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Effect of diet energy on the relationship of follicular fluid estrogen and progesterone concentration in postpartum crossbred Holstein x Gir cows

G.B. Santos¹, B.C. Carvalho², F.Z. Brandão¹, F.C. Varago³, M.W. Vargas³, F.S. Machado², M.M. Campos², L.S.A. Camargo², P.I. Otto¹

¹Universidade Federal Fluminense; ²Embrapa Gado de Leite; ³Universidade José do Rosário Vellano; ⁴Universidade Federal do Paraná.

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The reduction in reproductive performance in postpartum dairy cows is associated with negative energy balance, as well as changes in the composition of follicular fluid. This study aimed to evaluate the composition of follicular fluid in the postpartum of crossbred Girolando dairy cows fed high or low energy diets. The experiment was conducted at Embrapa Dairy Cattle Experimental Station, located in Coronel Pacheco, MG. Twenty-seven primiparous Girolando cows with 442.34 ± 2.45 kg of body weight and 3.04 ± 0.01 of body condition score (1-5 scale) were evaluated. Eight 3/4 Holstein x Gir (HG) and seven 7/8 HG were fed a high energy diet (1.93 Mcal/kg of dry matter (DM) of net energy for lactation and 0.168 kg of crude protein/kg of DM) and seven 3/4 HG and six 7/8 HG were fed a low energy diet (1.69 Mcal/kg of dry matter (DM) of net energy for lactation and 0.170 kg of crude protein/kg of DM). The diets were based on corn silage, grounded corn and soybean meal. The fluid of the dominant follicle of each cow was collected at 19, 33, 47 and 61 days postpartum. The follicular wave was synchronized by the ablation of follicles greater than 6 mm present in the ovaries. On the fifth day after the synchronization, the follicle diameter was measured and the aspiration of the dominant follicle fluid was proceeded using ultrasound (Vet® DP 2200, Mindray, Shenzhen, China) equipped with follicular aspiration guide and vacuum pump (WTA, Cravinhos, Brazil). The recovered fluid was centrifuged at 300 g for 10 min and immediately stored at -20°C until analysis of the concentrations of estrogen (E) and progesterone (P), using commercial radioimmunoassay kits (Immunotech®, Prague, Czech Republic). Data from follicular diameter on the fifth day after the synchronization of the wave, the concentrations of estrogen and progesterone and the E:P ratio were analyzed by ANOVA using proc GLM of SAS, considering the effects of diet, cross, days postpartum and their interactions. Cows fed high energy diet showed a smaller ($P = 0.0204$) dominant follicle (10.44 ± 0.32 mm) than cows fed low energy diet (11.34 ± 0.29 mm). There was effect of the cross for follicular estrogen concentration ($P = 0.0216$) and the E:P ($P = 0.0035$). The 3/4 HG cows showed higher concentration of estrogen (267.58 ± 14.38 ng/mL) and higher E:P ratio (5.99 ± 0.47) than cows 7/8 HG (223.49 ± 13.99 ng/mL and 4.16 ± 0.27 , respectively). There was interaction between diet and cross ($P = 0.0151$) in the concentration of progesterone. The 7/8 HG cows fed low energy diet had higher concentration of progesterone (75.32 ± 7.98 ng/mL) than those fed high energy diet (49.02 ± 4.87 ng/mL) and those 3/4 HG fed low and high energy (48.63 ± 4.94 and 50.98 ± 4.15 ng/mL, respectively). Differences in follicular concentrations of estrogen and progesterone and the E:P may be associated with differences in negative energy balance between evaluated crosses and diets.