The effects of dry matter content and hay particle size of total mixed ration on eating and lying behaviours of dairy cows

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INTRODUCTION

Water addition to total mixed ration (TMR) and particle size reduction of hay are techniques used to minimize diet selection of dairy cows, but these changes in physical form of diet may alter some eating behaviours of cows. There is limited work on the effect of diet physical form on lying time and latency of lie down after milking. The longer the animal stands after milking, the lower the risk for bacterial penetration of the teats when the cow eventually lies down. The objective of present experiment was to understand whether the particle size and dry matter content of the diet affects DMI, eating and lying behaviours of dairy cows.

MATERIAL AND METHODS

Eight multiparous Holstein cows were allocated to the treatments in a changeover design with periods of 21 d in early lactation period. The average day in milk (DIM) and milk production of the cows were 28±12 d (mean ± SD) and 43±3.5 kg/d, respectively. Cows were housed individually in a tie-stall with a 5 cm thickness of rubber mat. They were fed ad-libitum twice daily with a TMR diet and had free access to drinking water through one automatic water bowl for each cow. The balanced diets (NRC, 2001) had the same chemical composition. Two particle size of Alfalfa hay (5 and 20 mm theoretical cutting size) and two levels of TMR dry matter (without and with water addition up to 50% of DM) were applied in the treatments. All animals were milked three times a day. Eating, standing and lying behavioural activities were observed and recorded for 24 h (5 min intervals) during 14-15th days of each experimental period. The experimental cows were allowed to stay in the yard and exercise after morning milking time, then the latency to lie down was not recorded for morning milking. The data were analyzed using mixed model procedure of SAS (1998).

RESULTS

Experimental dietary treatments had no effect on total dry matter intake, eating behaviours (*i.e.* eating time (min/d), eating rate (g/min), meal number and meal duration (min/meal)) and lying behaviors of cows such as total lying time (min/d) and latency to lie down (min) after coming back from milking parlor. (Table1).

Table1 DMI, eating and lying behaviours of experimental cows

Behaviour		Long hay		Short hay		SEM	Effect[1]		
		Dry	Wet	Dry	Wet		PS	DM	PS×DM
	DMI(kg/d)	23.64	23.80	23.48	22.34	0.50	0.61	0.53	0.22
Eating	Time (min/d)	350.6	343.8	346.3	321.4	12.36	0.31	0.23	0.37
	Rate (g/min)	68.2	69.8	69.4	70.8	6.07	0.59	0.64	0.47
	Meal number	11.25	10.50	11.50	11	0.72	0.41	0.31	0.58
	Meal duration (min/meal)	31.7	32.1	30.3	29.8	2.14	0.12	0.20	0.31
Lying	Total lying time (min/d)	614.4	618.7	553.8	699.2	70.7	0.46	0.7	0.52
Latency to lie down (min)	After 1st milking	65.6	65	87.5	51.7	13.43	0.67	0.15	0.17
	After 2nd milking	41.25	41.88	51.88	52.86	5.71	0.19	0.67	0.59
	Mean	53.44	53.44	69.69	42.5	7.81	0.93	0.17	0.17

1-Probability of the main effect of hay Particle Size (PS), TMR Dry Mater (DM) and the interaction of Particle Size and Dry Mater (PS×DM)

Conclusion

This study did not support our hypothesis that the difference in hay particle size or dry matter percentage of TMR could change cows lying behaviours specially latency to lie down after milking.

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