



Effect of dietary potassium carbonate on milk fat concentration and yield in early-lactating dairy goats fed a high-concentrate diet

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Introduction

Milk fat depression in dairy herds can be associated with changes in rumen fermentation when animals are fed high-grain and low-fiber diets in early lactation. Due to diet selection behavior, this metabolic disorder can be accentuated in dairy goats. Recent studies have shown that in lactating ruminants, the addition of K_2CO_3 into the diet could limit the acidogenic effect of concentrates by its buffering capacity and could potentially prevent the shift from *trans*-11 to *trans*-10 pathway of biohydrogenation of polyunsaturated fatty acids.

Objective

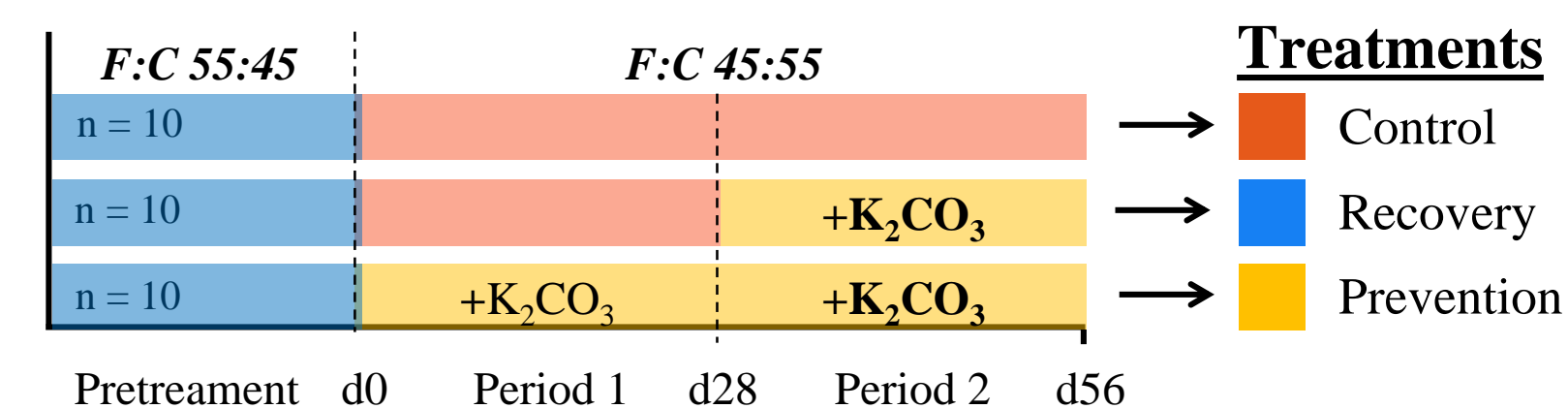
To investigate the use of K_2CO_3 as a treatment to prevent or recover from milk fat depression when early-lactating dairy goats are fed an acidogenic diet.

Materials and Methods

Goats and Diets

- 30 early-lactating Alpine goats housed in pens with Calan gate feeders were sorted into 10 blocks according to their milk fat concentration.
- A 27 ± 4 d pretreatment period was used as a covariate. Goats were fed a forage : concentrate (F:C) ratio of 55:45 on a DM basis.
- The experimental phase was divided into 2 periods (28 d) where goats were served an acidogenic diet containing a F:C ratio of 45:55 on a DM basis (Table 1).

Experimental Design



Pre-planned contrasts

- At the end of P1 to evaluate the preventive effect of K_2CO_3
 - Prevention vs. Others
- At the end of P2 to assess the potential of K_2CO_3 to alleviate an already existing state of milk fat depression
 - Control vs. Recovery
 - Prevention vs. Recovery

Results

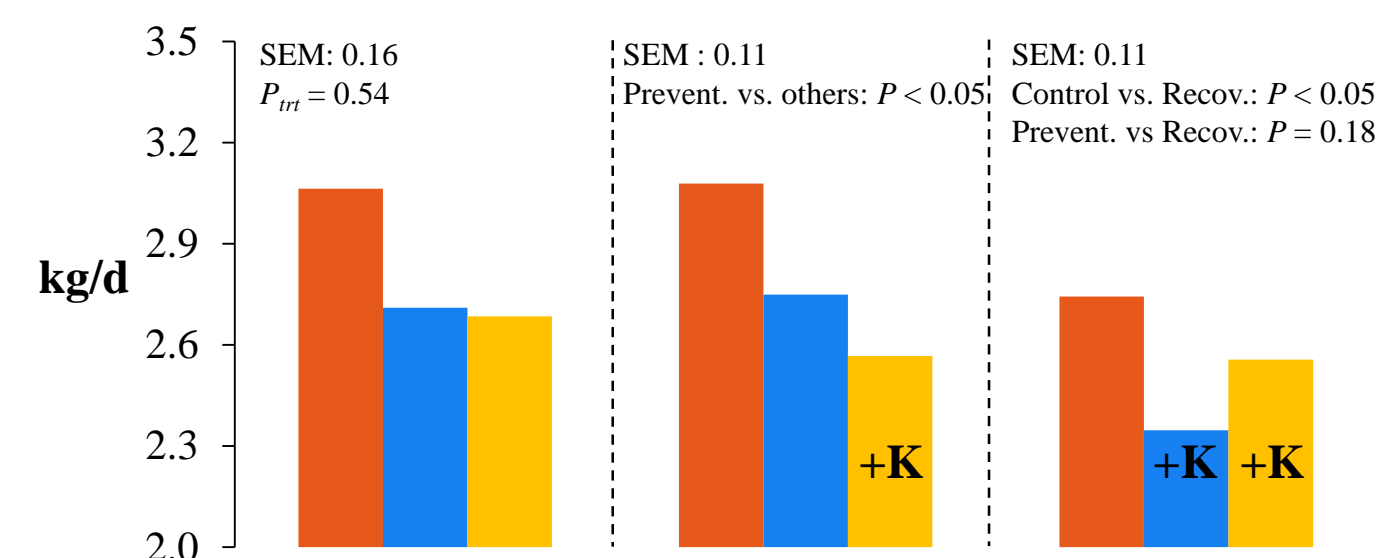
Table 1: Ingredients and chemical composition of experimental diets

Item, % of DM	Dietary treatment		
	Pretreatment	Control	K_2CO_3
Ingredient			
Alfalfa silage	33.7	16.9	16.6
Timothy silage	21.2	27.8	27.4
Cracked corn	34.9	45.2	44.5
Corn gluten meal	7.9	7.7	7.6
Mineral-Vitamin mix ¹	2.4	2.4	2.3
K_2CO_3 ²	-----	-----	1.6
Chemical composition			
DM, % as fed	44.6	48.8	49.2
OM	93.1	93.4	91.9
CP	15.4	15.1	15.0
NDF	30.7	30.0	29.5
ADF	26.5	23.6	23.4
Starch	21.0	23.8	23.1

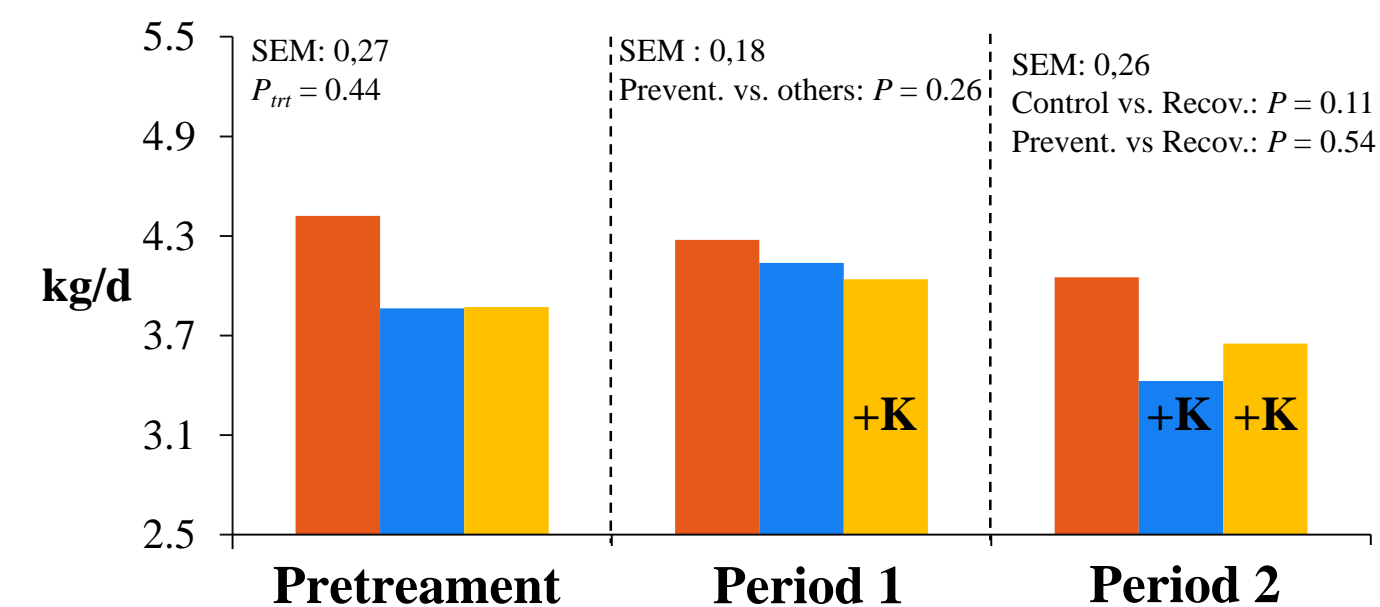
¹ Minéral Synchro 20-2T, La Coop, Montréal, Qc, Canada

² Stabilized Potassium Carbonate, Church & Dwight Co., Inc, Princeton, NJ

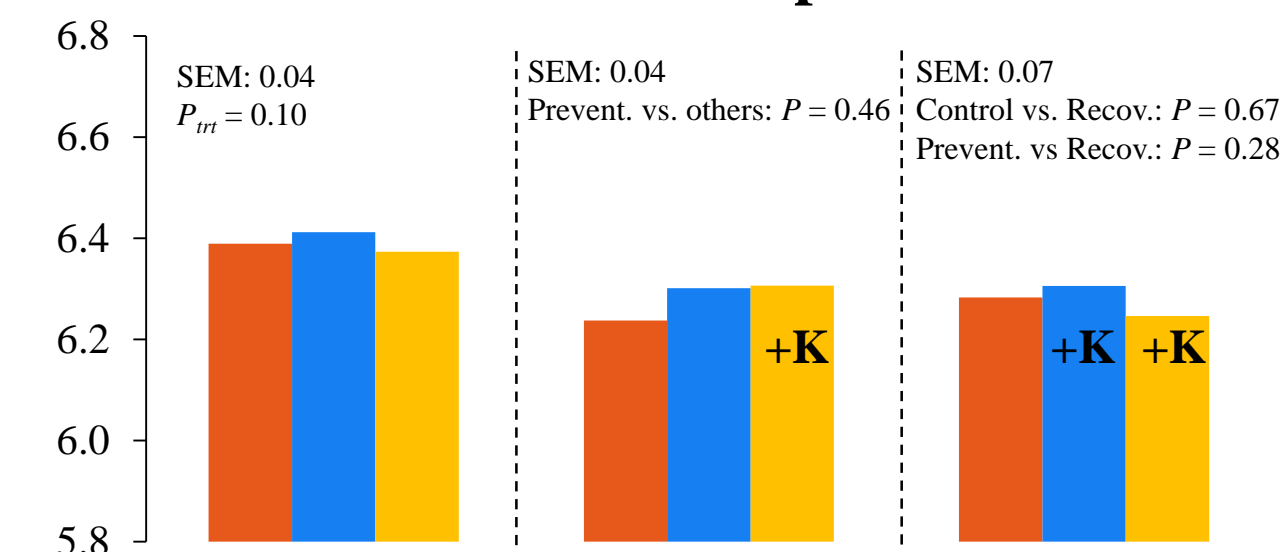
Dry Matter Intake



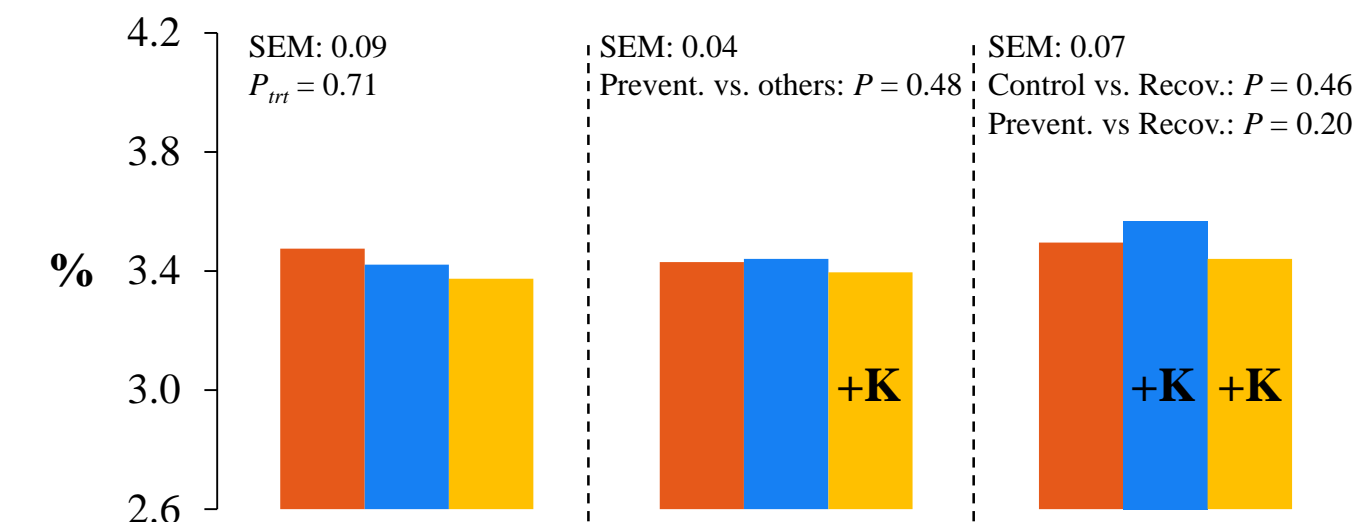
Milk Yield



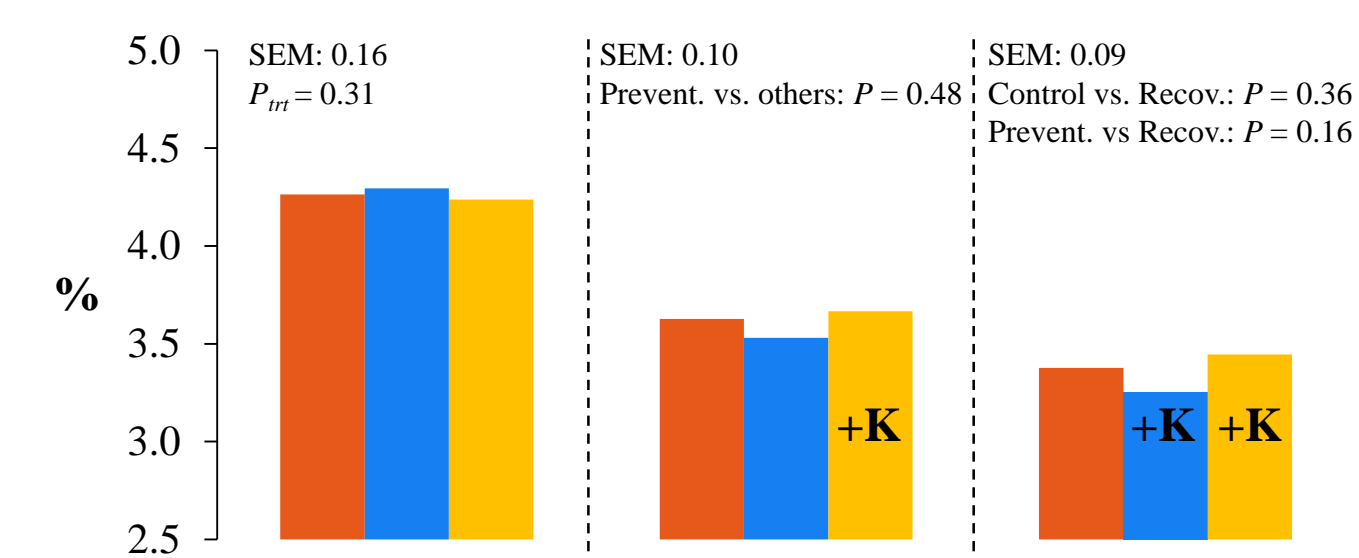
Ruminal pH



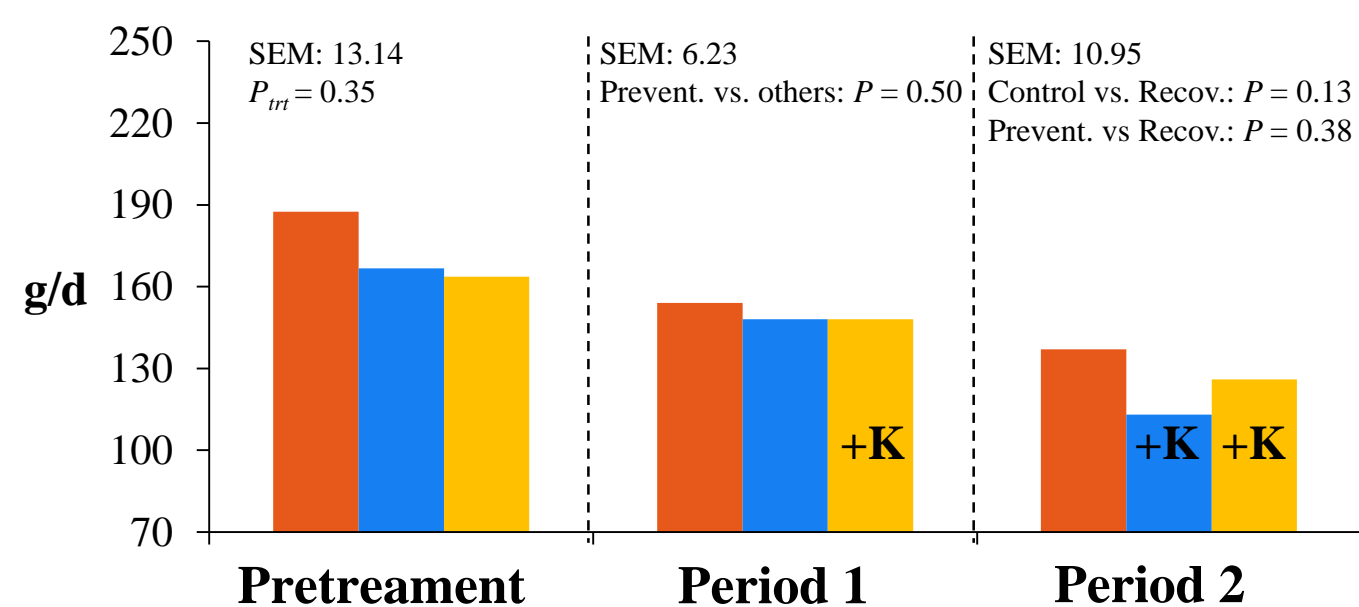
Milk Protein Concentration



Milk Fat Concentration

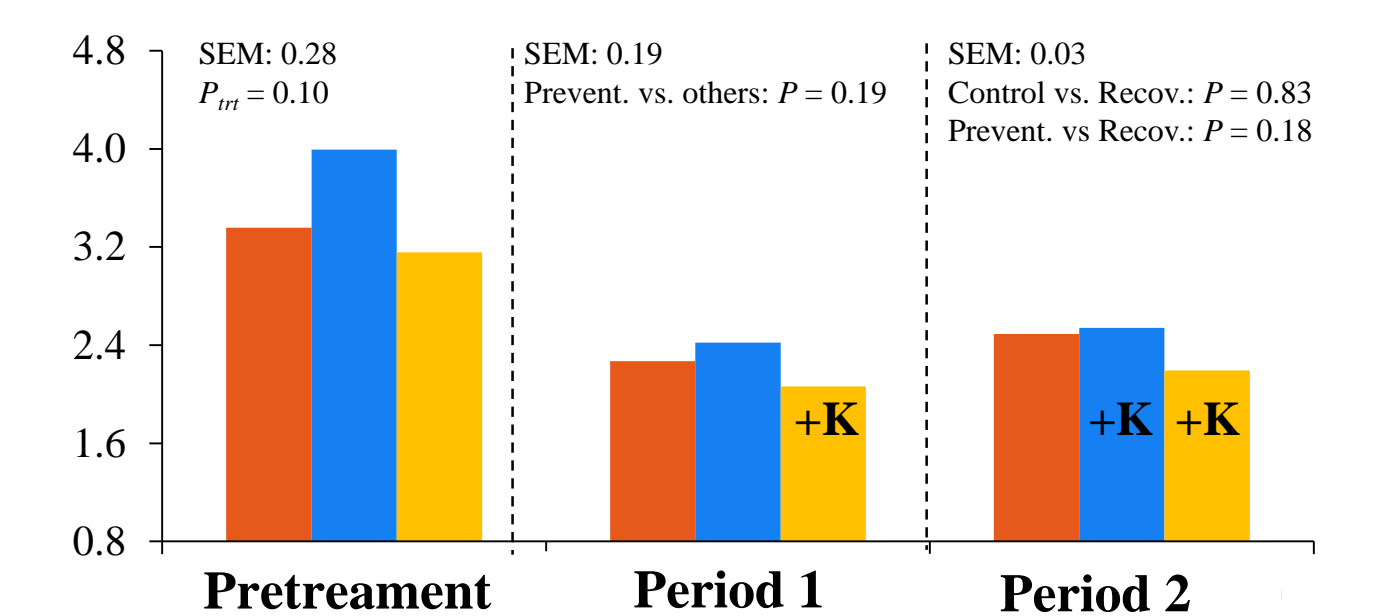


Milk Fat Yield



Conclusions

Milk *trans*-11 18:1 / *trans*-10 18:1



- There were **no differences in milk yield** (4.15 and 3.71 kg/d on average at the end P1 and P2, respectively) for any of tested contrasts ($P > 0.11$).
- Average milk fat decreased** from 4.27% and 173 g/d in pretreatment period to 3.61% and 151 g/d, then 3.36% and 125 g/d at the end of P1 and P2, respectively.
- At the end of **P1, milk fat concentration and yield did not differ** ($P > 0.47$) between goats fed the unsupplemented diet (3.58% and 151 g/d) and K_2CO_3 supplemented diet (3.67% and 148 g/d).
- At the end of **P2, milk fat concentration and yield did not differ** ($P > 0.13$) between goats fed the control diet (3.38% and 137 g/d) and diets where K_2CO_3 was used as preventive (3.44% and 126 g/d) or recovery treatment (3.25% and 113 g/d).
- Under the conditions of the current experiment **feeding K_2CO_3 was not effective in either preventing or in suppressing** already existing conditions of milk fat depression in dairy goats receiving a high-concentrate diet.

Acknowledgments

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