

Effect of different sources of pectin feedstuffs on milk yield and composition of early lactating Holstein cows

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Introduction The inclusion of high levels of cereal-based concentrates decreases rumen pH and the activity of rumen cellulolytic bacteria thus depressing rumen cell wall fermentation, digestibility and roughage intake. Citrus pulp has a high potential rumen degradability and apparent digestibility and, as with other pectin-rich foods such as sugar-beet pulp, causes a lower production of propionic and lactic acids than starchy foods. As a result, supplementation of roughages with pectin-rich foods generally has a less adverse effect than cereal grains on cell wall fermentation and digestibility and on roughage intake, thus resulting in similar or even greater total digestible organic matter intake (DOMI). The aim of the present study was to evaluate effects of different source of pectin feed stuff on milk yield and composition dairy cows.

Material and methods Eight primiparous early lactating Holstein cows (60 ± 23 days postpartum, weighing 530 ± 60 kg) were assigned into a replicated 4×4 Latin square design with four 3-wk periods. Cows were allocated into four diets which were: 1) 10% barely grain, 2) 10% sugar beet pulp, 3) 10% wheat bran and 4) 10% dried citrus pulp. Each experimental period was 21 days including 14 days adaptation period and 7 days collecting samples. Milk yield recorded daily and milk samples were taken from each milking times during the last 3 days of each period. Milk samples were subjected to analysis for CP, lactose, fat and SNF. Blood samples were collected from the jugular vein 2h after the morning feeding. Blood serum was collected after centrifuged at $1,500 \times g$ for 40 min, frozen at -40°C , and later analyzed for Glucose and urea N. Rumen samples were taken from each cow on the last days of each experimental period at about 3 hr after the morning feeding. Ruminal fluid pH was determined immediately. Differences in means were detected using the PROC GLM procedure of the Statistical Analysis System release 9.1 (SAS, 2004).

Results The dry matter intake (DMI), milk yield and composition, ruminal pH and blood metabolites are presented in the Table 1. DMI (kg/d), milk yield, milk composition, ruminal pH and blood metabolites were not affected by treatments ($P > 0.05$).

Table 1 Dry matter intake, milk production, and composition and ruminal pH of dairy cow

Treatment	T ₁	T ₂	T ₃	T ₄	SEM
Item					
DMI (kg day ⁻¹)	19.34	19.63	19.74	18.69	0.122
Milk yield (kg day ⁻¹)	28.68	28.3	28.81	27.37	0.201
Milk composition (%)					
Protein	3.1	3.03	3.16	3.12	0.046
Lactose	4.92	5.01	5.15	4.98	0.057
Fat	3.14	3.44	3.36	3.34	0.070
SNF	8.27	8.3	8.56	8.36	0.099
Ruminal pH	6.25	6.36	6.3	6.26	0.025

The data of blood metabolites are presented in the Table 2. There were no significant differences in blood metabolites between treatment diets ($P > 0.05$).

Table 2 Blood metabolites of dairy cow

Treatment	T ₁	T ₂	T ₃	T ₄	SEM
Item					
Glucose (mg/dl)	55.8	53.8	54.1	53.5	1.026
Blood urea nitrogen (mg/dl)	24.37	25.62	25.87	26.25	0.278

Conclusion The obtained results indicated that substitution of sources of pectin feed stuff by barely grain were not effect on DMI, milk yield and composition, ruminal pH and blood metabolites. This result in agreement with (Castel, 1972; Feregos *et al.*, 1995). However, the addition of sources of pectin feed stuff at 10% level (dry matter basis) of the dairy cow ration instead of cereal grain; can decrease the cost of milk production without any negative effect on animal performance.

References

- Castle, M.E. 1972. Journal of Agricultural Science 78:371-377
Feregos, K., Zeras, G., Stamouli, S. and Apostolaki, E. 1995. Journal of Dairy Science 78, 1116-1121.