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Canola meal as a substitute for soybean meal in diet of early lactation Iranian Holstein cows

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Introduction Canola meal is one of the most widely used protein sources in animal feeds. It has an excellent amino acid profile and it is rich in vitamins and essential minerals. Many experiments have been conducted on the value of canola meal for dairy cows. Excellent and often improved milk production has resulted from the use of canola meal as a main protein source. Canola meal provides an important contribution to both rumen microbial protein needs as well as to the digestible amino acids required for animal growth and lactation. Canola meal possesses an excellent RDP profile that may stimulate microbial growth in the rumen. Although canola meal was extensively degraded in the rumen, its 12-h residue still provided an estimated AA profile to the intestinal tract that was close to the AA profile of milk protein (Piepenbrink and Schingoethe, 1998). Kendall *et al*. (1991) found that the effective degradability of canola meal averaged 51.5%. This compared to 59.1% for soybean meal. 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 milk production and composition, and dry matter intake in early lactation Iranian Holstein cows.

Materials and methods From d 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-d milk, 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. Cows were housed in tie stalls and fed the TMR two times a day to allow 5 to 10% orts (as-fed basis). The TMR were sampled weekly throughout the experiment and DM content was determined by drying at 110 ˚C for 18 h. The data were analyzed using the MIXED procedure of SAS (2001) for a completely randomized design with repeated measures. Overall effect of treatment was tested using cow within treatment as the error term. For all analyses, least square means were calculated.

Results Milk production was similar among diets but increased over the time ($P < 0.001$). Diet had no effect on dry matter intake (DMI). The effect of time was significant ($P < 0.001$) and DMI was increased over the time. Except than fat content, milk composition was similar among the dietary groups. Canola meal increased milk fat ($P = 0.049$). Diet had no impact on body weight (BW) and body condition score (BCS). The BW and BCS were decreased by 7 week of experiment ($P < 0.001$).

Table 1 Least squares means of production parameters in cows fed diets containing soybean meal (SBM) or canola meal (CM) during the first 8 weeks postpartum

	Diets		SED	*Treat. P*	*Time P*
Parameter	SBM	CM		Value	Value
Milk, kg/d	36.51	36.00	0.76	0.64	<0.001
Fat					
%	3.25	3.47	0.07	0.05	0.40
Kg/d	1.21	1.24	0.04	0.66	<0.01
Protein					
%	3.07	3.10	0.04	0.66	<0.001
Kg/d	1.13	1.11	0.04	0.80	<0.01
Lactose					
%	4.60	4.62	0.07	0.88	<0.001
Kg/d	1.70	1.65	0.06	0.56	0.04
DMI, kg/d	20.16	21.03	0.34	0.11	<0.001
BW, kg	579	580	24.12	0.97	<0.001
BCS	2.99	2.96	0.09	0.83	<0.001

Conclusions The results of this study demonstrate that substituting soybean meal with canola meal in the diet of early lactating cows had no effect on dry matter intake, milk production and composition, except than milk fat. So, economically, diets containing canola meal could be better in terms of reducing the diet expenses.

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