Proceedings

of the British Society of Animal Science

2008

DAIRY

Effect of diets containing soybean meal or canola meal on follicular dynamic in early lactation Iranian Holstein cows

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Introduction Although there is no clear evidence to fully describe the mechanism involved in glucosinolate-related effects on animal reproduction, lowered fertility in animals fed diets with rapeseed meal (RSM) inclusion is related to glucosinolate (Gls) content in the diet (Mawson *et al*., 1994). The degree of reproduction impairment depends both on glucosinolate content and on the type of animal. Negative effects of feeding high Gls RSM on fertility and poor reproduction traits in cows fed high amounts of very low-glucosinolate rapeseed meal were reported (Tripathi and Mishra, 2007). Therefore, cows fed diet not only high in Gls RSM but also high in low-glucosinolate RSM are sensitive to dietary glucosinolates. Diets containing Gls may cause thyroid disturbances that depressed fertility (Ahlin *et al*., 1994), such as increased calving to conception period, more numbers of inseminations per pregnancy and more numbers of acyclic and cystic ovaries (Tripathi and Mishra, 2007). Canola is a trademarked quality description of a group of cultivars of rapeseed variants from which low erucic acid rapeseed oil and low glucosinolate meal are obtained. In the current animal feed market in Iran, canola meal is cheaper than soybean meal (320 *vs*. 482 Toman/kg; US $1=933 Toman). The objective of this experiment was to evaluate substitution of soybean meal with canola meal and measure its effects on follicular dynamic and days postpartum to first ovulation in early lactation Iranian Holstein cows.

Materials and methods From days 5 to 56 postpartum, cows were fed diets that were isoenergetic containing soybean meal (SBM; n = 5) or canola meal (CM; n=5). Holstein cows were blocked in pairs based on their previous 305-day milk yield, parity (2^{nd} and 3^{rd} to 5^{th}) and expected calving dates. Cows within each block were randomly assigned to one of the two treatments. Ultrasound measurements of follicular activity were made on alternate days from days 10 - 35 postpartum (PP) to ascertain the characteristics and fate of the first follicular wave utilising a 7.5-MHz rectal transducer. Dominant follicle development was characterised by follicular mapping of recorded ultrasound images. Follicular recruitment during the first follicular wave after parturition was evaluated by quantification of the numbers of 5 to 10-mm follicles on d 10 and 14 PP. A dominant follicle was defined as a follicle that was >10 mm in diameter in the absence of other large (>9 mm) growing follicles. The data were analysed using the General Linear Model (GLM) procedure of SAS (2001) for a completely randomised design.

Results Diet had no effect on follicular parameters and days postpartum to first ovulation (Table 1). The number of medium-sized follicles (5 to 10 mm) present on days 10 and 14 PP, diameter of the first dominant follicle on days 10 and 14 PP, maximum diameter of the first dominant follicle and number of days until detection of a follicle ≥ 10 mm in diameter were similar among diets. Except for 3 cows, the others were ovulated. The mean and median days to first PP ovulation were not affected by the diets.

Table 1 Follicular dynamic parameters in cows fed total mixed rations containing soybean meal (SBM) or canola meal (CM)

	Diet			
Parameter	SBM	CM	SE	P
Number of follicles (>= 5 mm in diameter) on day 10	2.00	2.60	0.47	0.40
Number of follicles (>= 5 mm in diameter) on day 14	2.83	3.00	0.56	0.83
Follicles diameter (>= 5 mm) on day 10, mm	10.75	9.80	1.79	0.72
Follicles diameter (>= 5 mm) on day 14, mm	12.00	12.41	1.21	0.81
Diameter of first dominant follicle, mm	16.16	19.60	1.35	0.11
Days postpartum to first dominant follicle, d	14.50	16.40	0.96	0.20
Days postpartum to first ovulation, d	17.60	20.25	1.35	0.21

Conclusions The results of this study demonstrated that substituting soybean meal with canola meal in the early lactation cows had no apparent effect on follicular dynamics and days postpartum to first ovulation. So, economically, diets containing canola meal could be better in terms of reducing the dietary costs.

Acknowledgements The authors gratefully acknowledge funding from Excellence Centre for Animal Science, Ferdowsi University of Mashhad.

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