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Diurnal variation of ruminal pH and N-NH3 concentration in dairy cows grazing two pasture allowances and supplemented with high moisture corn or cracked wheat

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1. INTRODUCTION

In grazing dairy systems, milk production is limited by low dry matter intake. Pasture allowance and energy supplementation are tools that determine dry matter intake and milk yield. The aim of the trial was to determine diurnal variation of ruminal pH and N-NH3 concentration of dairy cows grazing two pasture allowances (PA) and supplemented with high moisture corn (HMC) or cracked wheat (CW).

2. MATERIALS AND METHODS

The trial was conducted in Vista Alegre Experimental Station of the University Austral of Chile, during 56 days in spring of 2010.

➢ *Treatments.*

- 2x2 factorial arrangement
- 2 pasture allowances: 30 and 20 kg DM/cow/day
- 2 supplement types: 3.5 kg DM/cow/day of HMC or CW (2 equal rations at milking times)

➢ *Animals.*

- 4 Holstein-Friesian ruminally cannulated dairy cows

➢ *Design.*

- 4x4 Latin Square (14-day periods)

➢ *Pasture and grazing management.*

- Permanent ryegrass (*Lolium perenne*)
- Access to new pasture after each milking.
- Daily area calculation based on herbage mass estimated from rising plate meter measurements (RPM, New Zealand).

➢ *Ruminal pattern measurements*.

- 7 times on day 14.

➢ *Statistical analyses.*

- ANOVA with repeated time.

Table 1. Chemical composition of pasture and supplements.

Variable	Pasture				Supplements			
	30 kg		20 kg		HMC		CW	
	X	SD	X	SD	X	SD	X	SD
DM (%)	18.8	1.86	18.8	2.79	69.2	2.60	84	0.05
CP (% DM)	20.8	2.48	20.7	1.96	7.7	0.51	12.4	0.40
ME (Mcal/kg DM)	2.79	0.07	2.76	0.04	3.3	0.03	3.18	0.04
NDF (% DM)	39.2	2.97	40.2	2.11	10.6	0.09	14.4	1.70
ADF (% DM)	24.1	1.96	25.2	1.33	1.9	0.35	3.4	0.24

3. RESULTS

Table 2. Ruminal pH and N-NH3 concentration of dairy cows supplemented with HMC or CW grazing at two pasture allowances.

	Pasture allowance		Supplement type		P value			
	30kg	20 kg	HMC	CW	SEM	PA	ST	PA * ST
pH	5.72	5.76	5.74	5.74	0.06	0.660	0.988	0.462
N-NH3 mmol/L	7.70	8.24	7.48	8.46	0.71	0.596	0.332	0.686

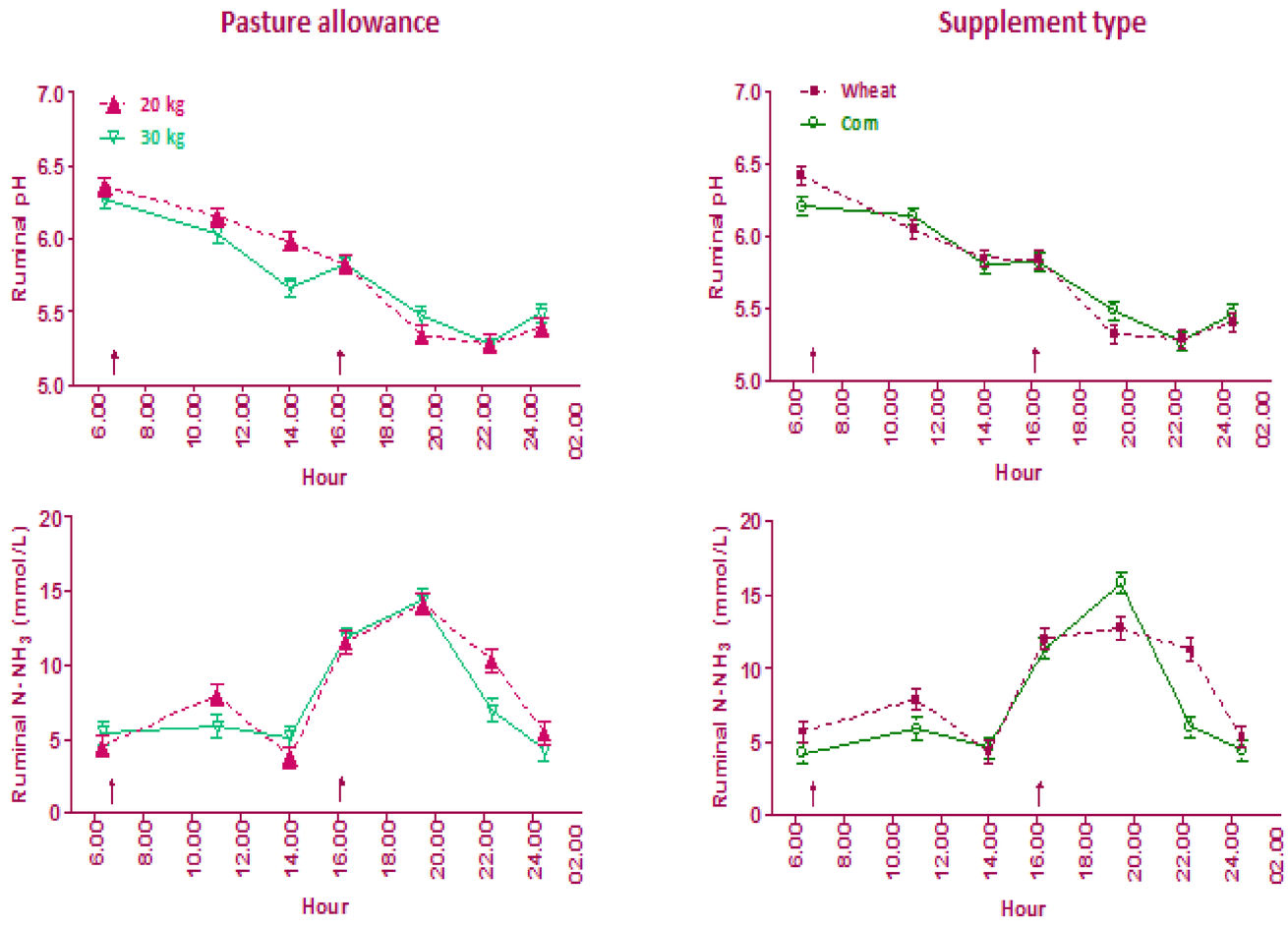

Figure 2. Diurnal pattern of ruminal pH and N-NH3 concentration of dairy cows grazing at two pasture allowances (left) and supplemented with HMC or CW (right). ↑ : ration

4. CONCLUSIONS

- Under these grazing management conditions, ruminal N-NH3 concentration peak is much greater in the evening than in the morning.
- Dairy cows grazing at 20 or 30 kg DM/cow/day of PA in permanent pasture, and supplemented with HMC or CW presented the same pattern in diurnal variation of ruminal pH and N-NH3 concentration.