ETH zürich

Food Day @ETH 2024

Feed intake regulation stabilized daily intake pattern but reduced lactational performance with little impact on rumen fermentation or efficacy of 3-nitrooxypropanol in dairy cows

K. Wang[1], S. E. Räisänen[1], M. Niu[1], F. Dohme-Meier[2]
[1] Institute of Agricultural Sciences, ETH Zurich; [2] Ruminant Nutrition and Emissions, Agroscope

Background and Objective

- The effect of 3-nitrooxypropanol (3-NOP), a methane (CH_4) inhibitor, was more effective after feeding and gradually declined throughout the rest of the day (Hristov & Melgar, 2020).
- Dairy cows in intensive systems have most of their intake immediately after fresh feed delivery, which may negatively impact nutrient partitioning and rumen functions (DeVries & Von Keyserlingk, 2005; Niu et al., 2014; Niu & Harvatine 2018).
- To investigate whether feed intake regulation stabilizes feed intake and alters rumen microbial fermentation and CH_4 production, and consequently enhances the efficacy of 3-NOP.

Methods

4 × 4 Latin Square
- 4 periods
- 16 Holstein cows

2 × 2 Factorial design
- Regulation: ad libitum vs. regulated
- Inhibitor: placebo vs. 3-NOP

Regulated access
- Each visit capped at 12% of daily intake
- No feed access for 1 hour after 12% intake

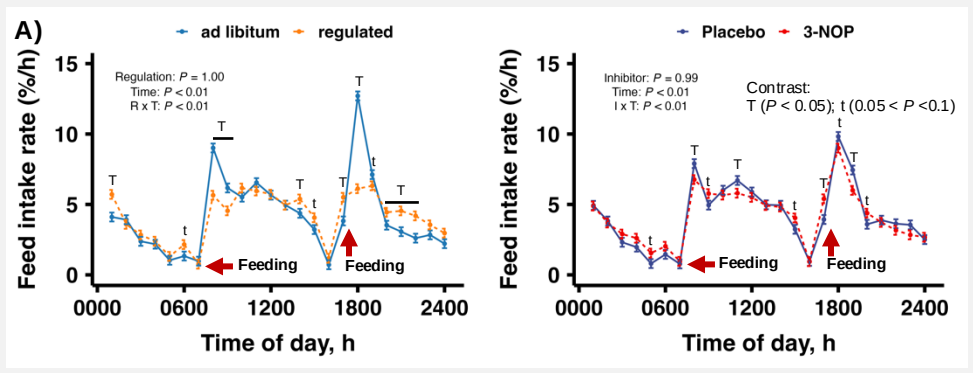

Roughage Intake Control System

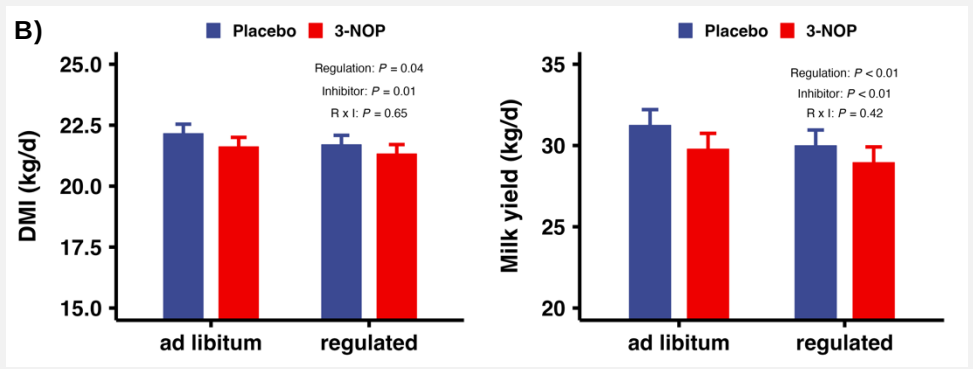
Preliminary Results

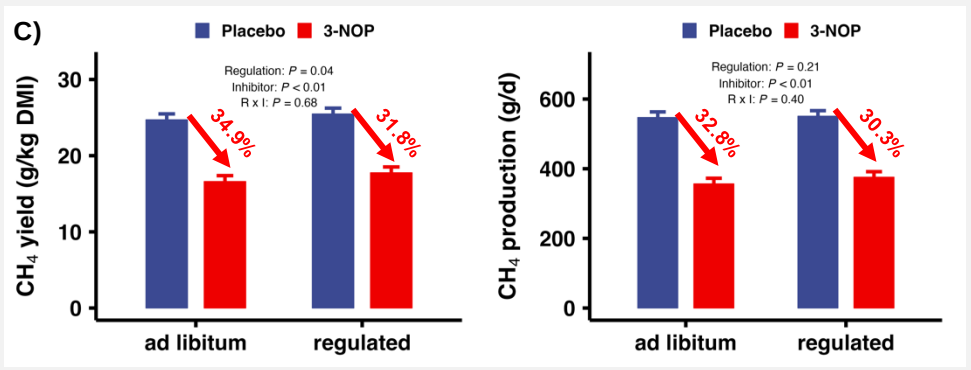
Eating behavior

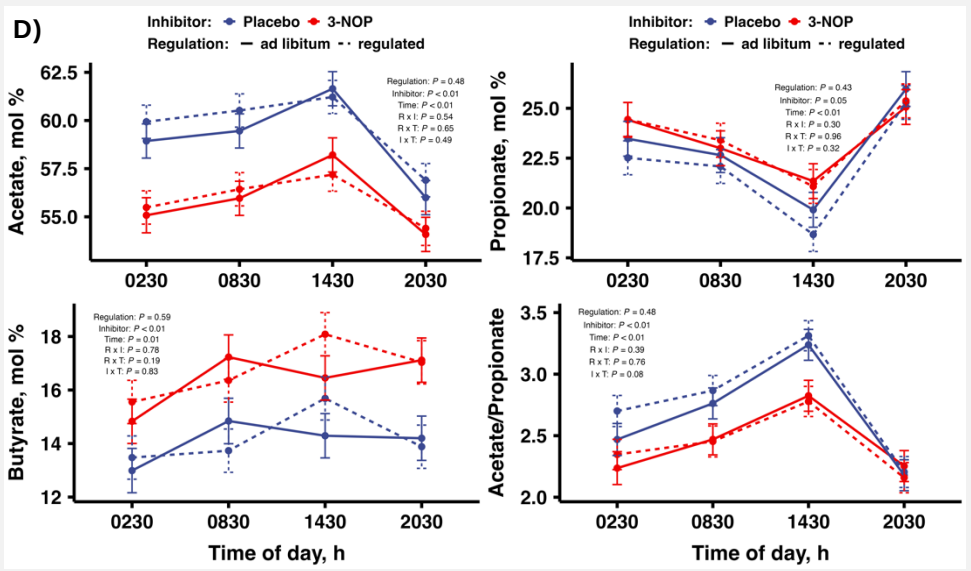
	Bouts/d	Meal size, kg as-is		Meal length, min		Eating rate, kg as-is/min	
		Conditioned	Others	Conditioned	Others	Conditioned	Others
Ad libitum	8.9 ± 0.19	8.7 ± 0.32	4.5 ± 0.13	51.5 ± 1.75	30.0 ± 0.78	0.18 ± 0.011	0.17 ± 0.008
Regulated	10.8 ± 0.18	4.1 ± 0.31	4.5 ± 0.12	17.6 ± 1.69	23.9 ± 0.73	0.28 ± 0.010	0.21 ± 0.008

The effect of regulation and CH_4 inhibitor on A) feed intake pattern, B) production, C) CH_4 emissions, and D) rumen VFA profile.









Partner/Sponsor: Agroscope

World Food System Center