

Effect of lactose ureide on methane emission and ruminal fermentation in vitro

T. Nishida, S. Hayasaki, K. Kida, T. Matsumoto, R. Asa-Morikawa, J. Takahashi

(nishtake@obihiro.ac.jp, Obihiro University of Agriculture & Veterinary Medicine, Obihiro-city, Hokkaido, 080-8555, Japan)

Curds and whey

Curds

(Cheese)

whey

Add the rennet into milk



Whey --- by-product of the manufacture of cheese 📃

 Fresh whey
 1%> protein

 94% water
 1%> ash

 4.5% lactose
 1%> fat



Lactose ureide (LU), was newly found to be formed in thermally processed milk and milk products (Suyama and Sasaki, 2006).



Oral urea to ruminants --- used for amino acid synthesis Oral lactose to ruminants --- used for energy source



Table 1. Nutritive value of lactose, urea, LU and soybean meal

	MW ¹	Ratio	TDN (%)	Crude protein
Lactose (C ₁₂ H ₂₂ O ₁₁)	342	85%	100	0
Urea (CH ₄ N ₂ O)	60	15%	0	284
Lactose ureide	402	-	85	43.5
Soybean meal ²			86.8	46.1

1: Molecular weight, 2: 88.3% dry matter





Table 2. Effects of LU addition on VFA concentration after 24 h incubation

	0g	5g	10g	15g
Total VFA (mM)	49.6 ^a	71.8 ^{ab}	80.6 ^b	78.6 ^b
Acetate acid (mM)	35.4	49.2	55.3	53.7
Propionic acid (mM)	11.0ª	16.0 ^{ab}	19.5 ^{ab}	22.5 ^b
Butyric acid (mM)	2.9	5.7	3.5	7.3
A/P ratio	3.3	3.0	2.9	2.4

Means with different letters differ significantly (P<0.05)



Figure 1B. Effects of LU addition on CO₂ production



Figure 2. Effects of LU addition on pH after 24 h incubation

**; P<0.01 compared to 0g

Materials and methods

400 ml of rumen fluid 400 ml of McDougall's buffer 10 g of concentrate + Timothy hay (1:1, w/w)





39 °C, 24 h CH₄, CO₂, VFA, pH, ammonia nitrogen



3 times replicates

Conclusion



Figure 3. Effects of LU addition on ammonia concentration

*; P<0.05 and **; P<0.01 compared to 0g