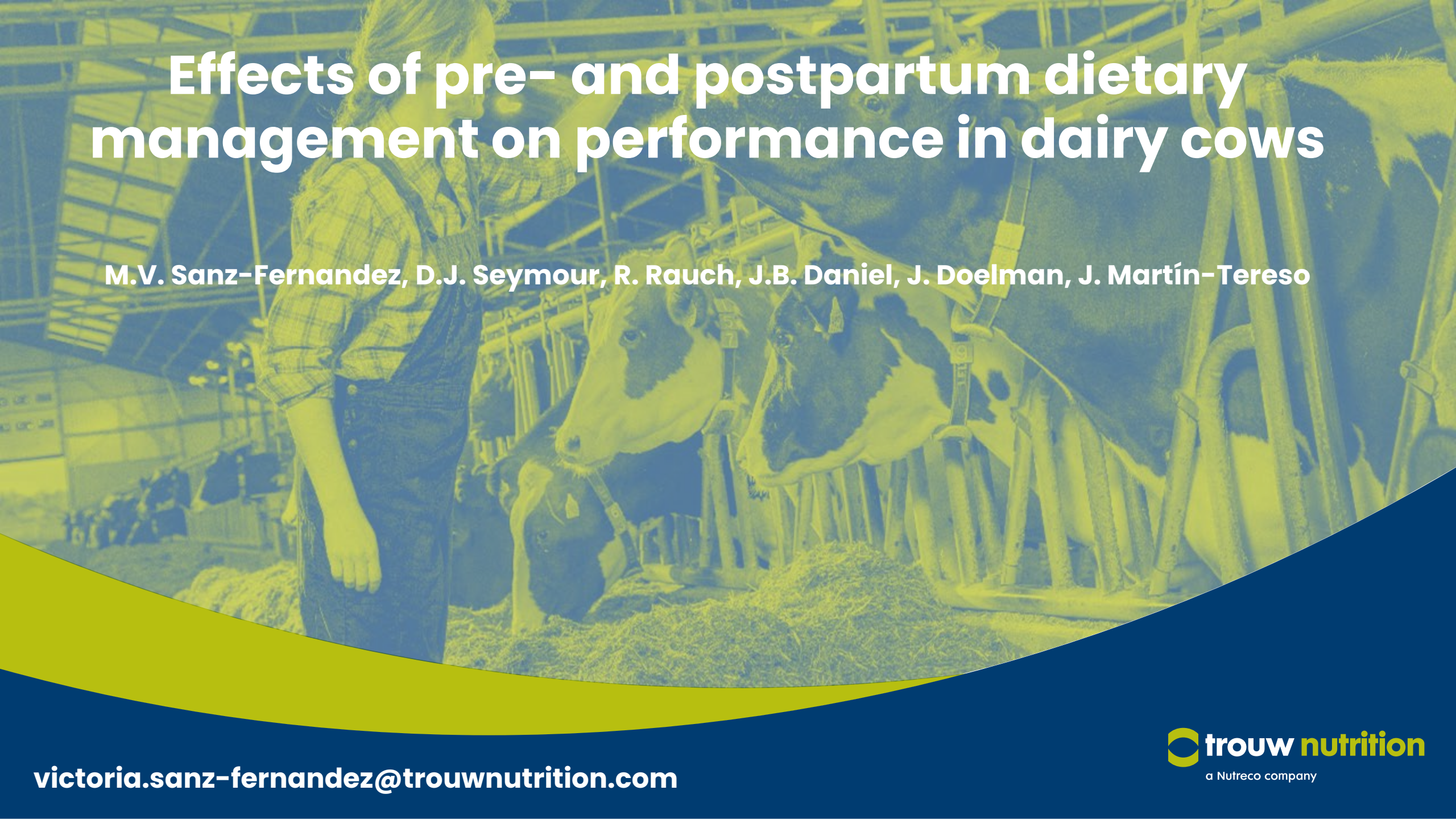




Effects of pre- and postpartum dietary management on performance in dairy cows

M.V. Sanz-Fernandez, D.J. Seymour, R. Rauch, J.B. Daniel, J. Doelman, J. Martín-Tereso

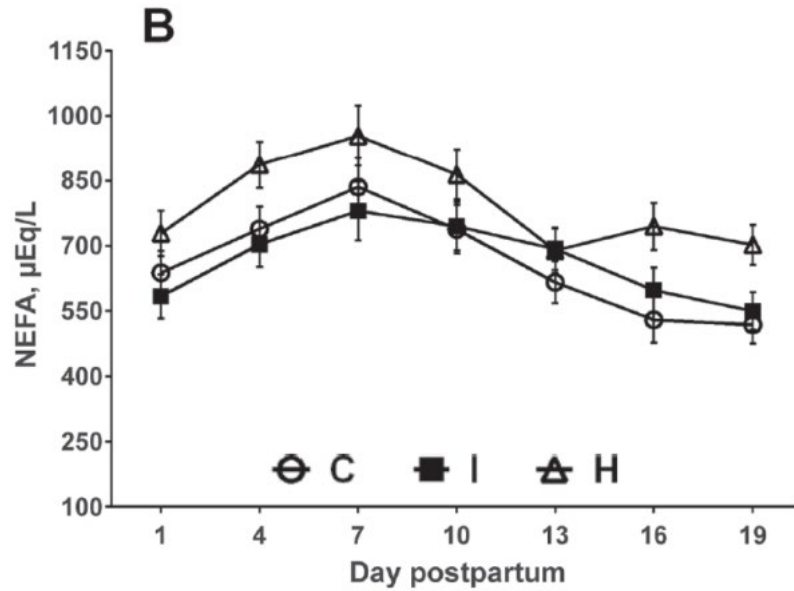
victoria.sanz-fernandez@trouwnutrition.com

Transition period management

The peripartum is a critical period in the production cycle of dairy cows

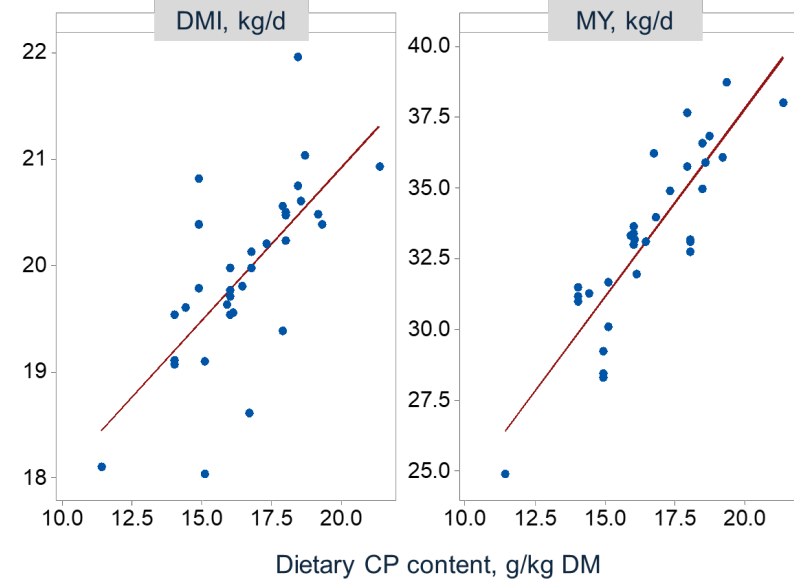
PREPARTUM

Manipulation of dietary energy levels



POSTPARTUM

Manipulation of dietary protein levels



Experimental design

**Far-off
(D-57 to D-21)**

Low Energy Diet (LED)

**Close-up
(D-21 to calving)**

Low Energy Diet (LED)

≈50% forage NDF
~80-90% of NE_L requ.

High Energy Diet (HED)

≈30% forage NDF
~130% of NE_L requ.

**Early Lactation
(0-70 DIM)**

Average Protein Diet (APD)

~15-16% CP

High Protein Diet (HPD)

~17-18% CP

Average Protein Diet (APD)

~15-16% CP

High Protein Diet (HPD)

~17-18% CP

Experimental design

Netherlands

- 60 cows (15 blocks) – 20 primi + 40 multi
- Free stall barn + RIC bins

PREPARTUM DIET		
Nutrients	LED	HED
NDF (g/kg DM)	433	301
NEI (MJ/kg DM)	5.44	6.82

POSTPARTUM DIET		
Nutrients	APD	HPD
CP (g/kg DM)	153	183

Canada

- 48 cows (12 blocks) – 20 primi + 28 multi
- Dry period: straw pen + Calan gates
- Lactation: tie stall

PREPARTUM DIET		
Nutrients	LED	HED
NDF (g/kg DM)	510	351
NEI (MJ/kg DM)	4.94	6.44

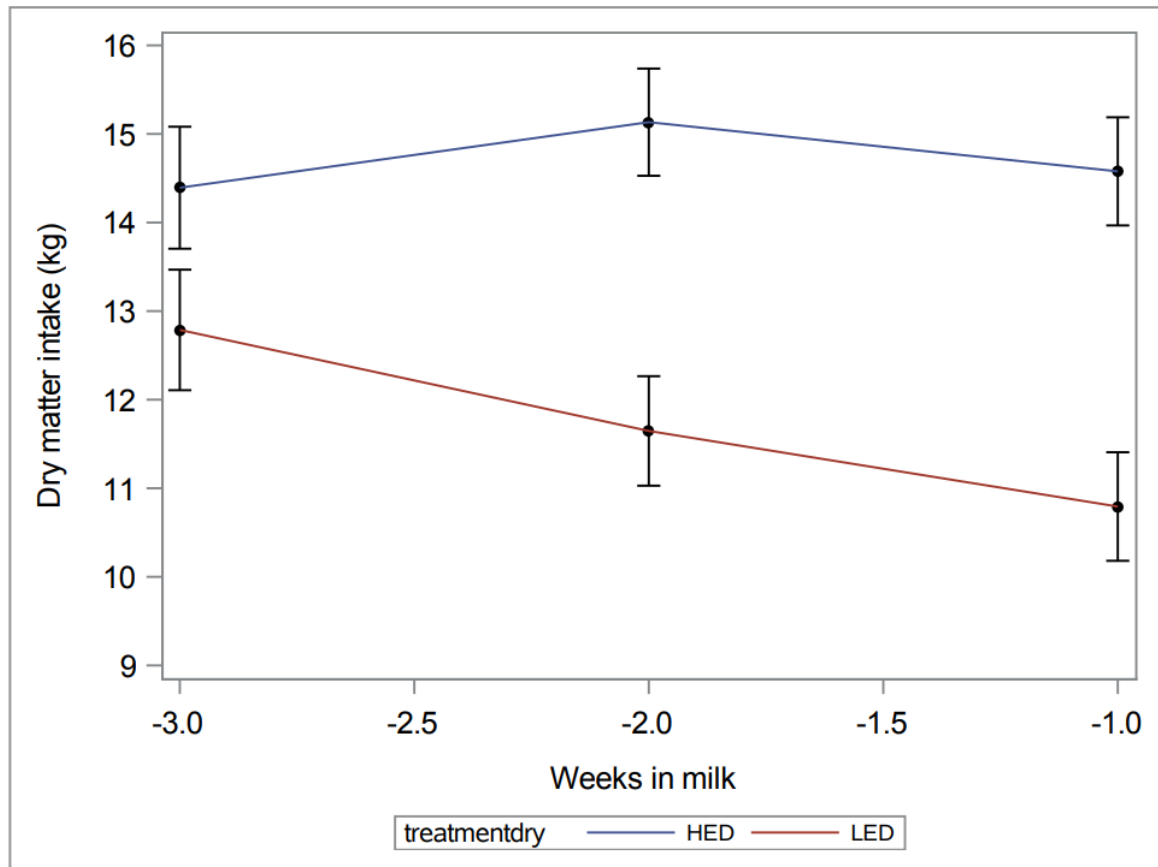
POSTPARTUM DIET		
Nutrients	APD	HPD
CP (g/kg DM)	155	185

Statistical analysis

- **2x2 factorial complete randomized block design**
- Blocking factors: parity and calving date
- **Proc mixed/glimmix**
- **Fixed effects:** treatment prepartum, postpartum, the weeks to/from calving and all possible interactions
- Weeks from beginning of prepartum treatment/calving **repeated measure**
- **Block** as a random effect

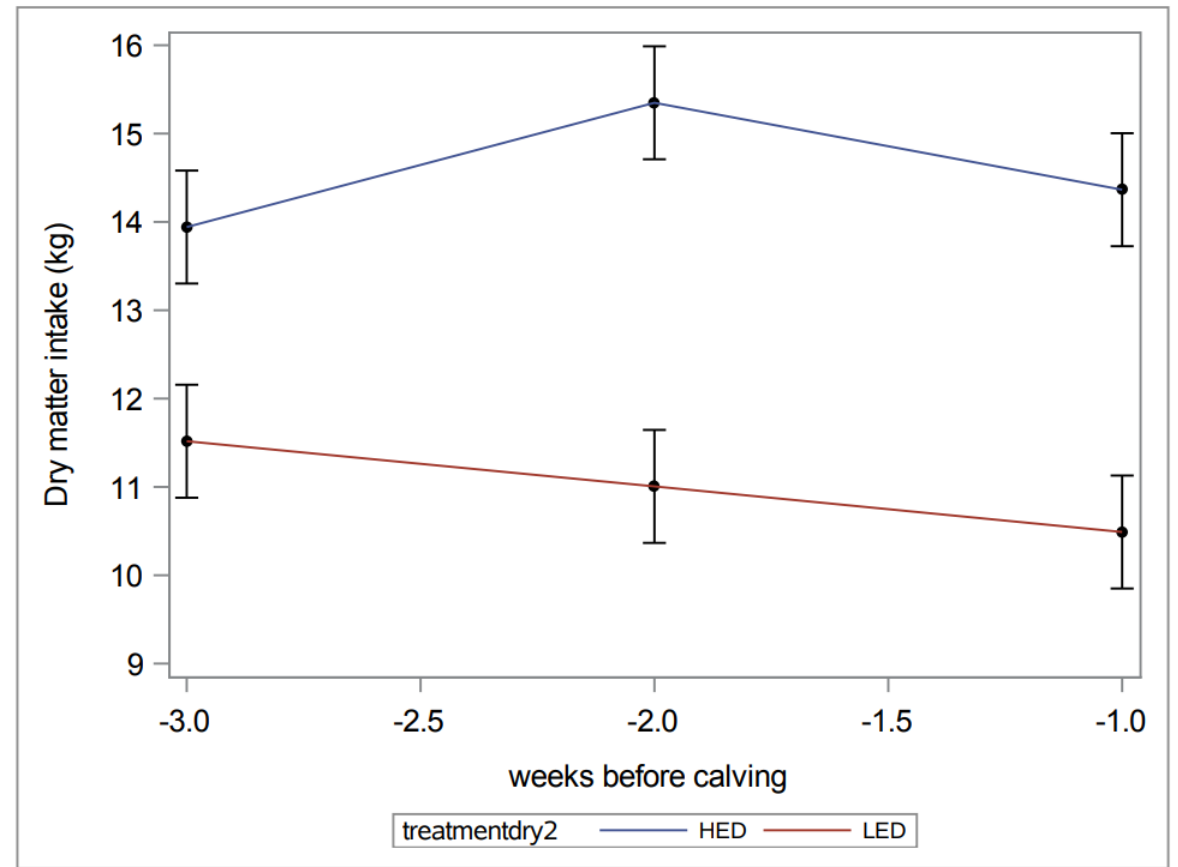
Prepartum DMI

Netherlands



$P < 0.0001$
(pre)

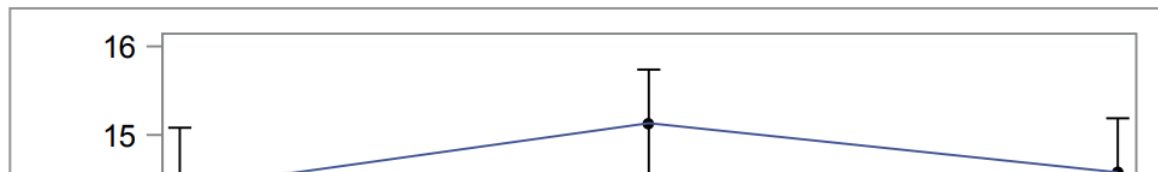
Canada



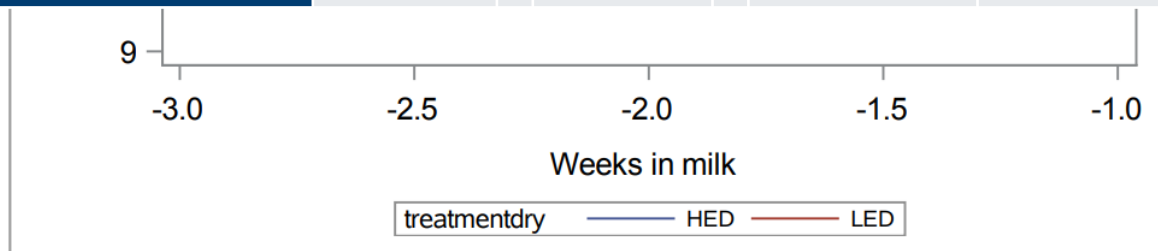
$P < 0.0001$
(pre)

Prepartum DMI

Netherlands

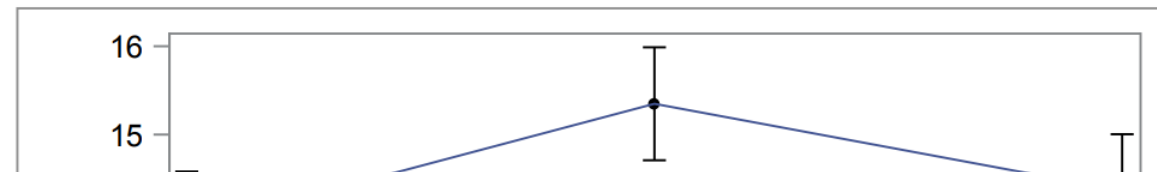


Prepartum ¹	Treatments			P-values
Variable	LED	HED	Highest SEM	pre
BCS week 1 ²	3.3	3.5	0.05	0.006
BCS difference ³	0.09	0.18	0.05	0.15
BW difference ⁴	-55.6	-38.0	5.4	0.006

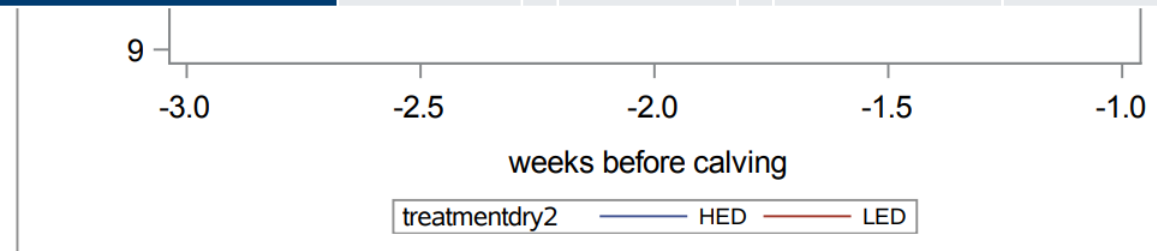


$P < 0.0001$
(pre)

Canada



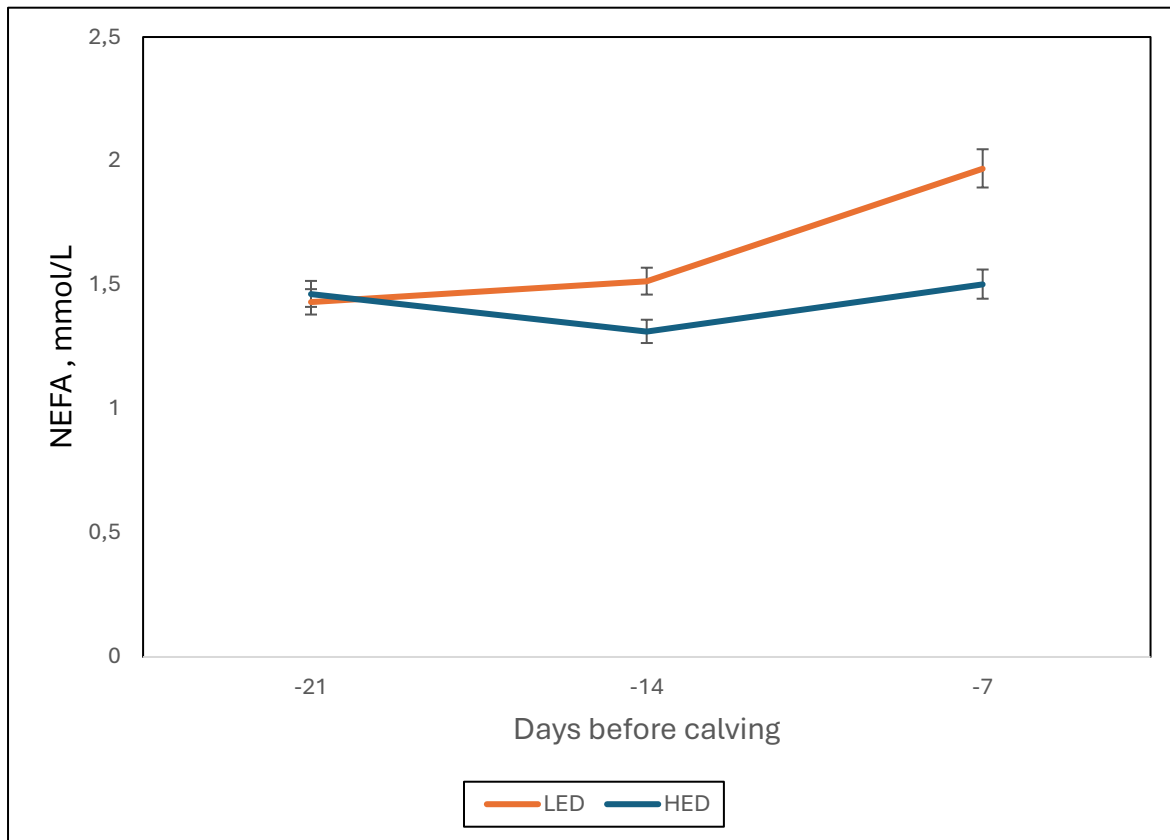
Prepartum ¹	Treatments			P-values
Variable	LED	HED	Highest SEM	pre
BCS week 1 ²	3.2	3.4	0.1	0.05
BCS difference ³	-0.1	0.0	0.06	0.32
BW difference ⁴	-44.3	-30.1	4.7	0.03



$P < 0.0001$
(pre)

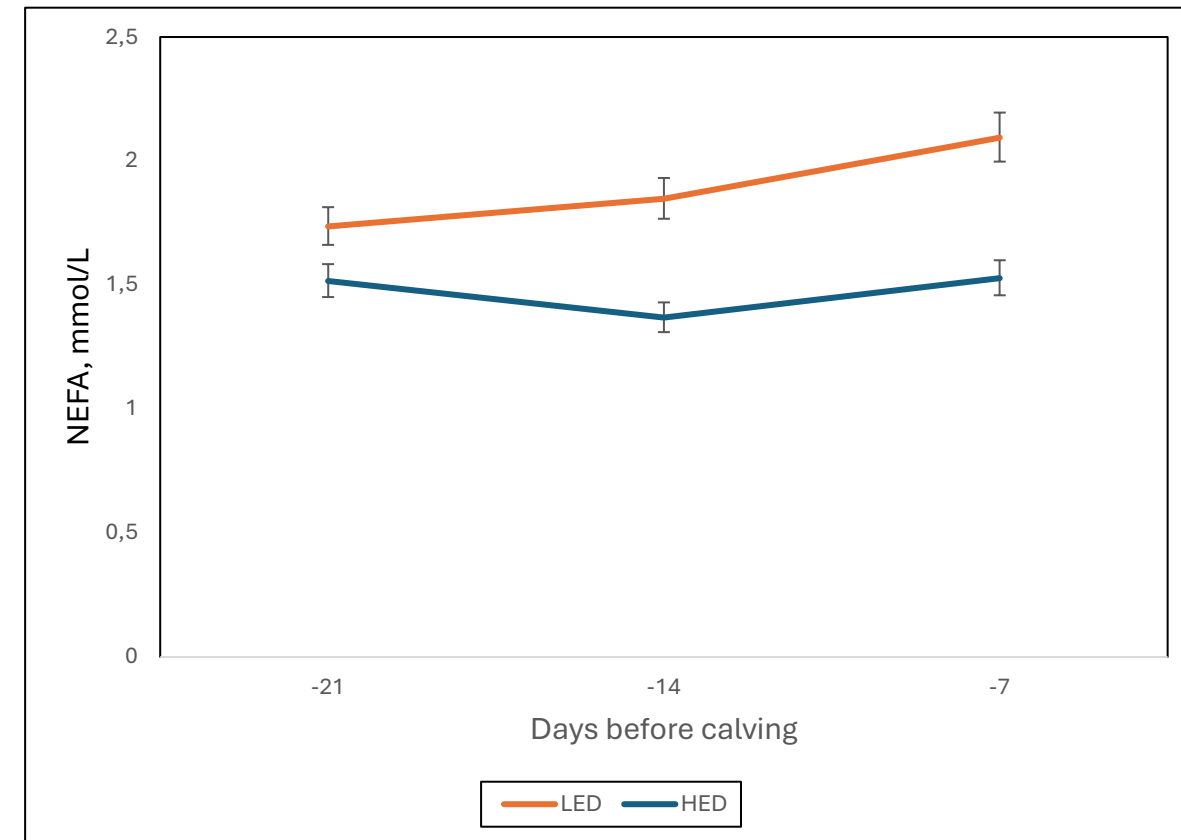
Prepartum blood NEFA

Netherlands



$P < 0.0001$
(pre x day)

Canada

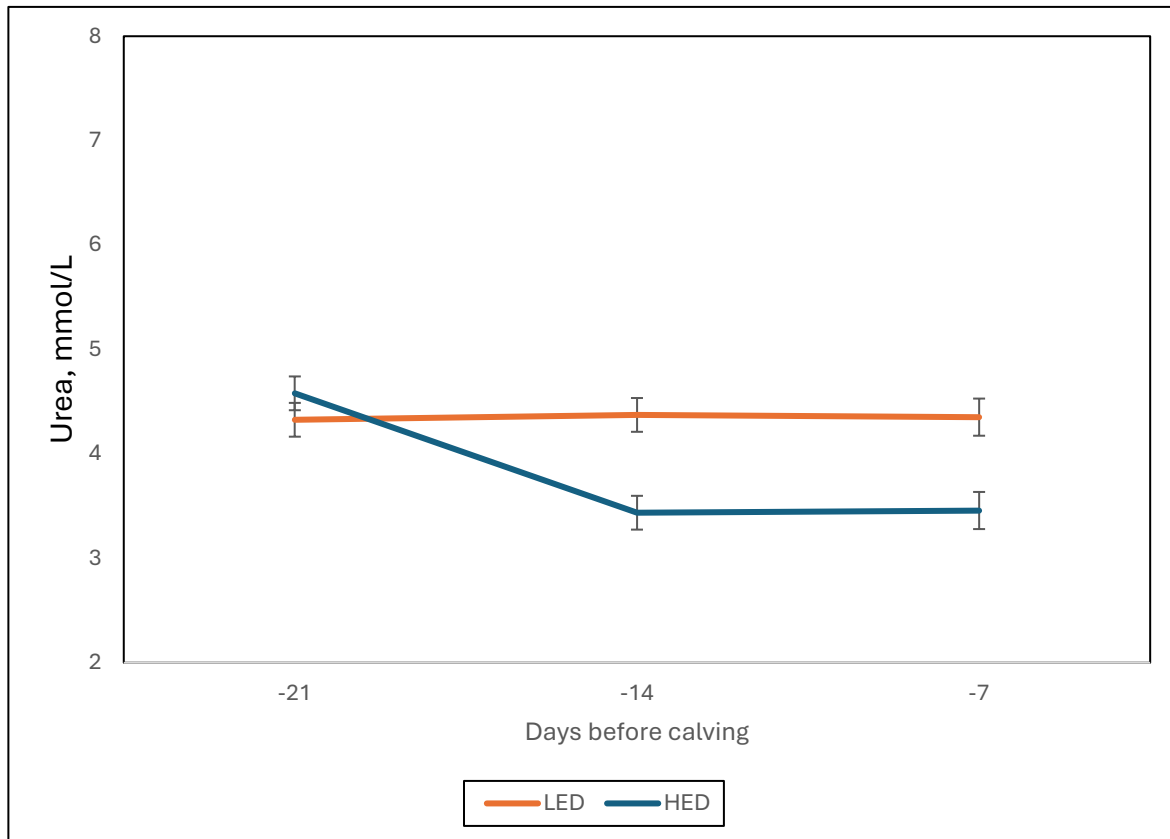


$P < 0.0001$
(pre)

$P = 0.04$
(pre x day)

Prepartum blood urea

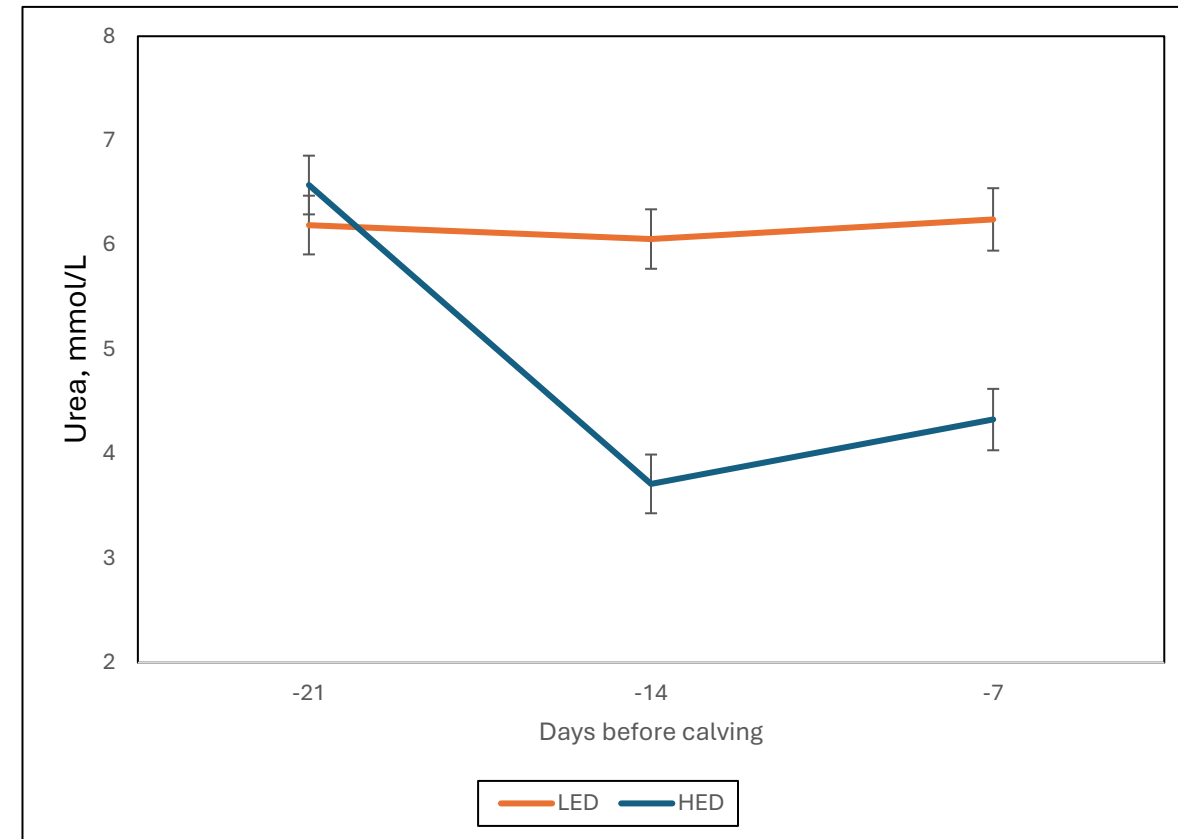
Netherlands



$P = 0.0009$
(pre)

$P < 0.0001$
(Pre x day)

Canada

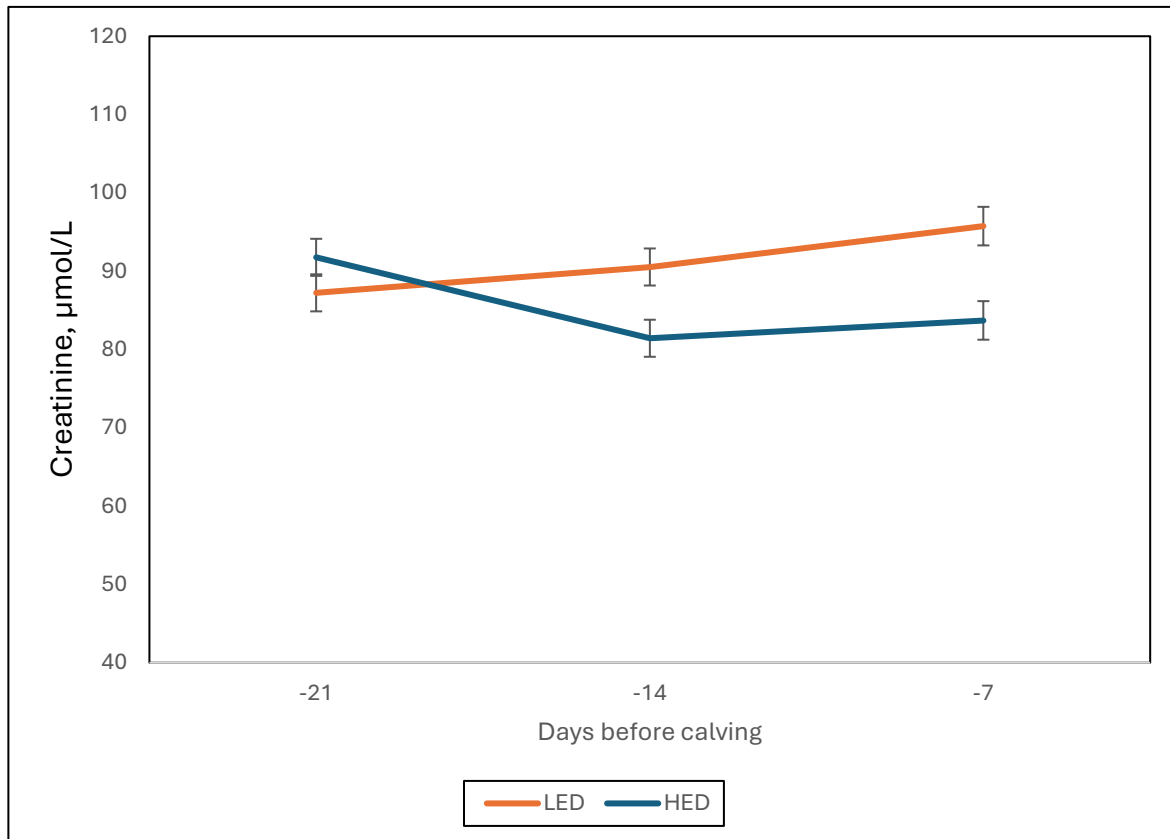


$P < 0.0001$
(pre)

$P < 0.0001$
(pre x day)

Prepartum blood creatinine

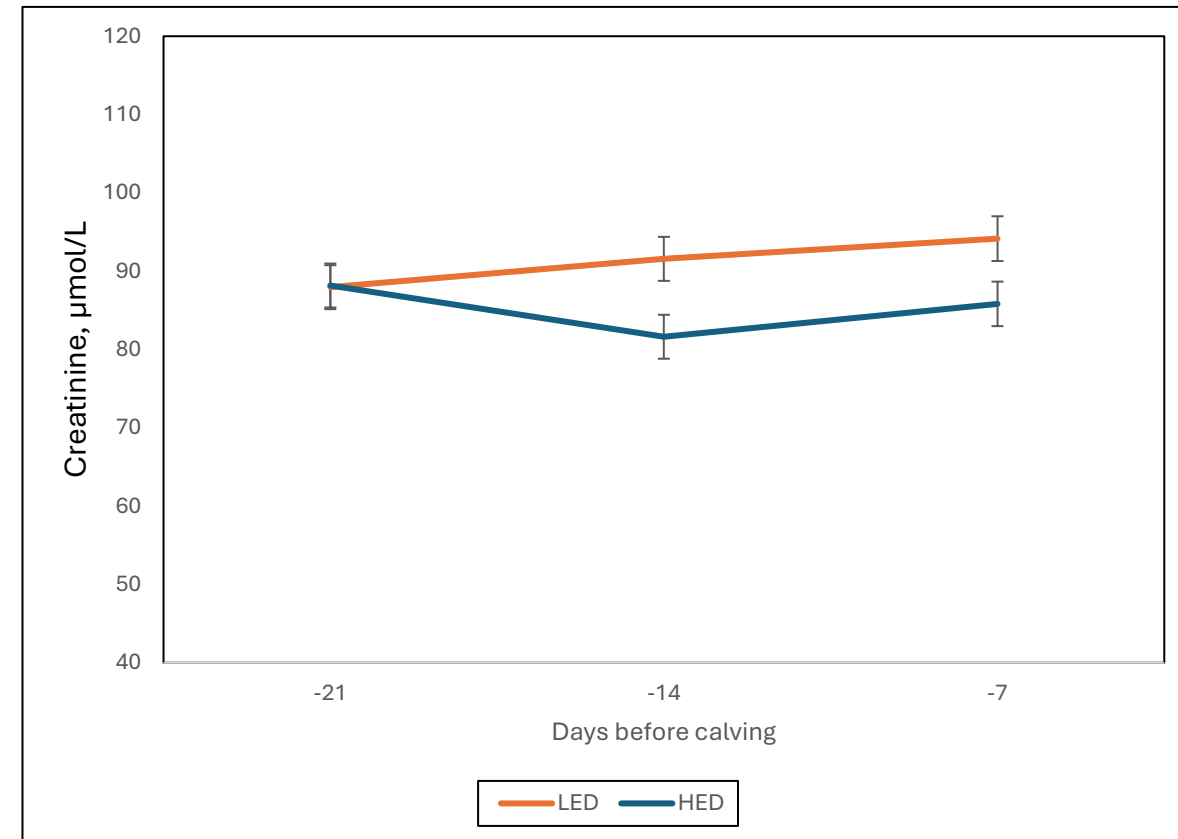
Netherlands



P=0.03
(pre)

P<0.0001
(pre x day)

Canada

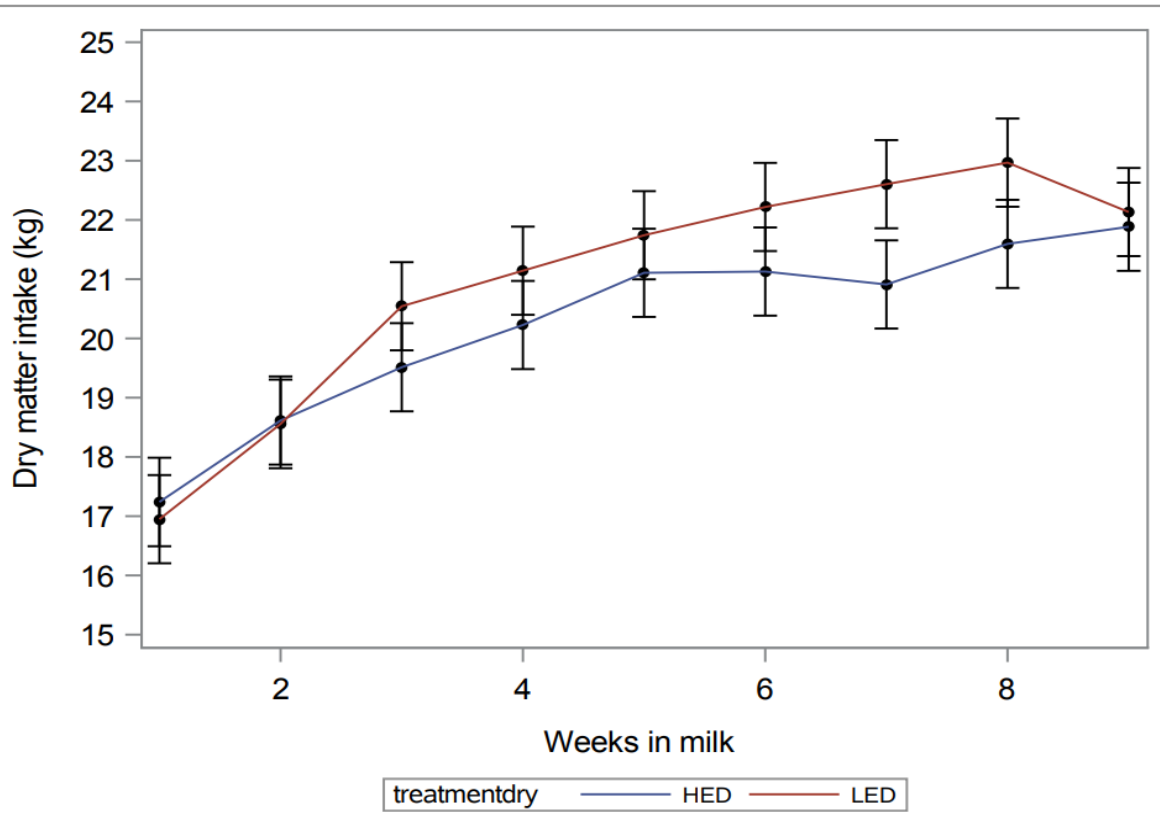


P=0.02
(pre)

P<0.0001
(pre x day)

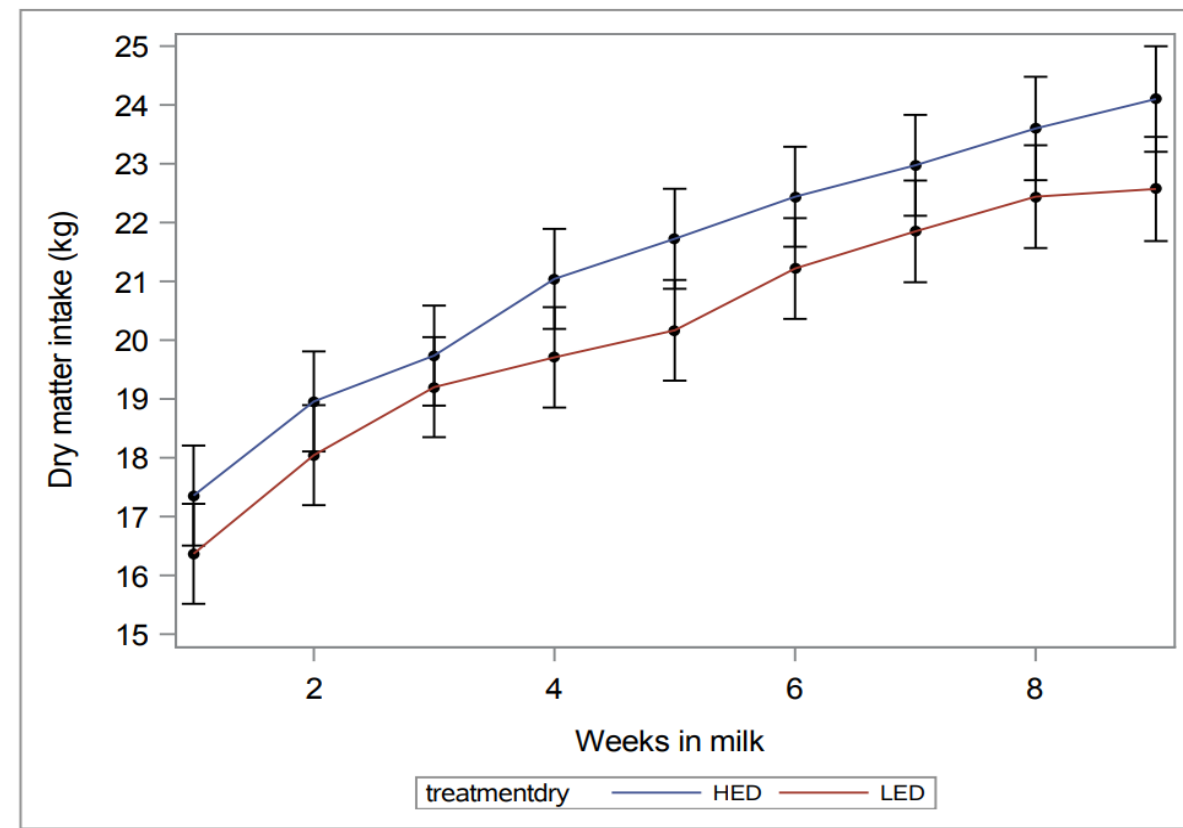
Postpartum DMI

Netherlands



$P=0.23$
(pre)

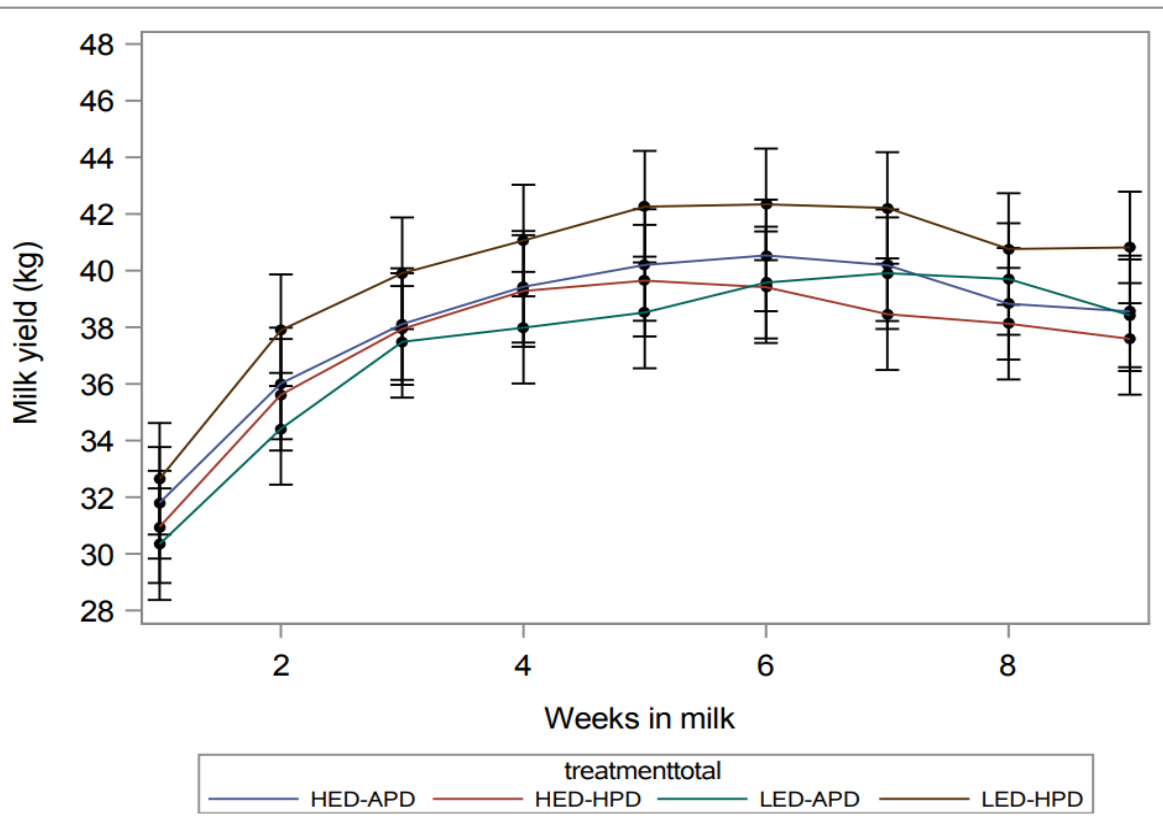
Canada



$P=0.03$
(pre)

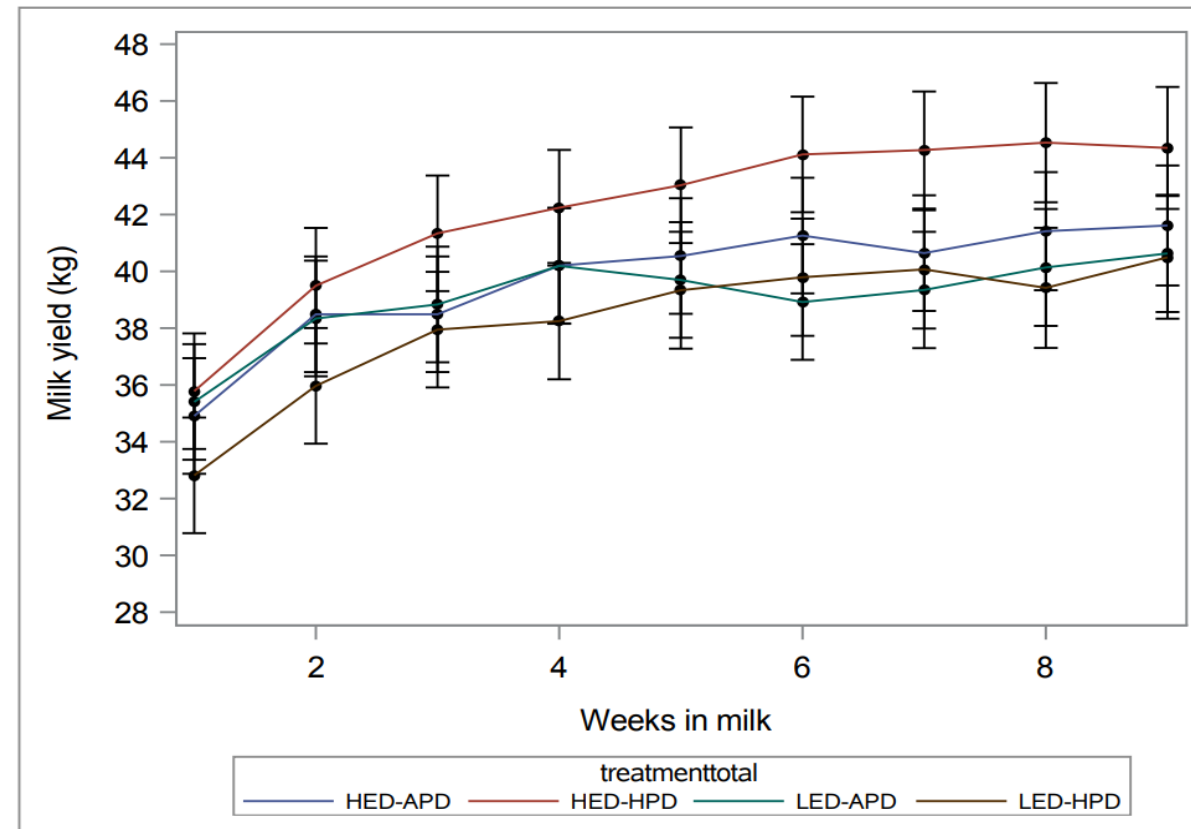
Milk yield

Netherlands



$P=0.08$
(contrast)

Canada

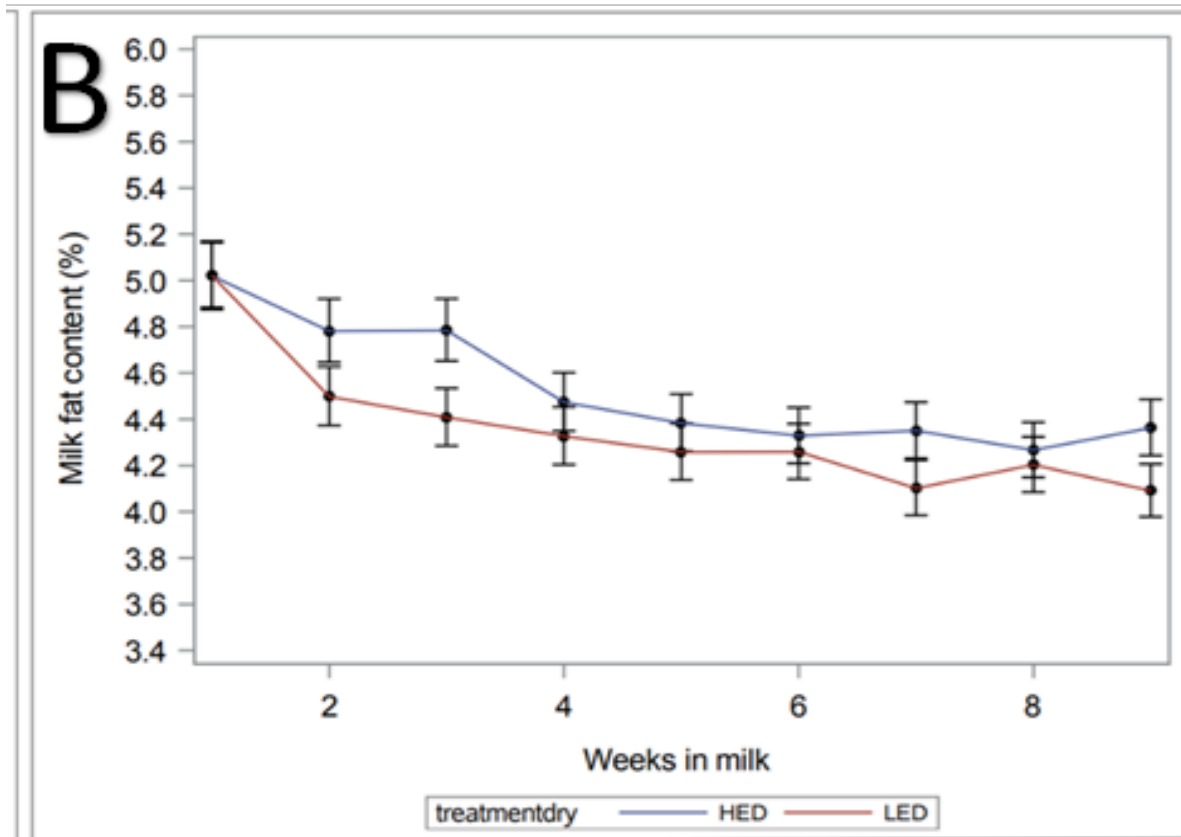


$P=0.03$
(pre)

$P=0.02$
(contrast)

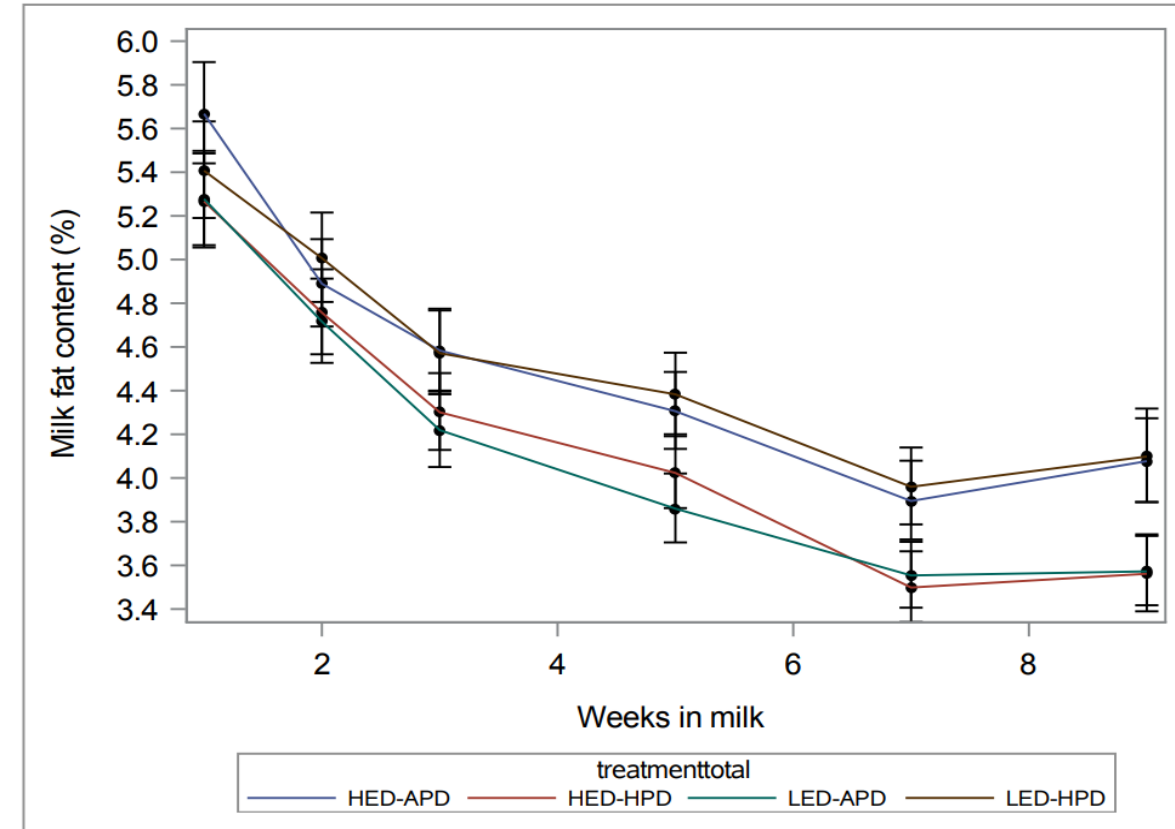
Milk fat %

Netherlands



$P=0.06$
(pre)

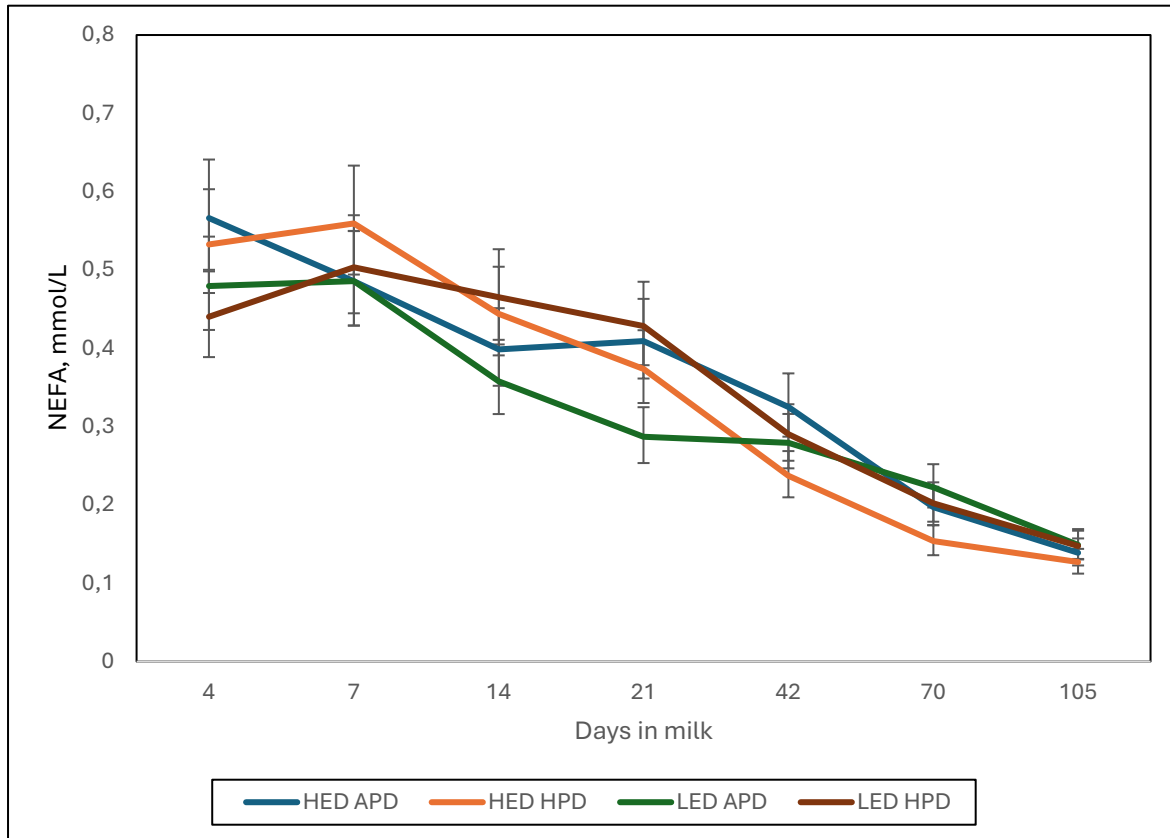
Canada



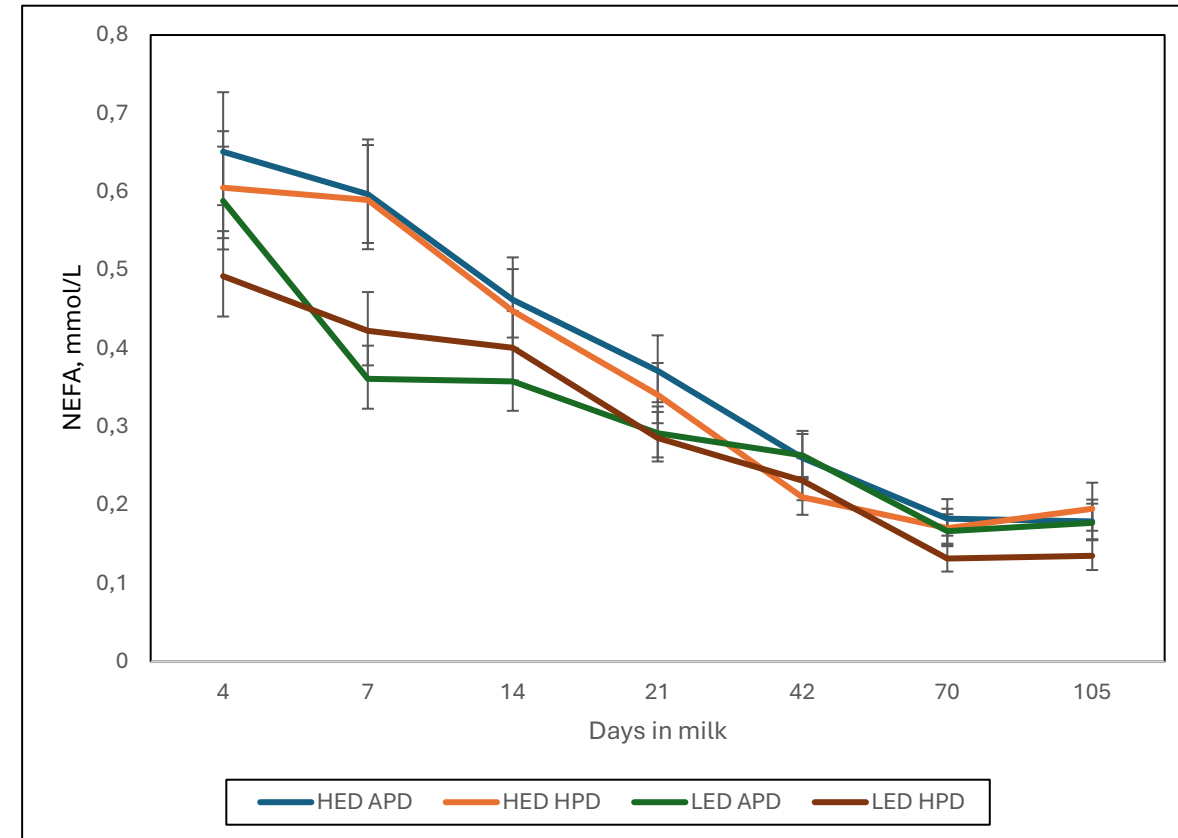
$P<0.01$
(pre x post)

Postpartum blood NEFA

Netherlands



Canada

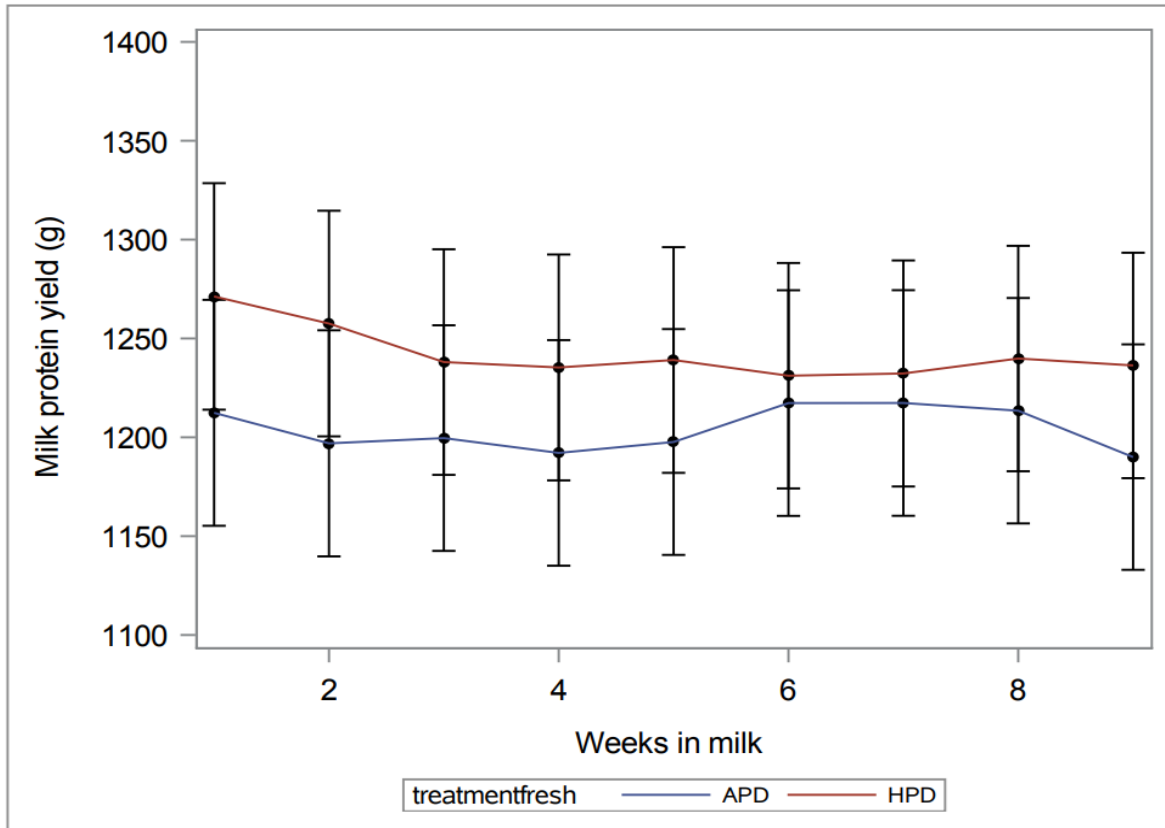


P=0.002
(pre)

P=0.02
(pre x day)

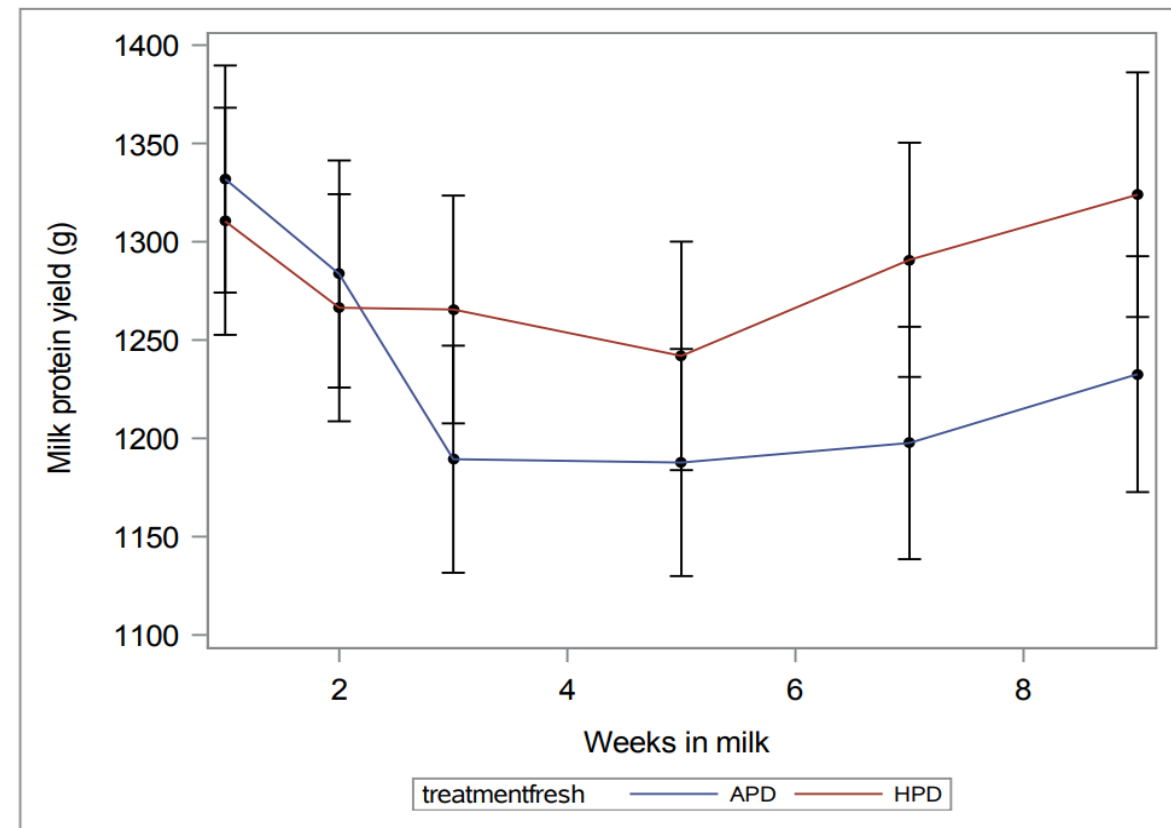
Milk protein yield

Netherlands



$P=0.35$
(post)

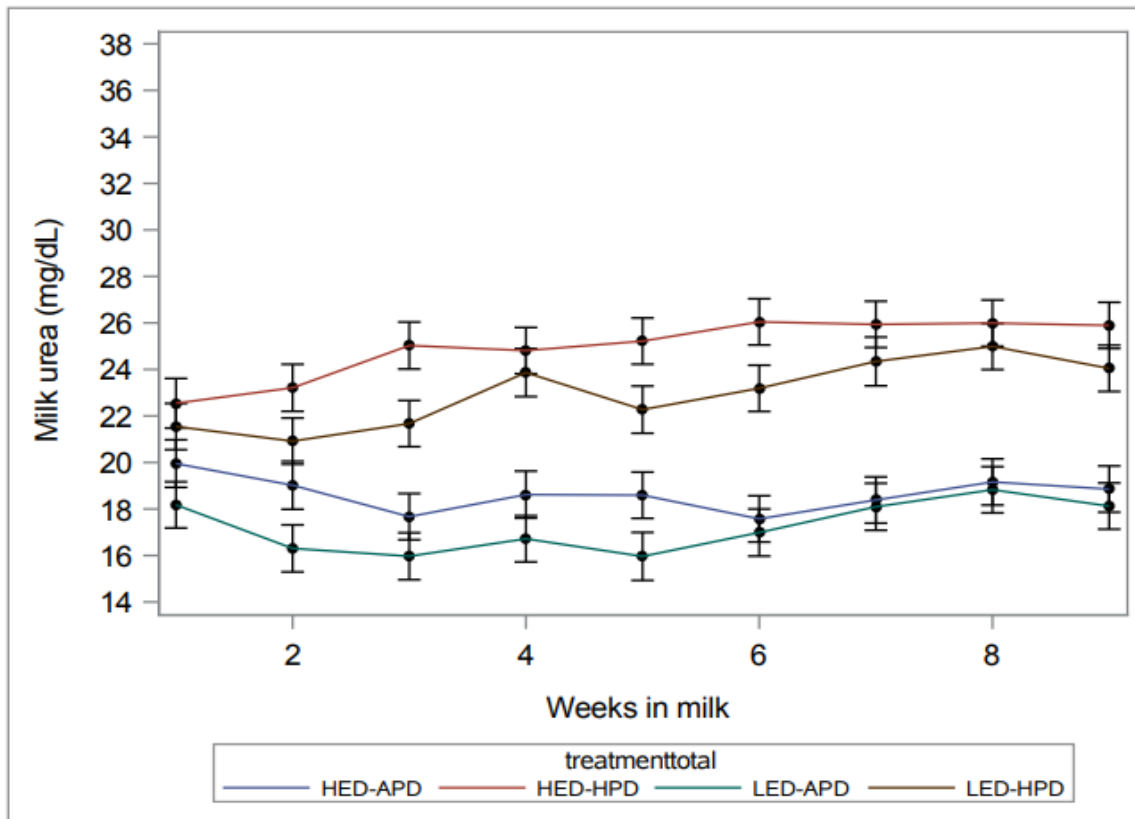
Canada



$P=0.09$
(post x week)

Milk urea concentration

Netherlands

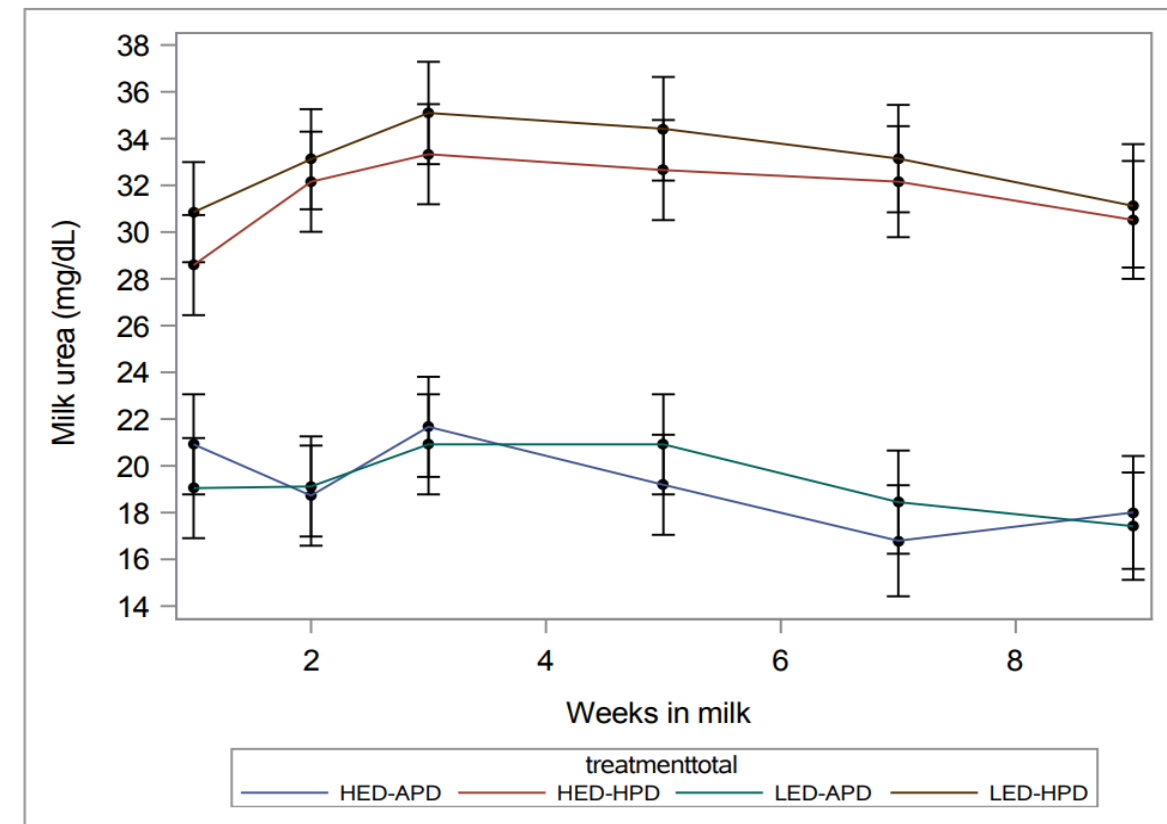


$P=0.002$
(pre)

$P<0.0001$
(post)

$P=0.06$
(post x week)

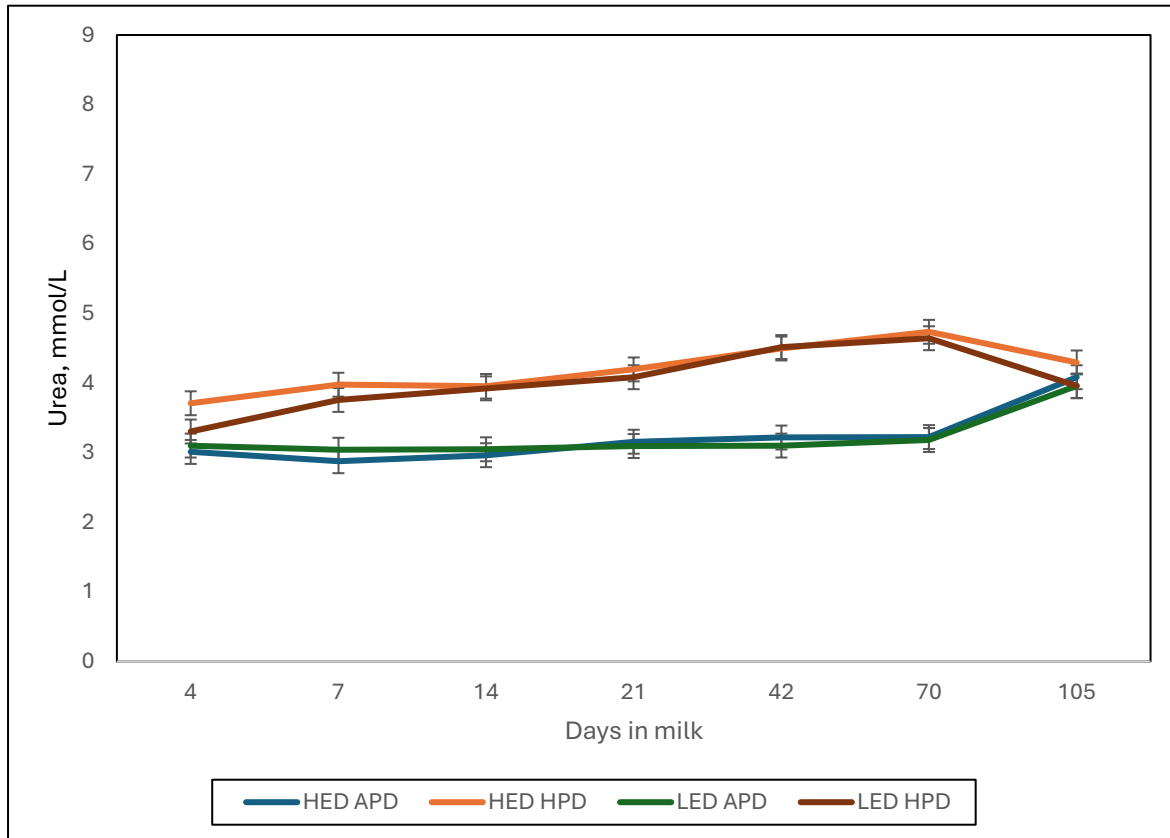
Canada



$P<0.0001$
(post)

Postpartum blood urea

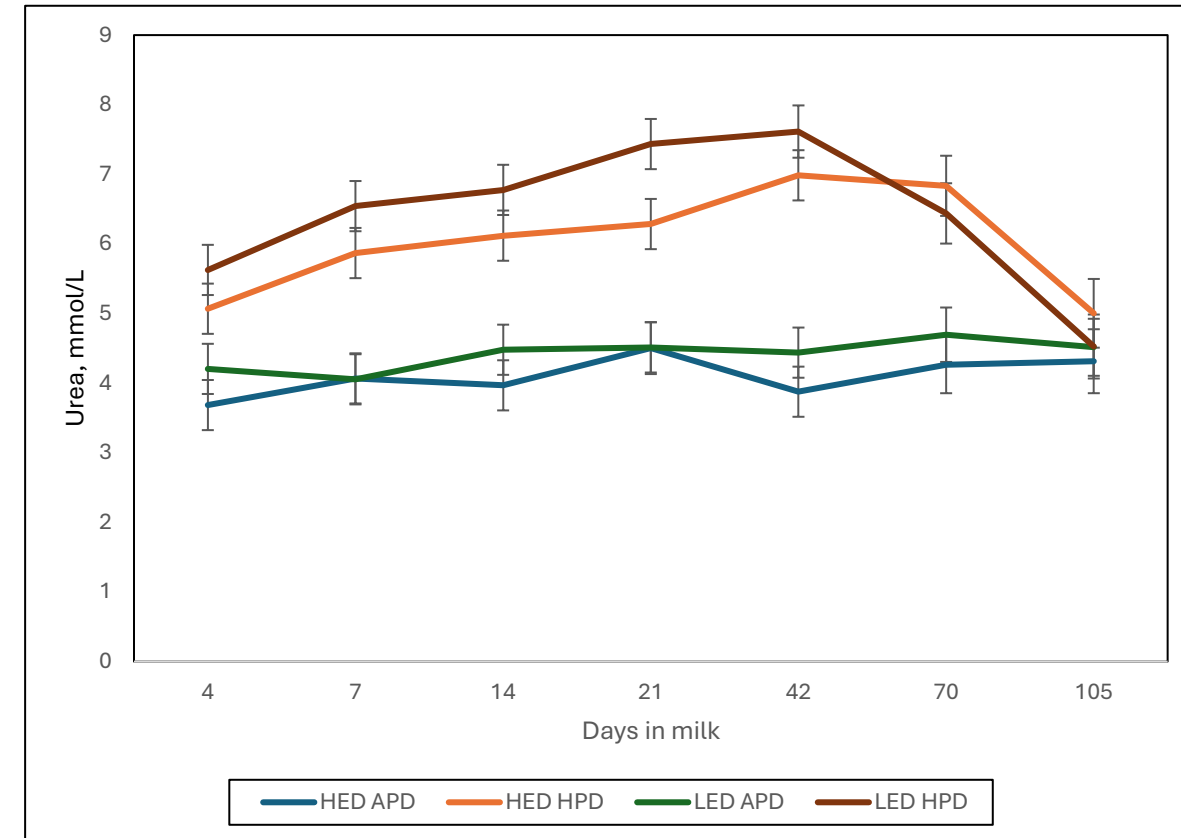
Netherlands



$P < 0.0001$
(post)

$P < 0.0001$
(post x day)

Canada



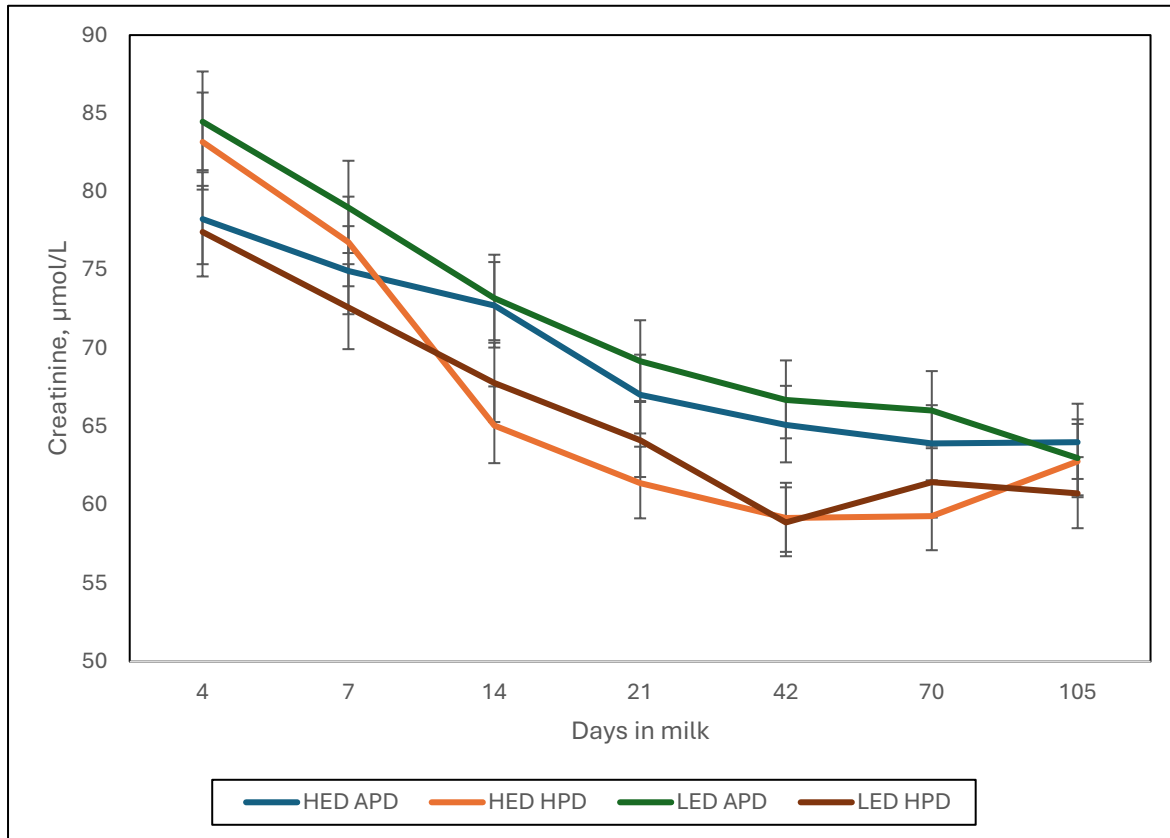
$P = 0.02$
(pre)

$P < 0.0001$
(post)

$P < 0.0001$
(post x day)

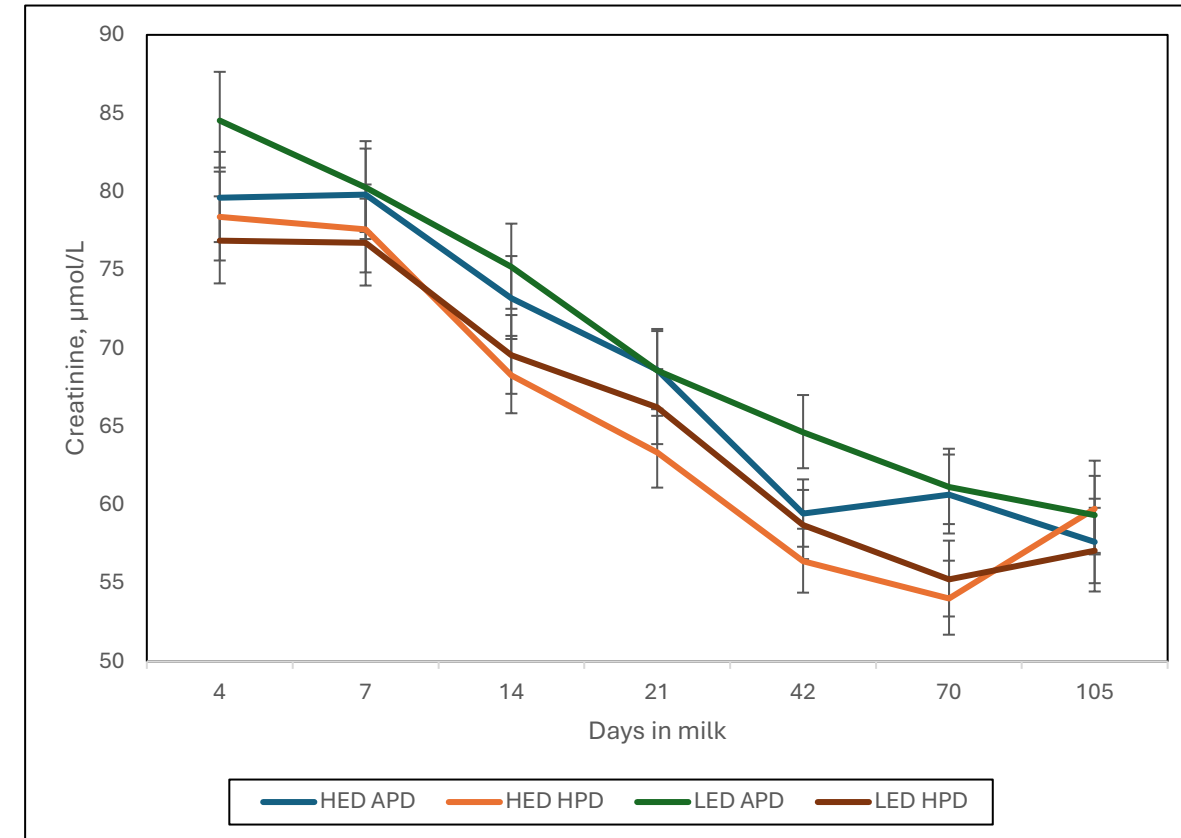
Postpartum blood creatinine

Netherlands



P=0.007
(post)

Canada



P=0.001
(post)

Conclusions

- No interaction between prepartum dietary energy and postpartum dietary protein levels.
- Postpartum responses to prepartum dietary energy levels were inconsistent between locations
 - Differences in diet's energy content
- Protein metabolism parameters were altered according to dietary protein inclusion
 - No clear response in production parameters
- Practical implications: one size might not fit all



Thank you