Effects of physical forms of total mixed rations on ruminal pH and chewing activity of lactating cow

M Haj Shamsaei[1], A Foroughi[2], M Bashtani[1], H Farhangfar[1], H Naeemipour[1], P Rowlinson[3]
[1]Birjand University, Birjand, Islamic Republic of Iran, [2]Research Centre of Agricultural Jihad, Mashhad, Islamic Republic of Iran, [3]University of Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom
Email: hfarhangfar2003@yahoo.co.uk

Introduction Various chemical and physical factors such as NDF concentration and particle size affect rumen fermentation and as a result influence milk production and composition (Leonardi and Armentano, 2003). It is commonly believed that feeding forage with short particle size decrease chewing activity and salivary buffer secretion leading to lowering rumen pH and milk fat percentage (Mertens, 1997). Nocek and Braund (1985) suggested that feeding TMR is the optimal way to provide the balance of nutrients (including protein and structural and non-structural carbohydrates) that ruminants need to maintain a stable and efficient microbial population. In particular, the *ad libitum* feeding of TMR results in a ruminal steady state condition conductive to continuous rumen function and digesta flow (Nocek et. al, 1986). The objective of this research was to determine effects of different physical forms of total mixed ration (TMR) on eating behaviour of lactating dairy cows.

Material and methods Three ruminal canulated primiparous Brown Swiss cows with average days in milk 130, body weight 560 kg and daily milk yield 20 kg were randomly assigned to a 3*3 Latin square. Three 21d periods were considered in the experiment. During each period (including 14d for adaptation and 7d for record collection) the animals were offered one of three TMRs. Ingredients and chemical composition were the same over the experimental diets (NE_l 7.10 MJ/kg, CP 160 g/kg and NDF 365 g/kg). The diets were 1. TMR with mash concentrate 2. TMR with pellet concentrate and 3. Cubed TMR. The cows were fed at hours 08:00 and 20:00 *ad libitum*. Total chewing activities (eating + rumination) were measured d 18 each period. On d 21 of each period, ruminal for determine pH were taken at 0.0, 2, 4, 6, 9 and 12 h after a.m. feeding.

Result Effects of TMR physical form on rumen pH and eating and ruminating activities are presented in Tables 1 and 2 respectively.

Table 1 Effects of TMR physical form on ruminal pH of lactating dairy cow

Hour	Diets			SEM
	Mash	Pellet	Cube	
0	6.56	6.54	6.26	0.048
2	6.21	6.14	6.02	0.048
4	5.94	5.98	5.76	0.048
6	6.06	6.10	5.85	0.048
9	6.23	6.26	5.98	0.048
12	6.38	6.54	6.28	0.048

Table 2 Effects of TMR physical form on chewing activities of lactating dairy cow.

case		Diets			SEM
		Mash	Pellet	Cube	
Eating	$Time_{min/d}$	335^{a}	356.67^{a}	285^{b}	10.184
	$DMI_{min/kg}$	17.3^{a}	19.4^{b}	14.26^{c}	0.134
	$NDFI_{min/kg}$	51.57^{a}	59.41^{b}	41.28^{c}	0.353
Rumination	$Time_{min/d}$	458.33^{a}	443.33^{a}	316.67^{b}	28.50
	$DMI_{min/kg}$	23.75^{a}	24.3^{a}	15.85^{b}	0.954
	$NDFI_{min/kg}$	70.88^{a}	73.58^{a}	45.81^{b}	2.796

Means within the same row with differing superscripts are significantly different $P<0.05$

Conclusion Based upon the findings of the present research it can be concluded that feeding cubed rations decrease chewing activity and salivary secretion and decrease rumen pH due to shorter particle size as compared to other forms of TMR applied.

Reference

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