Comparison of methane emissions of Belgian Blue and Holstein Friesian heifers

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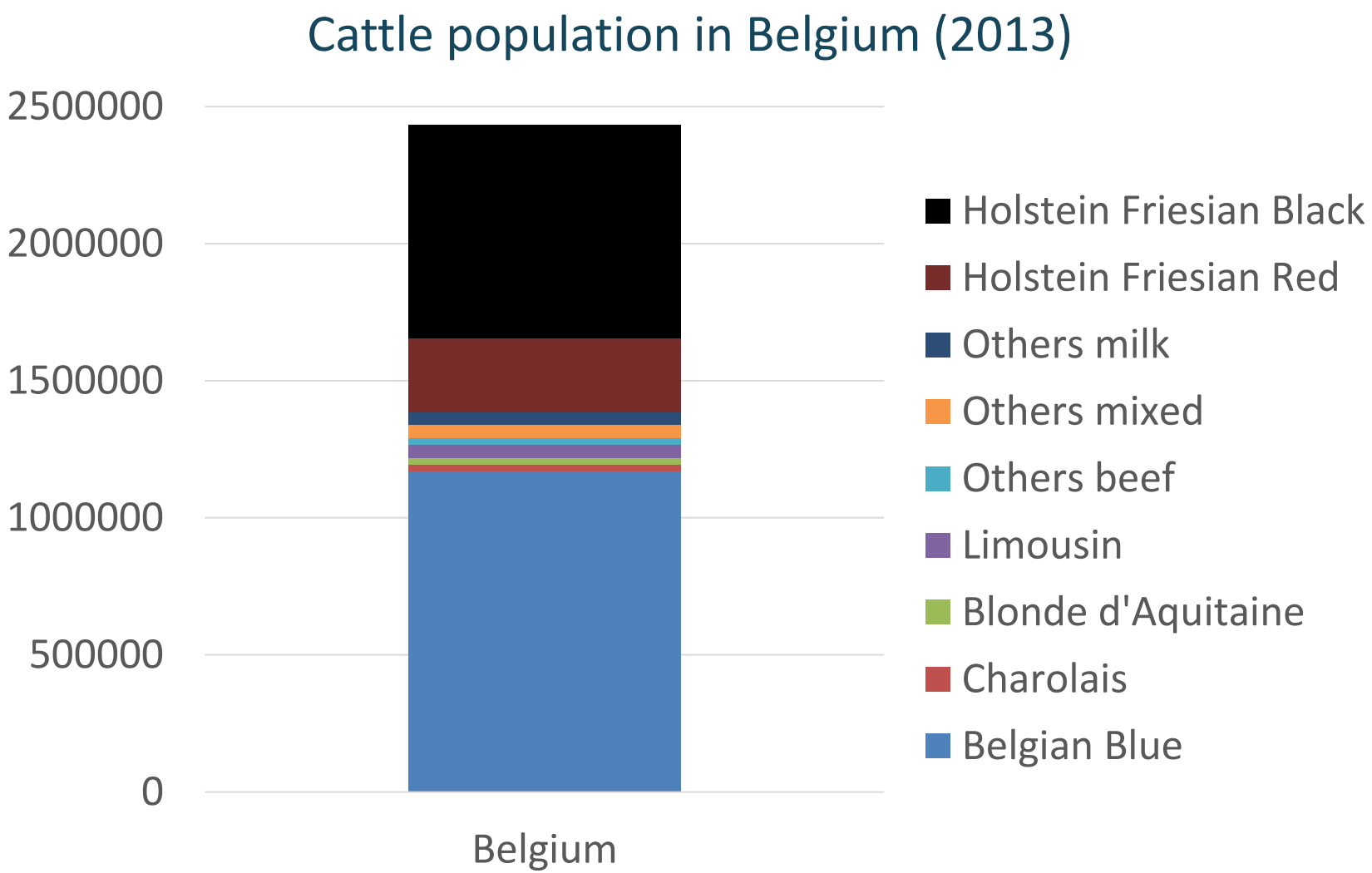
Introduction



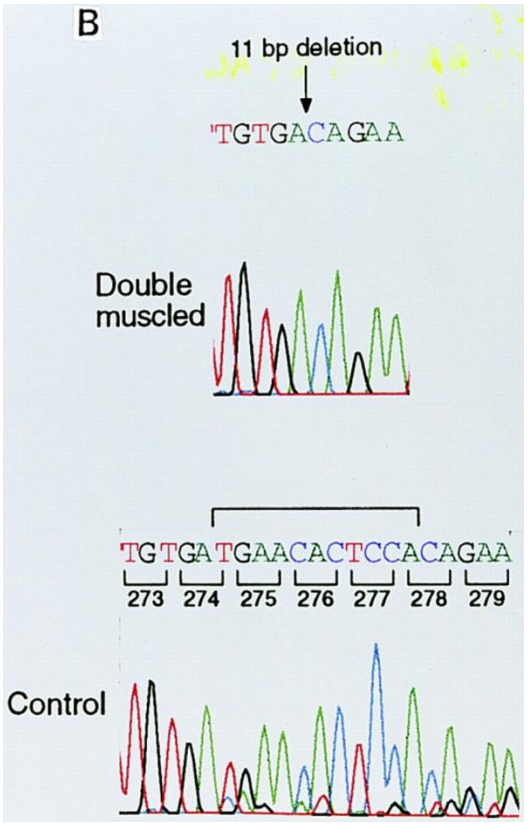
Introduction

Belgian Blue (DMBB): a remarkable breed

- “double-muscling”: muscular hypertrophy caused by mutation in the myostatin gene

KI Bull: Kubitus De Bray
https://www.crv4all.be/

KI Bull: Empire D’Ochain
http://www.fabroca.com/



Ravi Kambadur et al. 1997

- High feed conversion ratio
- Reduced size of internal organs, high meat percentage in carcass
- Effect on meat quality: lean meat, low intramuscular fat content

Introduction

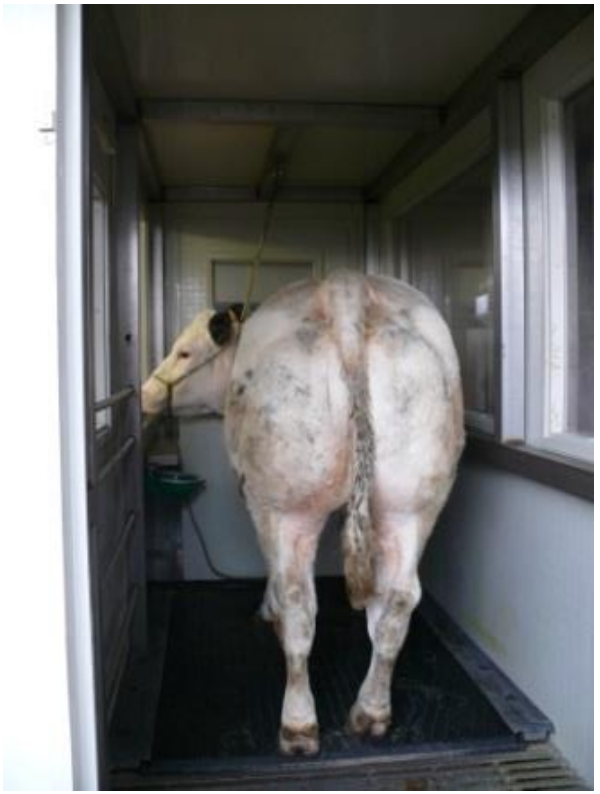
- Belgian farmer organisations are convinced that due to it's unique physiology DMBB are highly efficient beef producers

Introduction

- Methane emission data of DMBB are very rare
  (*Mathot et al., 2012; Peiren et al., 2013*)

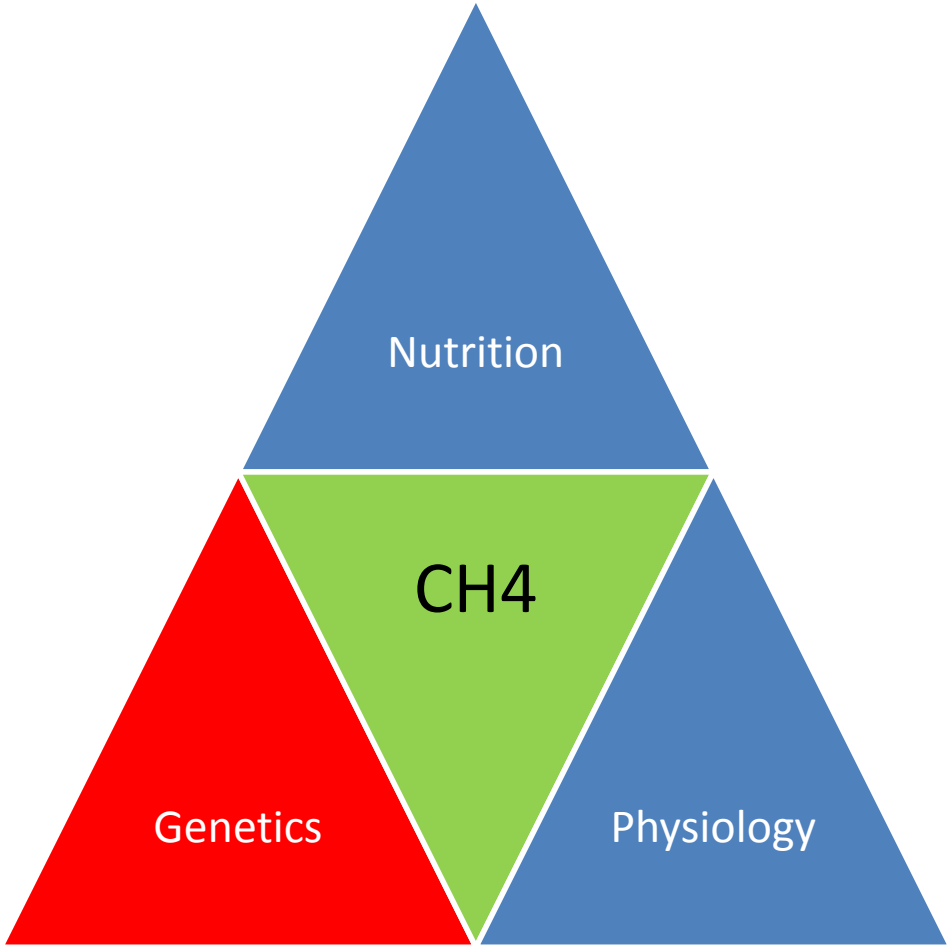
- Correlations for other beef breeds were found between methane output and live weight, DM intake and GE intake

- Based on the high meat percentage and the higher feed efficiency a lower emission is expected



Trial setup

Therefore a trial was setup with heifers of both breeds in a comparable physiological stage, fed the same diet



Materials and methods

- 8 HF and 8 DMBB pregnant heifers, aged 23-24 months
- 6-week measurement GreenFeed (C-lock)
- roughage diet on DM basis
  - 40% maize silage
  - 40% grass silage
  - 20% grass hay
- balanced concentrate in the GreenFeed (max 1.3 kg/day)
- daily roughage and concentrate intake was individually monitored
- live weight of the animals was measured 2-weekly

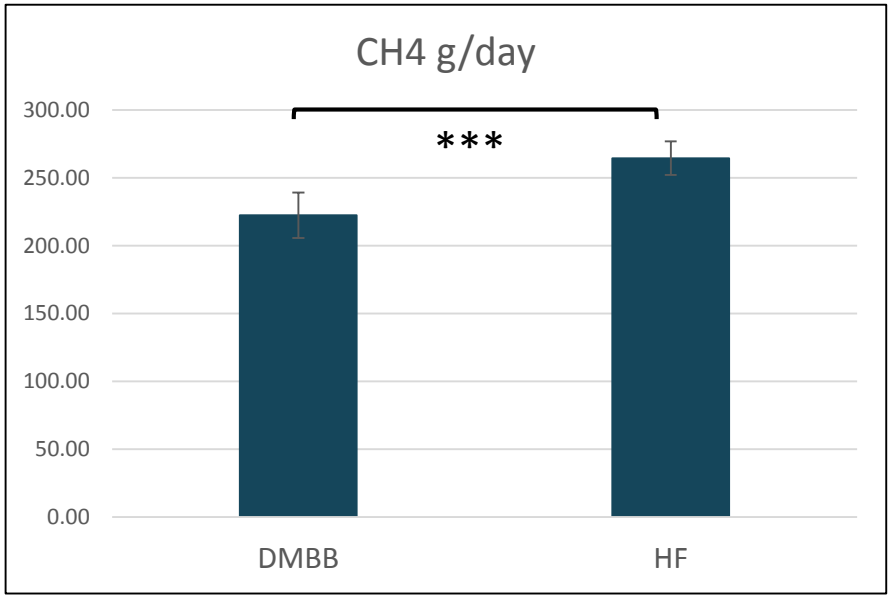
Results diet

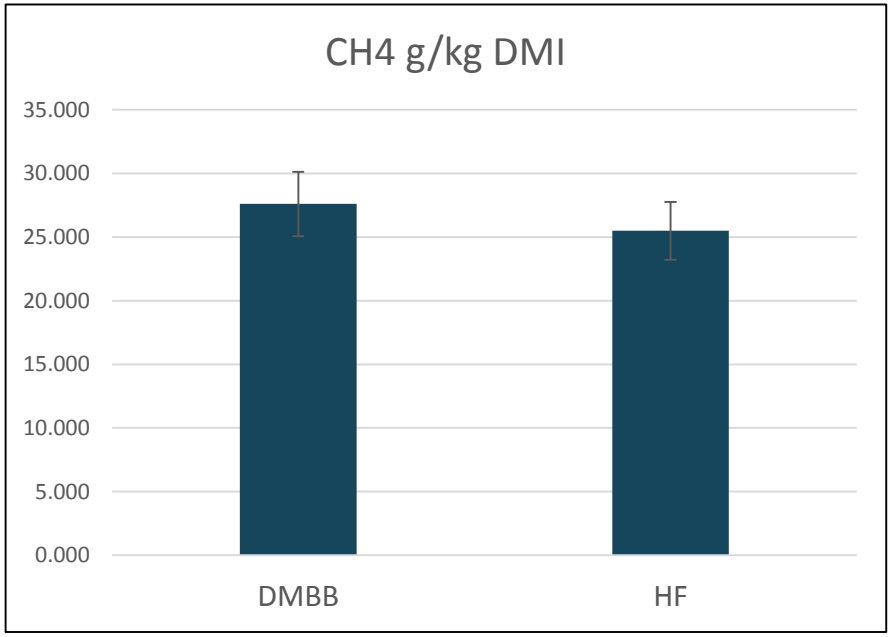
	Diet g/kg DM
NE(MJ/kg)	**5.7**
Crude fat	22.8
NDF	434
Starch	149
Crude protein	**148**
DPI	69
RDPB	23

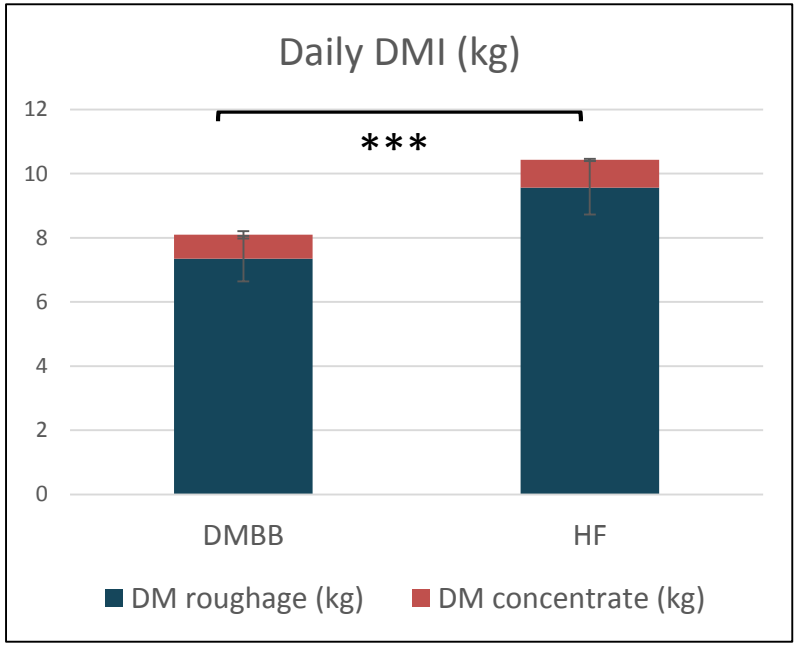
Results feed intake

	Holstein	DMBB	P-value
DMI (kg/day)	10.43 ± 0.83	8.10 ± 0.71	< 0.001
Roughage (kg/day)	9.57 ± 0.84	7.35 ± 0.71	<0.001
Concentrate (kg/day)	0.86 ± 0,04	0.74 ± 0,12	<0.05
DPI (g/day)	716 ± 46	565 ± 46	<0.001
RDPB (g/day)	238 ± 10	193 ± 18	<0.001
NE (MJ/day)	59.2 ± 4.6	46.0 ± 4.0	<0.001

Results CH_4 emission







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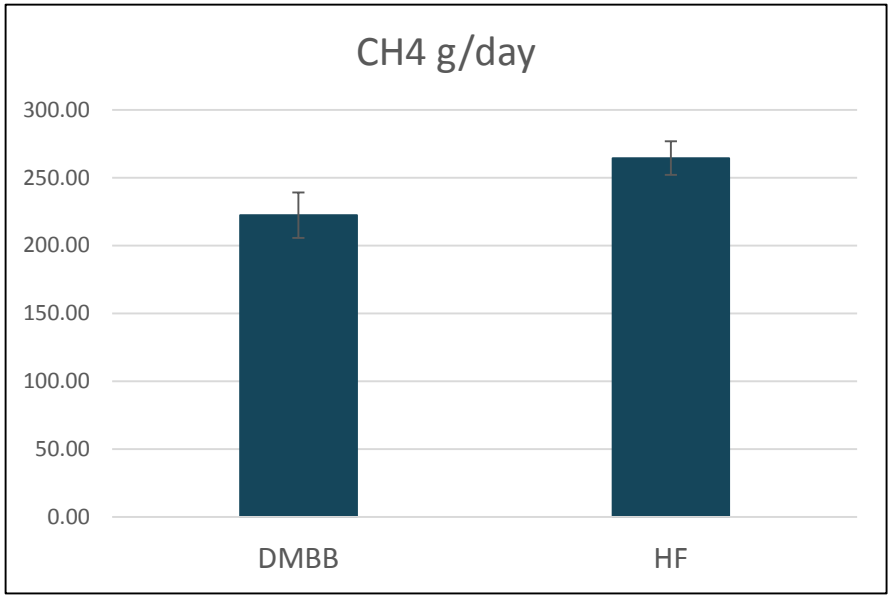
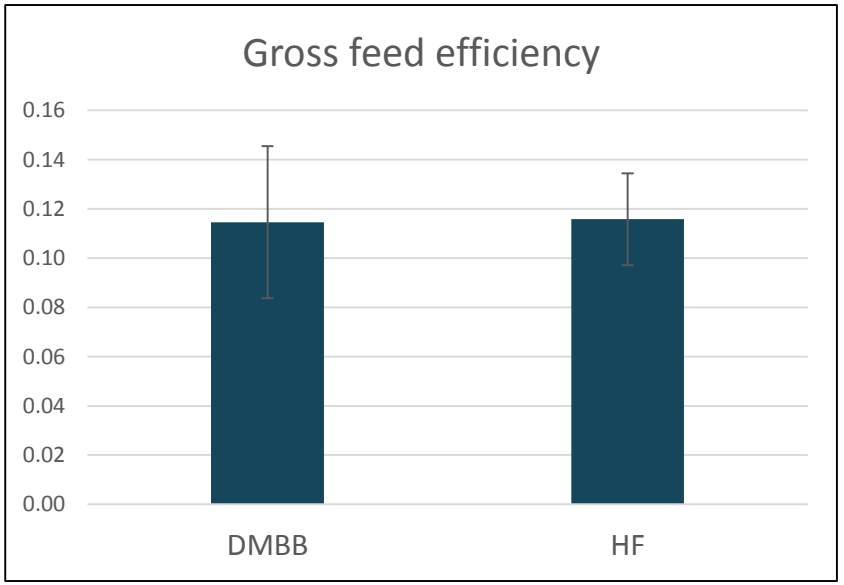
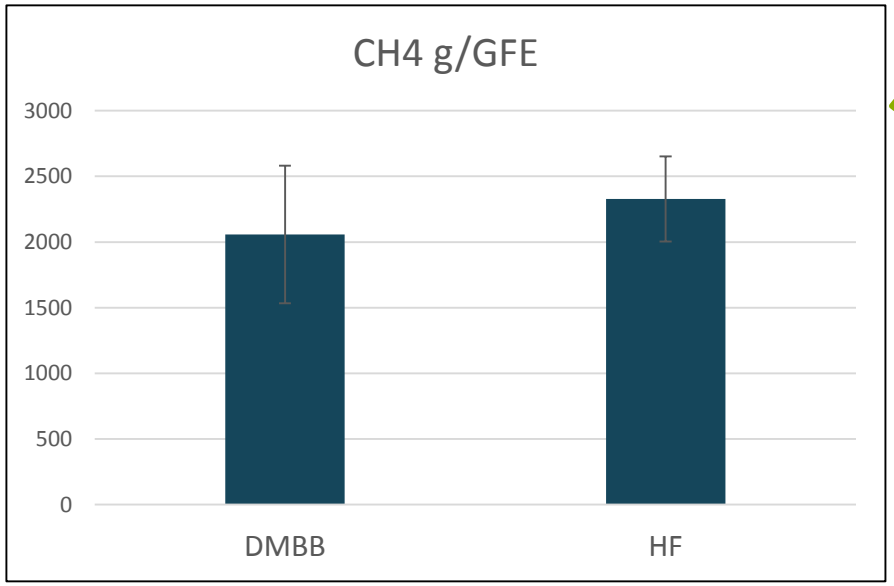
Results CH_4 emission







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Discussion

- Estimation: DMBB produce 15-20% less CH_4 per day than Holsteins

- GreenFeed measurements:
- DMBB produce 223±17 g CH_4/day
- Holsteins produce 265±12 g CH_4/day $P<0.001$

→ DMBB produce 16% less CH_4/day than Holsteins

- DMBB produce 0.029±0.002 $CH_4/C0_2$
- Holsteins produce 0.033±0.001 $CH_4/C0_2$

→ DMBB produce 11% less $CH_4/C0_2$ than Holsteins

Discussion

- DMBB heifers were fed under their energy requirements

DMBB	DM intake (kg)	NE (MJ/day)	DPI
Intake	8.1	46.0 (78.2%)	565 (104%)
Req	± 9	58.8	544
Holstein	**DM intake**	**NE (MJ/day)**	**DPI**
Intake	10.4	59.2 (95.7%)	716 (114%)
Req	± 12	61.8	629

- Live weight gain higher than expected

DMBB	LWG/day (kg)
LWG	0.917
Exp	0.850

Holstein	LWG/day (kg)
LWG	1.205
Exp	1.100

Conclusion

- Is DMBB a less emitting breed?
  - CH_4 expressed in g/day: Yes
  - CH_4 /kg DMI: No
  - CH_4 /kg LWG: No
  - CH_4/GFE: Equal

- It has to be investigated whether DMBB fed on a concentrate based diet will perform better in terms of emission

Thank you

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