

# Effect of type of silage and concentrate on eating behavior and relation to enteric methane

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## Background

While the relationship between diet composition and enteric methane emission from ruminants is well understood there is a lack of data that compares methane emission with eating behavior.

## Objectives

- To evaluate the effect of 2 silages and 2 concentrates on eating behavior recorded using the Rumiwatch system,
- To quantify the between-cow variation in eating behavior and methane emission and possible correlations.

## Material and Methods

- Twenty-four lactating Holstein cows.
- Crossover study with two 21 days periods.
- Six blocks of 4 cows each, with either 1<sup>st</sup> or 2<sup>nd</sup> lactation cows.
- Design balanced for carryover effects.
- Diets 2x2 factorial arranged (Table 1 and Figure 1),
- Eight Rumiwatch units were used to record eating behaviour.
- In a staggered progression, each block spent d 19-21 in respiration chambers to record gas exchange.
- Dependent variables were analysed in a linear mixed model including interaction between dietary factors, and effect of period and block as fixed effects, and cow as random effect.



Figure 1. Factorial arrangement of the 4 diets and pictures.

Table 1. Composition of the diets (g/kg of DM).

	GS-BA	GS-DB	MS-BA	MS-DB
Grass clover silage, 1 <sup>st</sup> cut	275	275		
Grass clover silage, 2 <sup>nd</sup> cut	275	275		
Maize silage			542	542
Barley, rolled	215		215	
Dried beet pulp		215		215
Rapeseed meal, 10% fat	105	105	105	105
Soybean meal	105	105	105	105

## Results

Cows fed MS had lower eating time (358 vs 384 min/d;  $P = 0.04$ ), eating rate (17.2 vs 19.2 min/kg DM;  $P < 0.01$ ) and total chewing time (796 vs 862 min/d;  $P = 0.02$ ) compared to cows fed GS diets. Cows fed BA had lower eating rate than cows fed DB (17.3 vs 19.2 min/kg DM;  $P < 0.01$ ).

Average and between-cow variation (model mean  $\pm$  sd for random cow) were  $440 \pm 30$ ,  $508 \pm 10$  and  $947 \pm 40$  min/d for eating, rumination and total chewing.

Average and between-cow variation for eating rate was  $21.5 \pm 1.5$  min/kg DMI. A negative correlation was found between random cow solutions for eating rate and daily methane production but no correlation was found when methane was related to DMI (Figure 2).

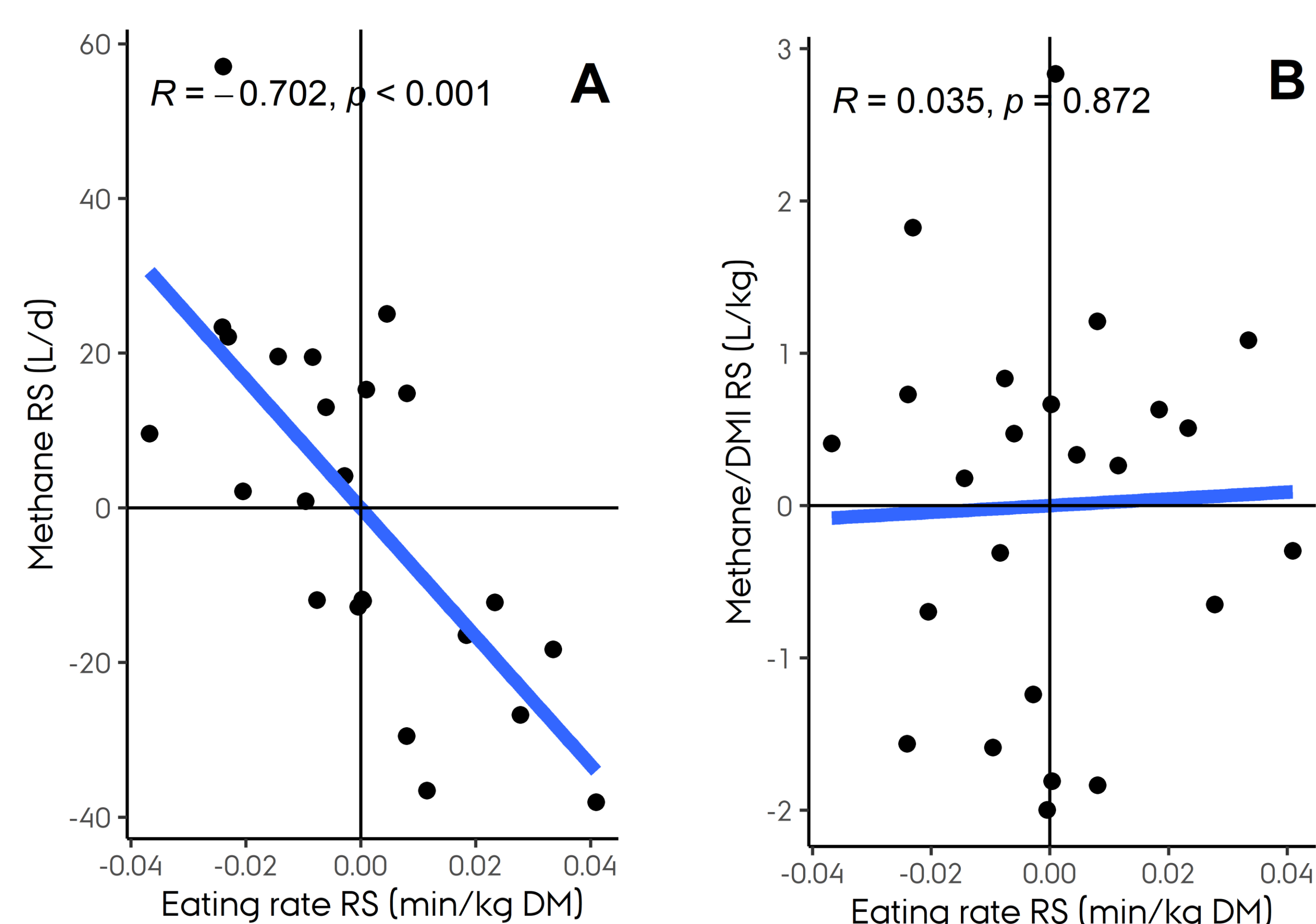
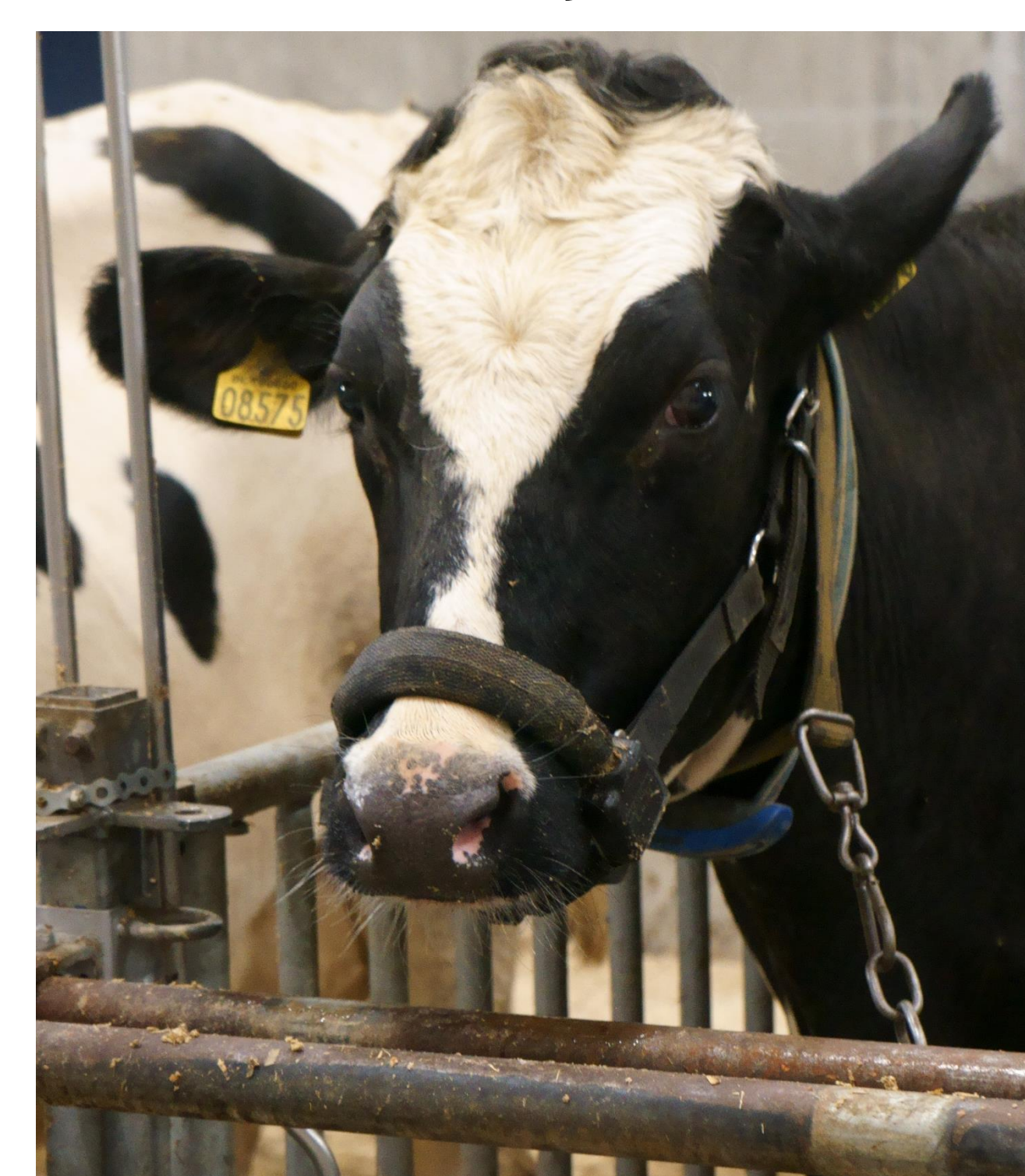


Figure 2. Cow random solutions (RS) from the linear mixed model for methane as L/d (A) and methane as L/kg DMI (B) in relation to eating rate (min/kg DM). Pearson coefficient (R) and P value reported.



## Conclusion

In this study dietary factors affected eating behavior, but no relationship between eating behavior and methane per kg DMI was found.