits in the 0.8% Arg supplementation group, kits born alive increased by 2.21 per litter compared with the control group ($P<0.01$), litter birth weight of all kits born alive increased by 142.86 g per litter ($P<0.01$), litter birth weight of all kits born increased by 111.33 g per litter ($P<0.01$), and there was a significant improvement compared with the control group. There were no significant differences for the other parameters, such as total number of kits born, number of kits born dead, litter birth weight of all kits born dead, and average birth weight of kits born alive, between treatment groups ($P>0.05$). Moreover, compared with the control group, 0.8% Arg supplementation sharply increased the average daily feed intake of the rabbits by 20.89 g per day ($P>0.05$). On d 0 of gestation, the plasma indicators did not differ among the three treatment groups. On d 10 of gestation, 0.4% Arg supplementation markedly increased plasma arginine, glycine, hydroxyproline, NO, T-NOS concentrations ($P<0.05$), and 0.8% Arg supplementation markedly increased plasma arginine, isoleucine, methionine, threonine, glycine, ornithine, hydroxyproline, urea, NO, T-NOS concentrations ($P<0.05$), but both arginine supplementation groups showed a marked decrease in plasma phenylalanine concentration ($P<0.05$). On d 20 of gestation, 0.4% Arg supplementation markedly decreased plasma alanine concentration ($P = 0.004$), and 0.8% Arg supplementation markedly increased plasma arginine and ornithine concentrations ($P<0.05$), while other biochemical indexes did not differ ($P>0.05$). Therefore, dietary supplementation with arginine during whole pregnancy could improve the number of kits born alive, live litter birth weight and total litter birth weight, as well as the metabolism of amino acids in the blood and an increase in the synthesis of NO and the expression of T-NOS.

Key Words: Arginine, Rabbit Does, Number of Kits Born Alive, NO