PO185

The effect of *DGAT1* K232A polymorphism and linseed oil supplementation on methane emission of dairy cows

Sanne van Gastelen,*† Sabine van Engelen,*‡ Jan Dijkstra,† and Marleen H.P.W. Visker*‡

Introduction

Methane (CH_4) emission has been related with milk fatty acids (MFA), and MFA has been associated with *DGAT1* K232A polymorphism .

We hypothesize an association between *DGAT1* K232A polymorphism and CH_4.

Objectives

- Establish the effect of *DGAT1* K232A polymorphism on CH_4 emission of dairy cows.
- Establish whether the response in CH_4 emission of dairy cows to dietary linseed oil supplementation is influenced by *DGAT1* K232A polymorphism.

Materials & Methods

24 HF dairy cows

- 12 *DGAT1* KK genotype
- 12 *DGAT1* AA genotype

Cross-over design with 2 diets

- Control diet (**CON**)
  - 40% corn silage, 30% grass silage, 30% concentrate (DM basis)
  - Fat content 29 g/kg DM
- Linseed oil diet (**LSO**)
  - Control diet + linseed oil supplementation
  - Fat content 54 g/kg DM

Experimental period was 17 days

- 12 days diet adaptation
- 5 days CH_4 measurement

Climate respiration chambers

Restricted feeding (95%)

Results

Table 1. The effect of *DGAT1* K232A polymorphism and diet on feed intake, milk production, and milk composition

	DGAT1 AA genotype		*DGAT1* KK genotype		*P*-value		
	CON	LSO	CON	LSO	Genotype (G)	Diet (D)	G*D
Dry matter intake (kg/d)	18.1	17.6	18.0	17.2	0.89	0.49	0.94
Milk yield (kg/d)	25.9	27.4	22.3	25.1	0.08	0.20	0.69
FPCM[1] (kg/d)	27.3	27.1	26.2	27.5	0.82	0.73	0.63
Milk fat content (%)	4.44^{ac}	3.99^{a}	5.42^{b}	4.90^{bc}	< 0.001	< 0.002	0.80
Milk protein content (%)	3.50^{ab}	3.37^{b}	3.82^{a}	3.58^{ab}	< 0.005	0.05	0.53
Milk lactose content (%)	4.66	4.70	4.61	4.65	0.35	0.38	0.99

[1] Fat- and protein-corrected milk = (0.337 + 0.116 × fat % + 0.06 × protein %) × milk yield (kg/d).

- *DGAT1* AA had higher milk yield (kg/d) and lower protein and fat content (%) compared to *DGAT1* KK
- Protein and fat content (%) were lower for LSO compared with CON
- *DGAT1* K232A polymorphism, diet, and *DGAT1* - diet interaction did not affect dry matter intake (kg/d) and FPCM production (kg/d)

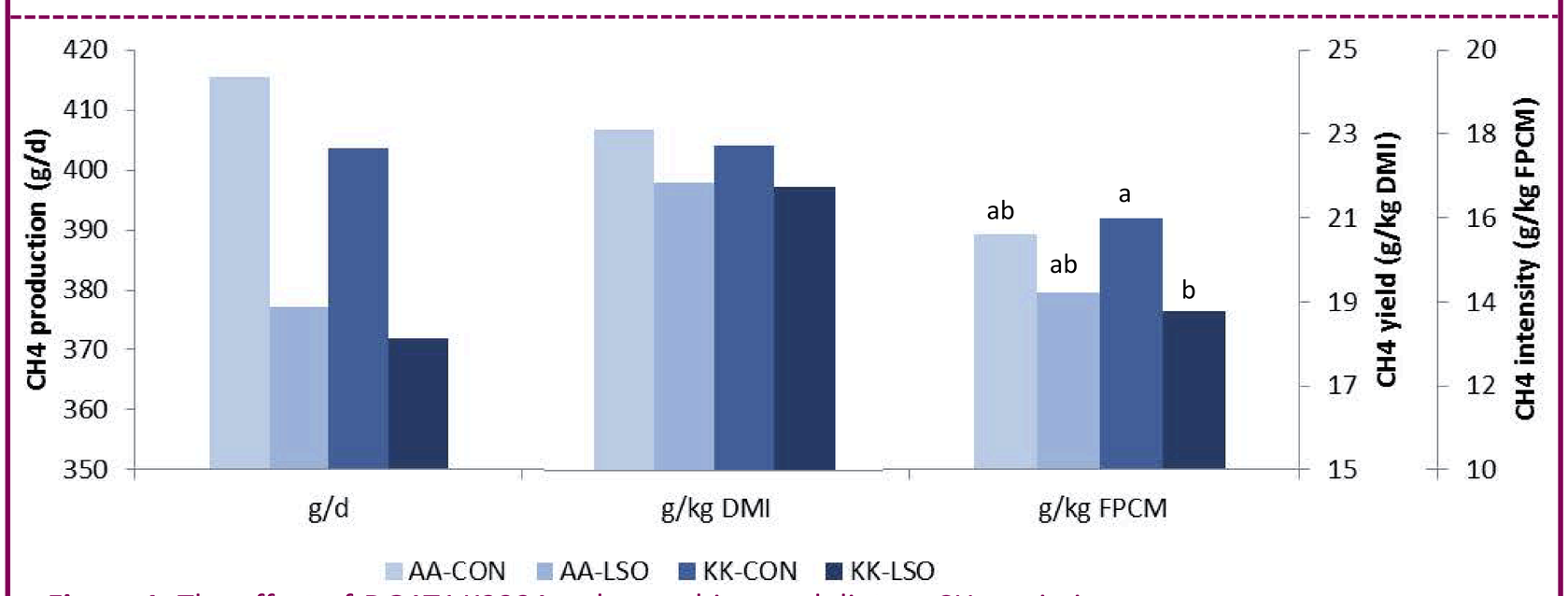

Figure 1. The effect of *DGAT1* K232A polymorphism and diet on CH_4 emissions

- CH_4 production (g/d), yield (g/kg DMI), and intensity (g/kg FPCM) were unaffected by *DGAT1* K232A polymorphism ($P > 0.62$), and *DGAT1* – diet interaction ($P > 0.44$)
- LSO reduced CH_4 emission compared with CON:
  - 9% reduction for CH_4 production (g/d; $P = 0.08$)
  - 5% reduction for CH_4 yield (g/kg DMI; $P = 0.02$)
  - 11% reduction for CH_4 intensity (g/kg FPCM; $P = 0.001$)

Conclusions

- *DGAT1* K232A polymorphism does not affect CH_4 emission in dairy cows.
- *DGAT1* K232A polymorphism does not influence the response in CH_4 emission of dairy cows to dietary linseed oil supplementation.

TI Food and Nutrition
P.O. Box 557
6700 AN Wageningen (NL)

Wageningen University
P.O. Box 338
6700 AH Wageningen (NL)

* TI Food and Nutrition
† Wageningen University, Animal Nutrition Group
‡ Wageningen University, Animal Breeding and Genomics Centre

Contact: sanne.vangastelen@wur.nl