Methane emission from rosé veal calves feed a maize cob silage-based or grass silage-based ration

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Grass versus maize cob silage

Rose veal calves farms want a high daily weight gain, cheap and reliable feed supply.

Grass silage	Maize silage
• Higher fibre content compared to maize • Higher fibre digestibility (depends on maturity) • No starch • Lower energy concentration • NDF increases methane emissions as it increases the acetate production • Growing of grass us seen has mitigation strategy in the field.	• Lower fibre content compared to grass • In general lower fibre digestibility • High starch content • Higher energy concentration • Starch lowers CH_4 as it increases the propionate production which acts as a sink • Growing of maize have a higher carbon foot-print compared with grass silage.

AIM AND HYPOSTHESIS

Aim:

To investigate the methane emission from rose veal calves feed a total mixed ration based on maize cob silage or grass silage optimized to same energy content.

Hypothesis:

The CH_4 emission did not differ between treatments

MATERIAL AND METHOD

- The calves were selected from a production experiment with 64 calves. The calves were fed the treatment rations from 4 month of age and until slaughter at 12 months.
  - The production experiment was performed in two blocks
  - Feed intake was registered individual and they were weighted every second week.
- 32 Holstein calves were used for the methane study
  - 16 fed a maize-based high energy ration - **yellow** (8 calves from each block)
  - 16 fed a grass-based high energy ration – **green** (8 calves from each block)
- The methane emission was measured by indirect calorimetry when the calves were 247±6 days (approx. 8 month)
- The calves were tied up 3-4 days before the measurements took place.
- Emissions were measured for three days.
- Dry matter intake was recorded daily.

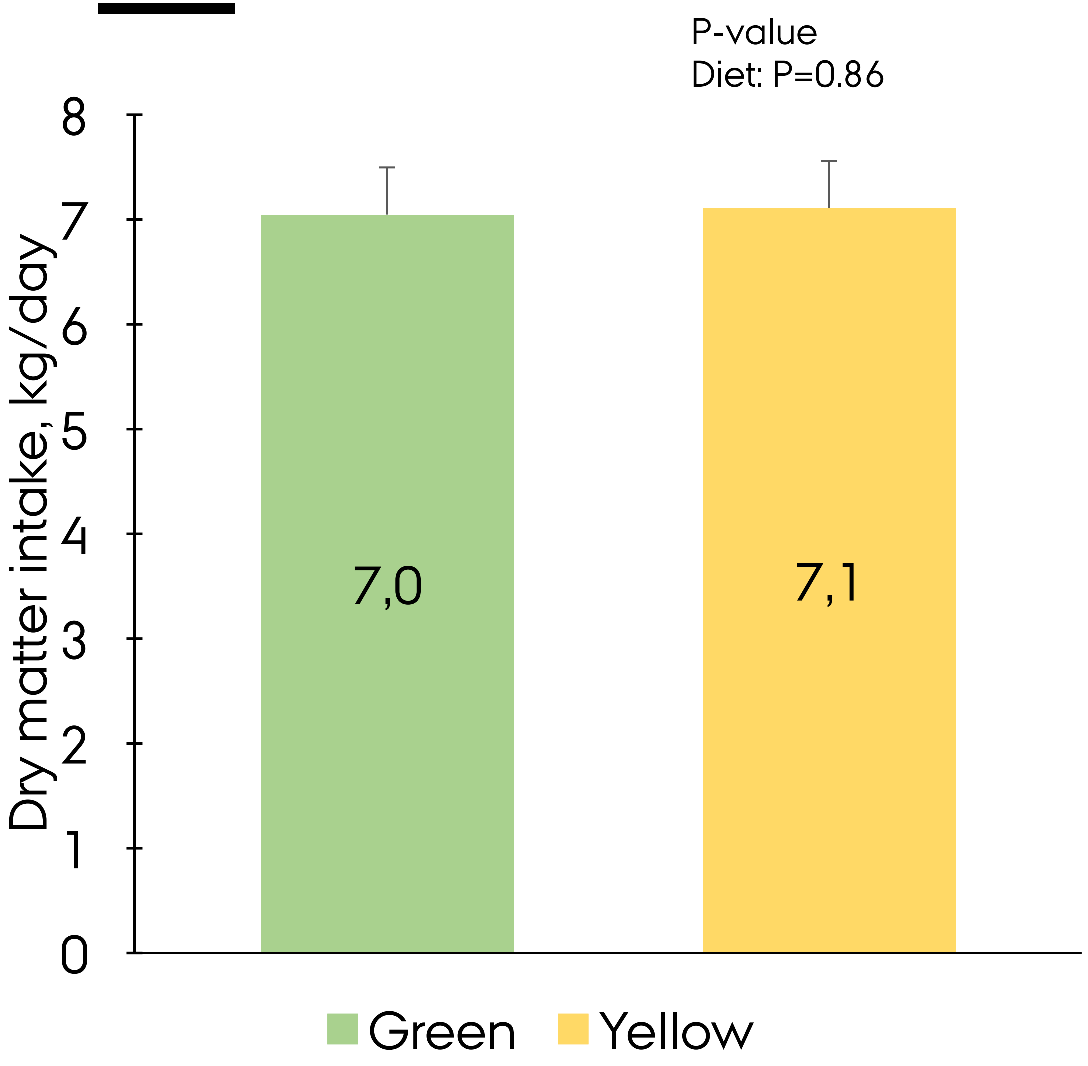
DIETARY COMPOSITION

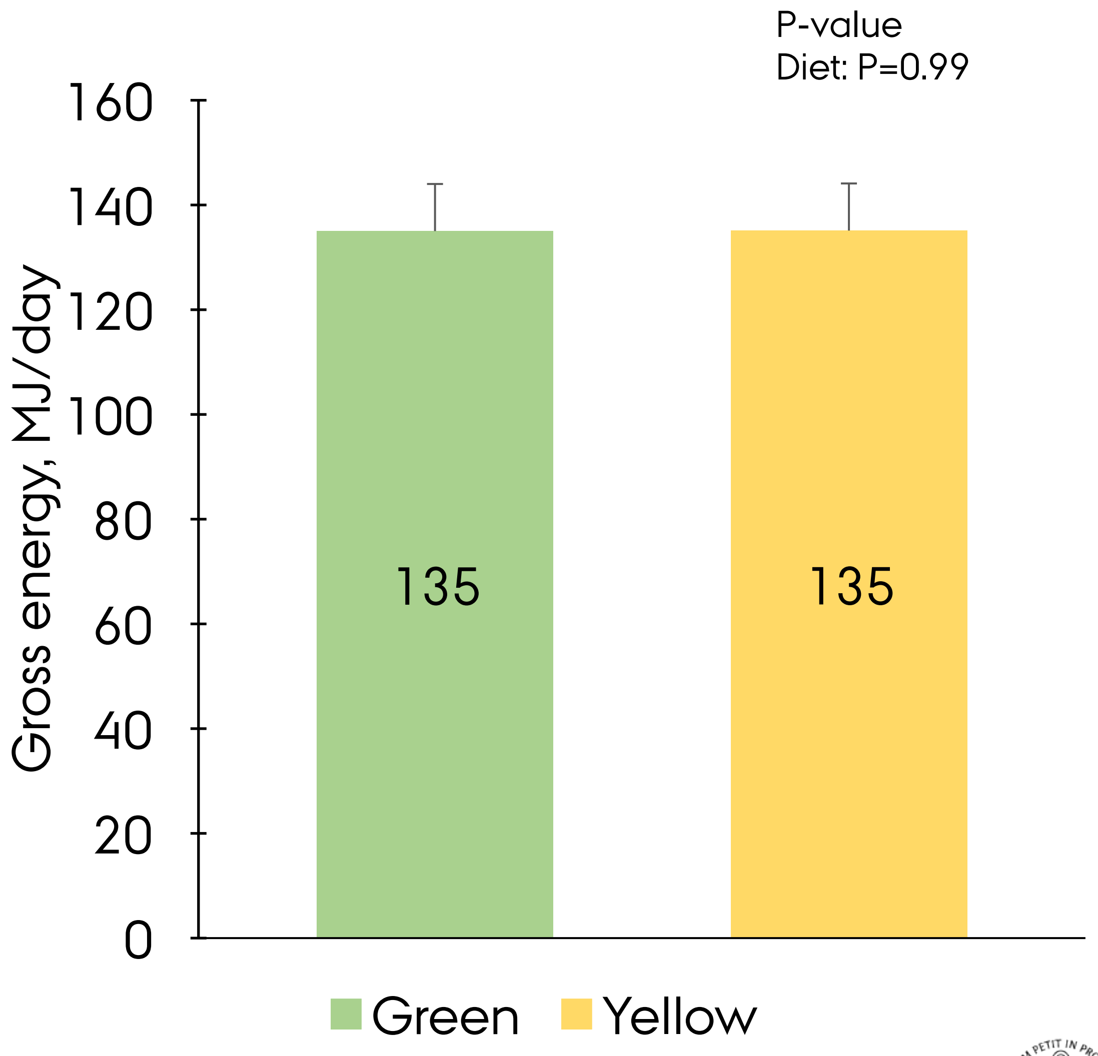
	Block 1		Block 2	
	Yellow	Green	Yellow	Green
Maize cob silage, g/kg DM	461		461	
Grass silage, 1 cut, g/kg DM		289		296
Spring barley, g/kg DM	199	485	199	471
Rapeseed, rolled, g/kg DM		52		54
Rapeseed meal, g/kg DM	261		261	
Fava beans, g/kg DM		157		162
Sugar beet pulp, g/kg DM	62		62	
Carbon carbonate, g/kg DM	9	9	6	9
Minerals, g/kg DM	6	6	6	7

CHEMICAL COMPOSITION

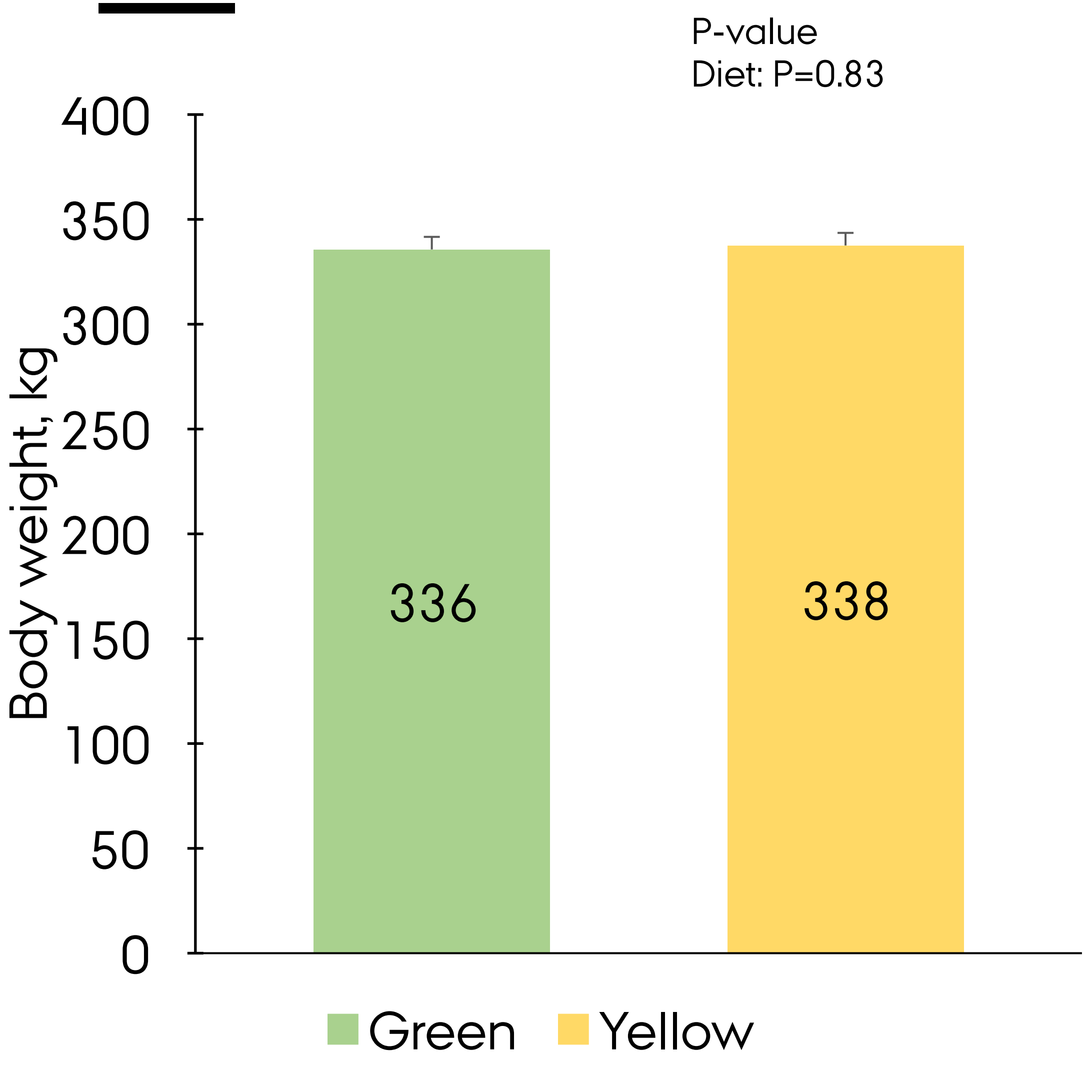
	Block 1		Block 2	
	Yellow	Green	Yellow	Green
Ash, g/kg DM	56	59	53	57
Organic matter, g/kg DM	944	940	946	942
Crude protein, g/kg DM	165	165	154	158
Crude fat, g/kg DM	34	52	35	57
Sugar, g/kg DM	36	25	34	16
Starch, g/kg DM	372	357	381	354
NDF, g/kg DM	208	181	252	212
Gross energy, MJ/kg DM	19.0	19.3	19.0	19.4

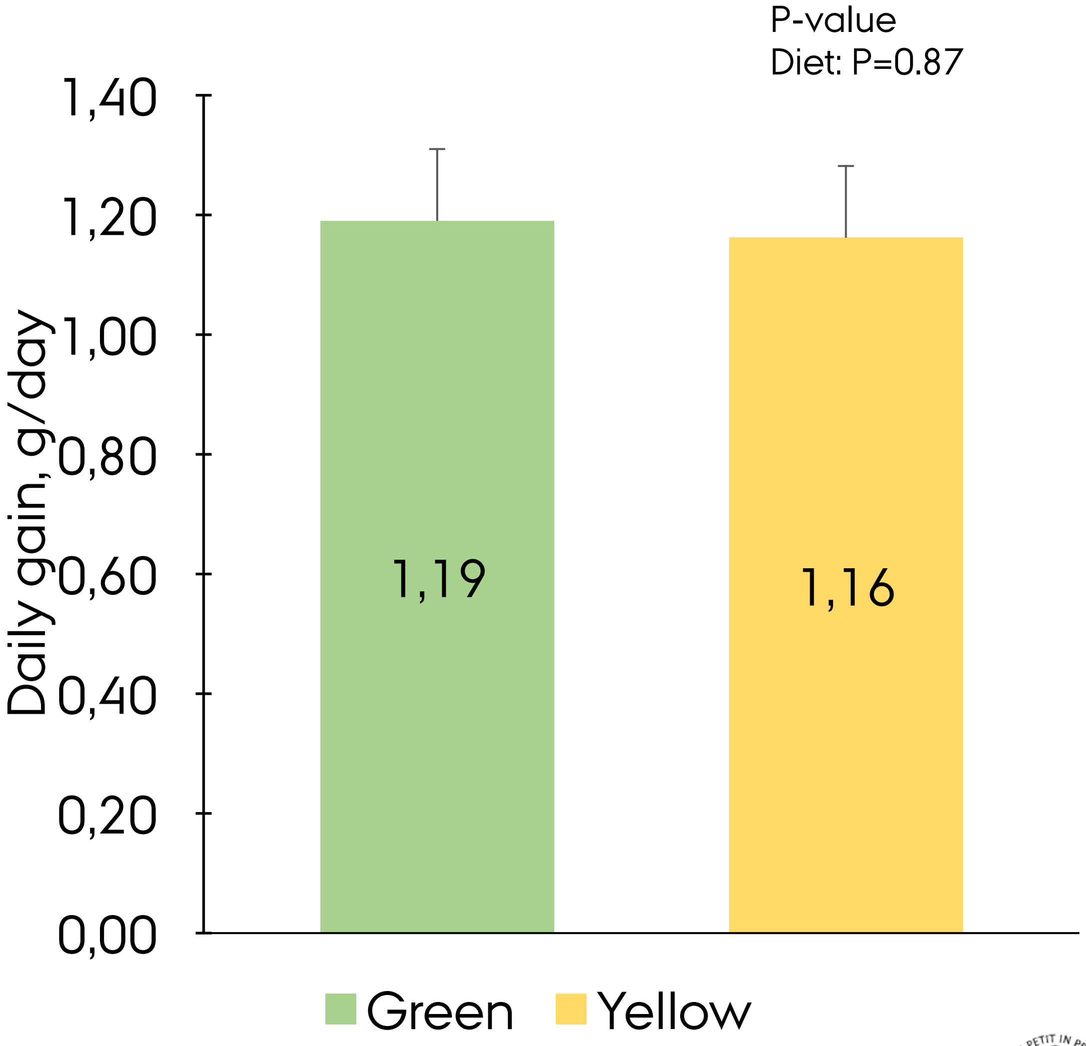
INTAKE


P-value
Diet: P=0.86
Dry matter intake, kg/day
0
1
2
3
4
5
6
7
8
7,0
7,1
Green
Yellow

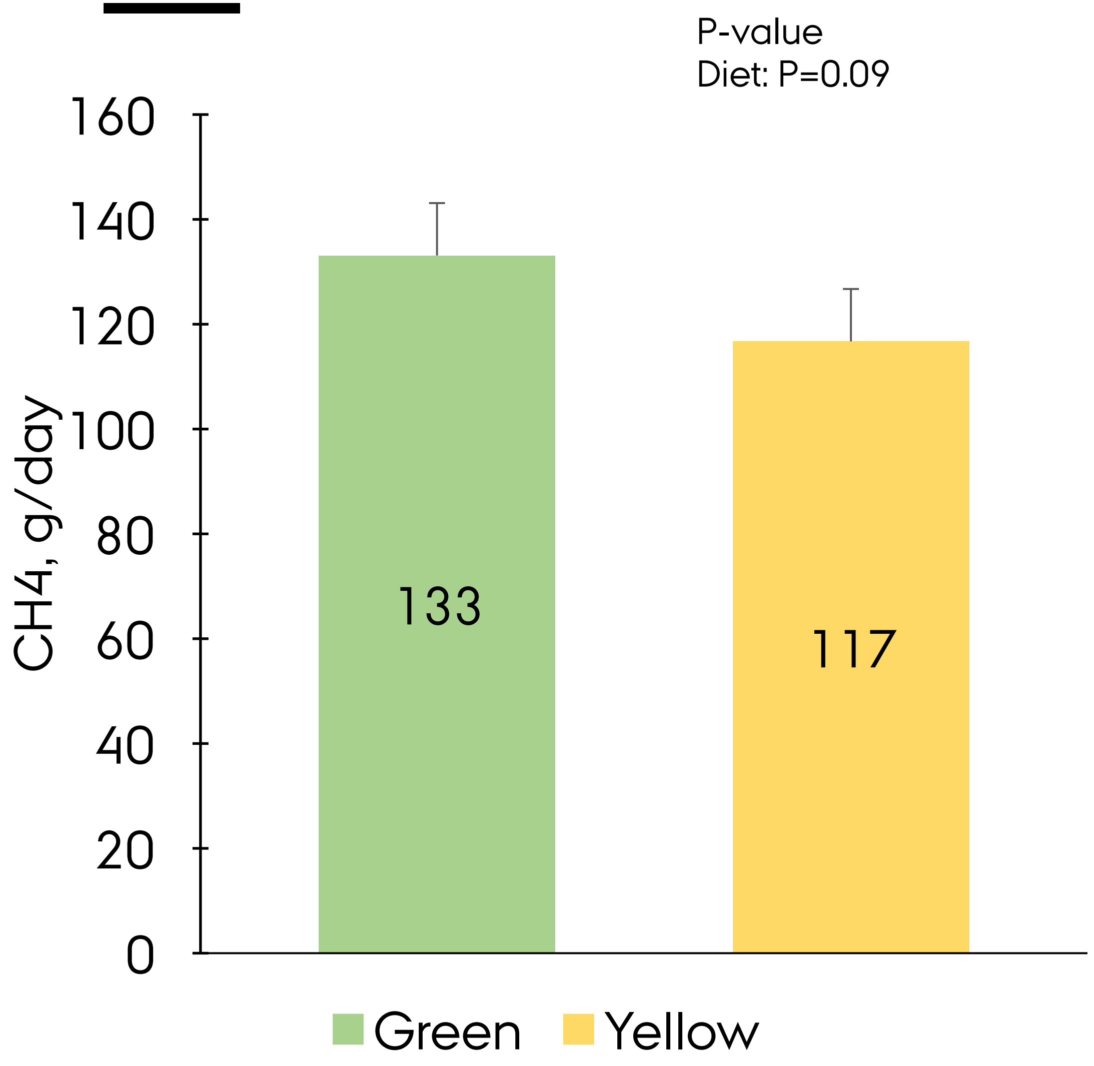

P-value
Diet: P=0.99
Gross energy, MJ/day
0
20
40
60
80
100
120
140
160
135
135
Green
Yellow

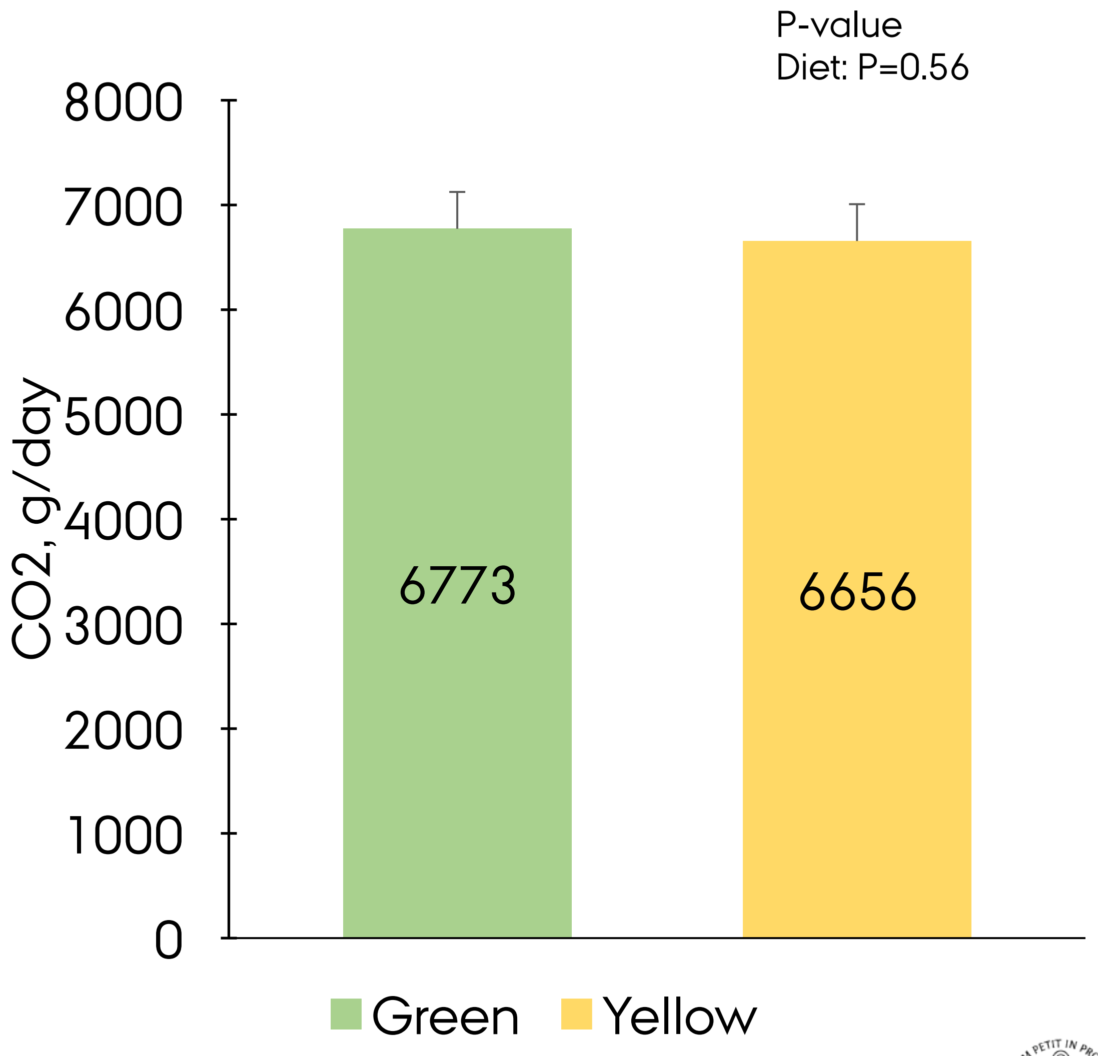
BODY WEIGHT AND DAILY GAIN





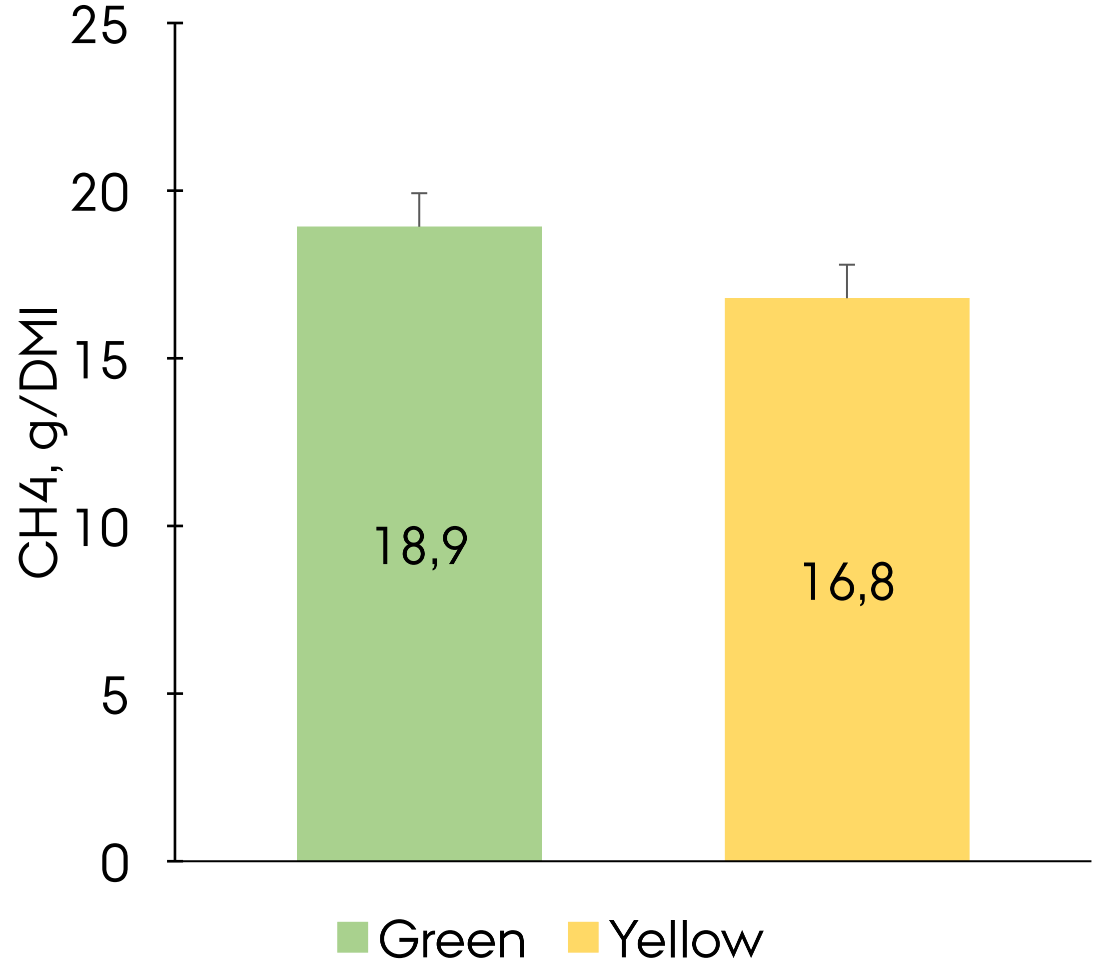
EMISSIONS PER DAY



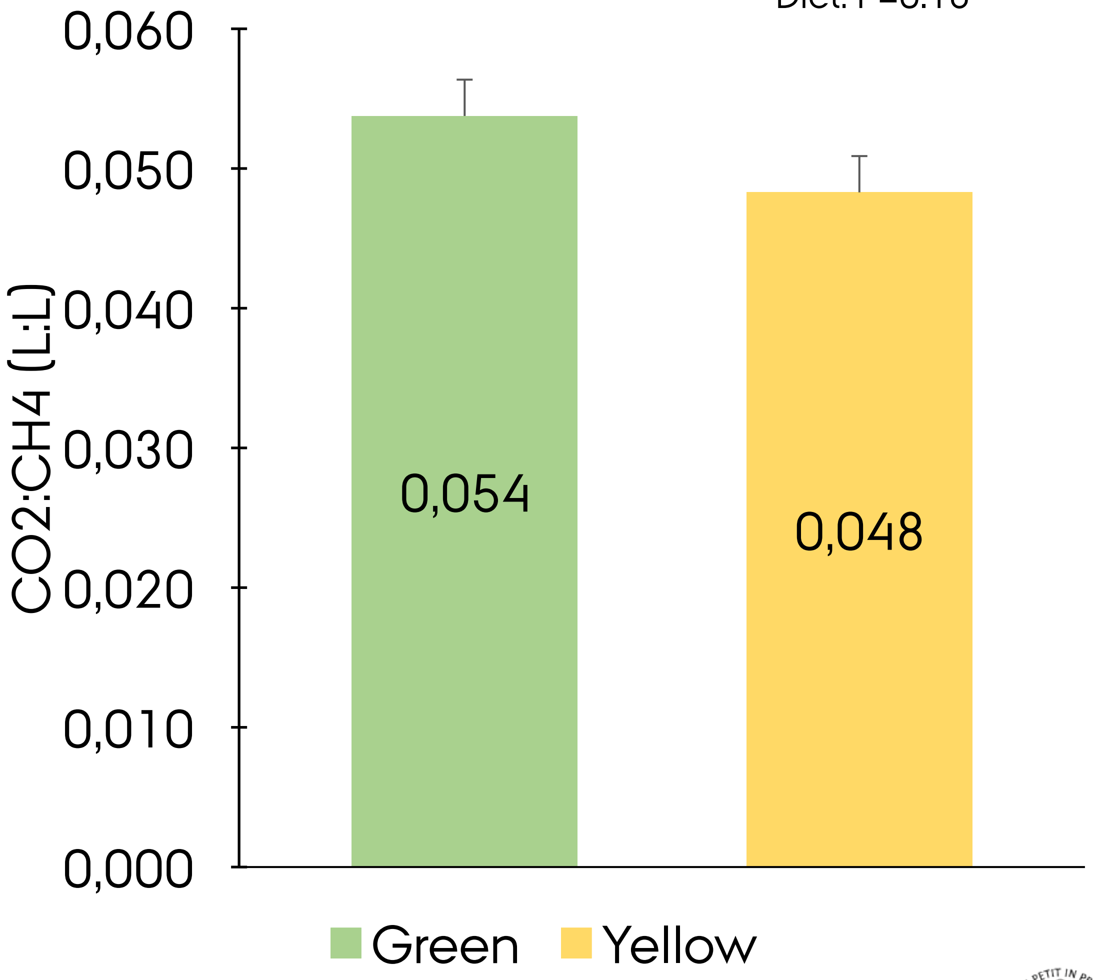


EMISSIONS

P-value
Diet: P=0.15

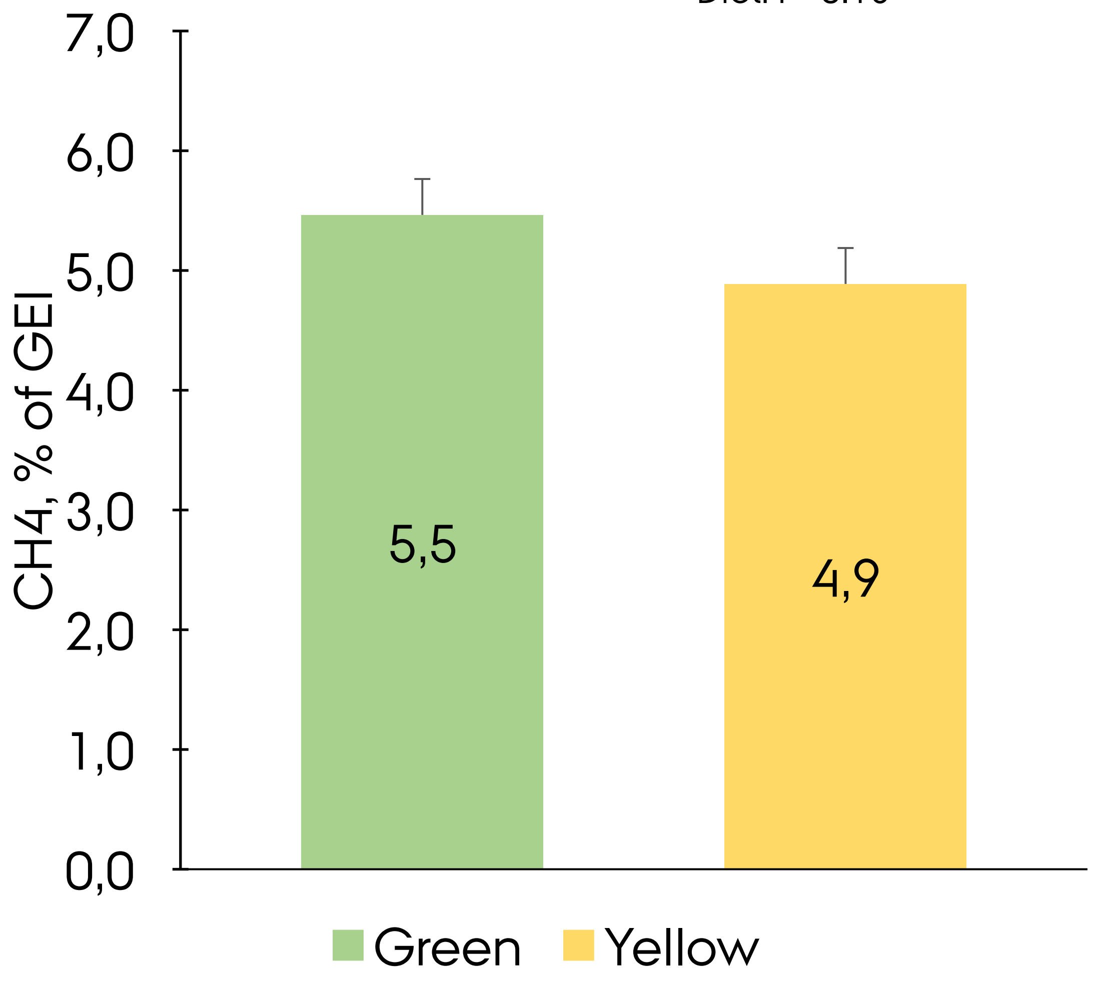


P-value
Diet: P=0.16

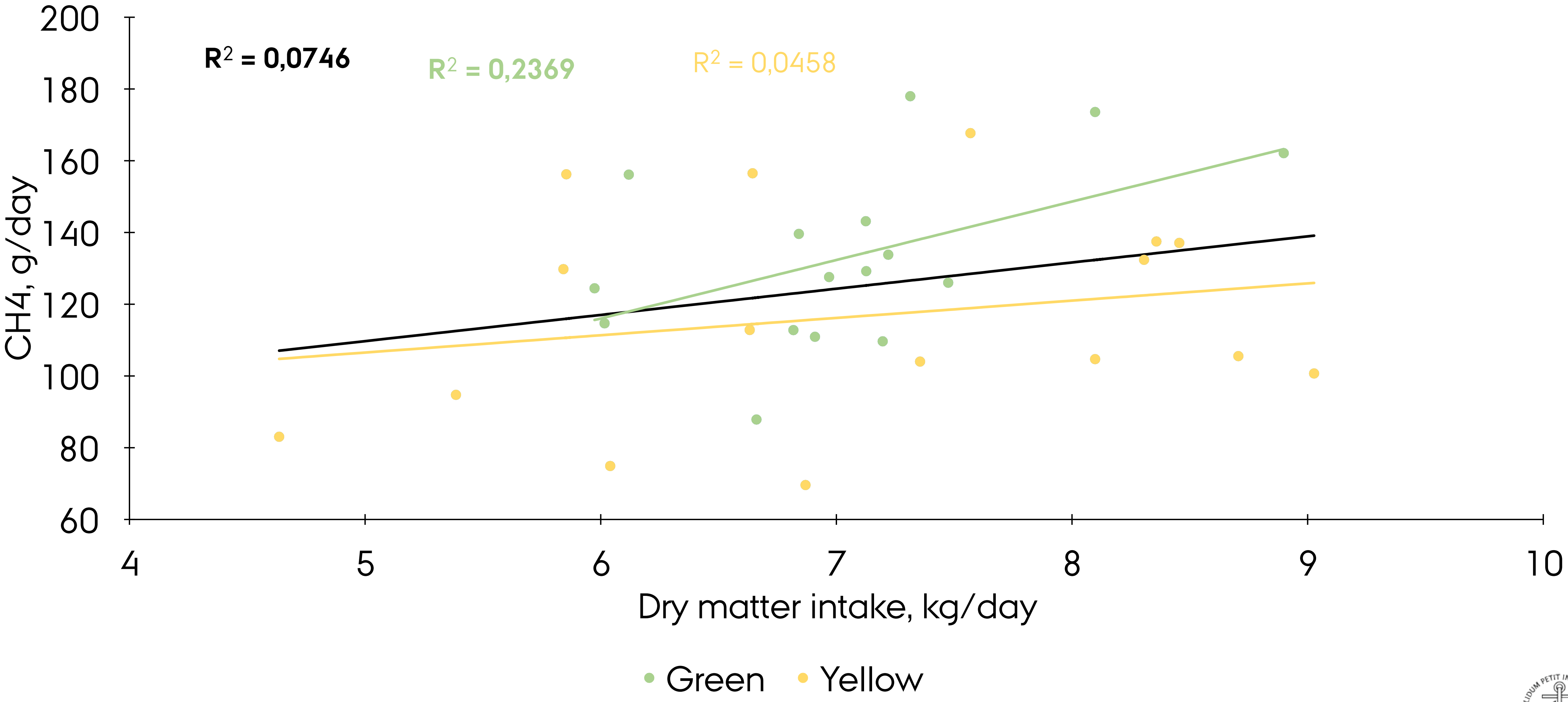


EMISSIONS

P-value
Diet: P=0.18

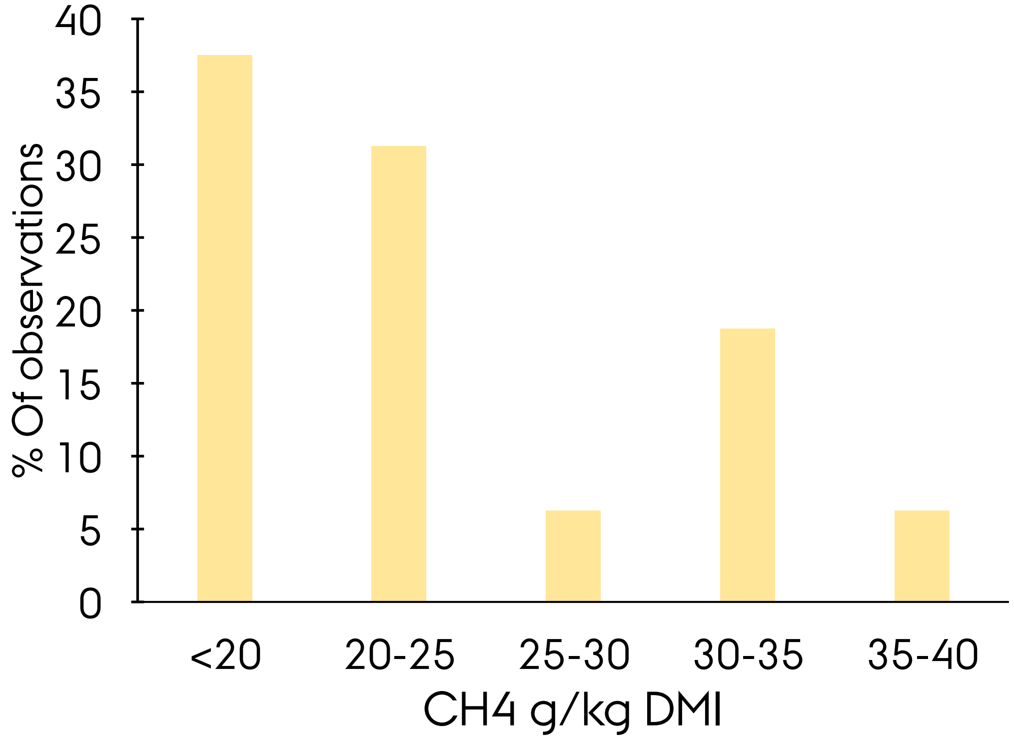


CH4 VERSUS DMI

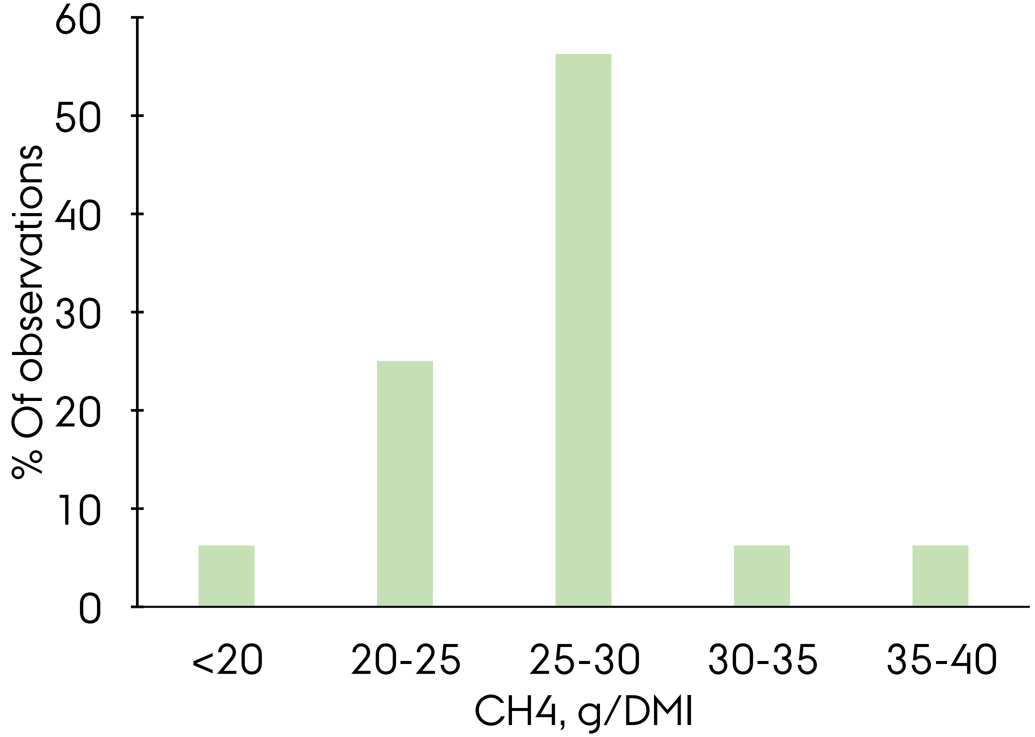


VARIATION IN DATA – CH_4, G/KG DMI

Yellow– Holstein bulls (n=16)



Green – Holstein bulls (n=16)



CONCLUSION

- The feed intake/energy intake did not differ between treatments

- There was a tendency to higher daily emission in the grass-based compared with maize-based TMR.

- The emission did not differ between treatments when the CH_4 emission was related to DMI, CO_2 production or energy intake.

Thanks for your Attention

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Kvægafgiftsfonden

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VARIATION IN DATA