EFFECT OF TIME ON METHANE CONCENTRATIONS MEASURED ON DAIRY COWS IN AUTOMATIC MILKING SYSTEMS

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Aim

Study the effect of time on methane concentrations measured in automatic milking systems.

Introduction

- Dairy cows produce enteric methane (**CH_4**), a harmful greenhouse gas.
- CH_4 is produced during breakdown of feed in the rumen.
- CH_4 production shows a diurnal pattern with lowest emissions during the night.

Material and methods

- CH_4 measured twice per second in automatic milking systems (**AMS**) with Fourier transformed infrared sensor.
- Data of 67,553 AMS visits on 942 cows on 8 farms.
- Phenotypes calculated per AMS visit: CH_4 mean and CH_4 median.
- Animal model in ASReml with day-AMS and days in lactation as fixed effects.
- Time effects were added one at a time and in combination to the model.
- Repeatability: $\sigma^2_{animal} / \sigma^2_{animal} + \sigma^2_{error}$

Conclusion

- Time explains substantial part of variation in CH_4 concentration.
- Effects of time after feeding and hour of the day are confounded.
- Repeatabilities are not influenced by the addition of time effects to the model.

Results

Time effects added to the model one at the time or in combination resulted in similar repeatabilities for all models :

- CH_4 mean: 0.32
- CH_4 median: 0.24

Effects of time	CH_4 mean	CH_4 median
Time effects added to the model one at a time		
Time after feeding	<0.001	<0.001
Hour of day	<0.001	<0.001
Time effects added to the model in combination		
Time after feeding	0.888	0.327
Hour of the day	<.001	<.001

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