

Impact of feed quality on antimicrobial use in the mink (*Neovison vison*) live stock

Jensen VF¹, Sommer HM², Struve T³, Clausen J³, Chriél M⁴

¹ Section for Epidemiology, National Veterinary Institute, Technical University of Denmark., ² Statistics and Data Analysis, DTU, Technical University of Denmark, ³ Copenhagen Fur, Glostrup, Denmark, ⁴ Section for Diagnostics and Scientific Advice, National Veterinary Institute, Technical University of Denmark.

Objectives

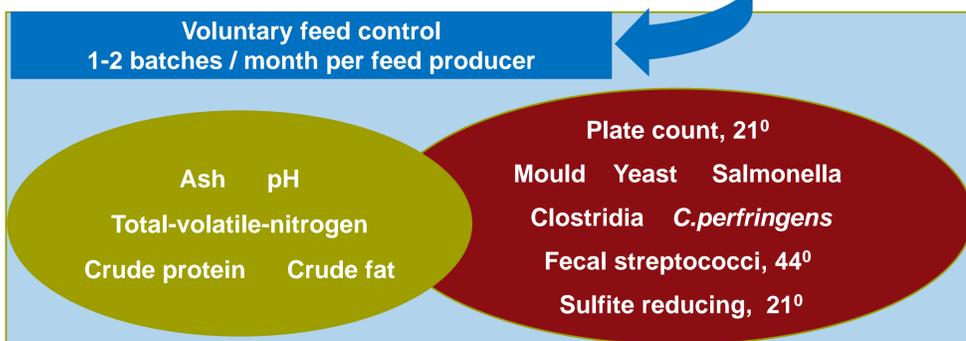
- **Study 1:** Identification of risk factors for antimicrobial use in the mink production
- **Study 2:** Investigation of the potential effects of specific feed quality parameters on the antimicrobial use in mink herds.

Patterns of antimicrobial use in mink

- The vast majority of antimicrobial is prescribed for **gastrointestinal disease**
- Antimicrobial prescription **peaks in May-July**, when the litters are young, and in relation to weaning of the litters (June)

Hierarchical structure of the feed supply

Farms are supplied from the same feed producer throughout the year(s).
Heat treatment sometimes fails (eg. on offal from slaughter pigs)



Material – register based studies

- **Kopenhagen Fur:** Data on growth rates, herd size (breeding stock) and the association between herds and feed producer.
- **VetStat** – the national prescription register : Data on antimicrobial use on farm level and the associated veterinarian
- **National Veterinary Institute:** Laboratory results for specific pathogens on herd level
- **The voluntary feed control**

Methods – Study design and statistical analysis

The samples for all four models were **cross-sectional**. Four generalized linear models were developed using the GENMOD procedure in SAS®, with herd level antimicrobial prescription as the response variable:

Study 1 Included all 1316 mink farms that were active throughout 2007-20012. The farm identity was included as a random variable in both models.

Model A: the response variable was reduced to a **binary outcome** (prescription/no-prescription) on monthly level.

Model B was a log-normal model. The herd level response variable was the monthly **treatment incidence, TI** ≈ defined animal daily doses/(biomass*days). Only months with antimicrobial use were included.(13,480 observations=herd*months).

Study 2 Included all batches with feed control results from 2012-2014, and recipient farms. The **response variable** was binary, ie. antimicrobial prescription (+/-) on herd level within a defined period (3,5 and 7 days) after feeding a specific batch.

In Model C, the farm was included as a random variable, thus correcting for the effect of veterinarian and other continuous farm specific factors.

In Model D, the response variable was defined as the proportion of farms receiving antimicrobial prescription in relation to a batch delivered to them.

Results

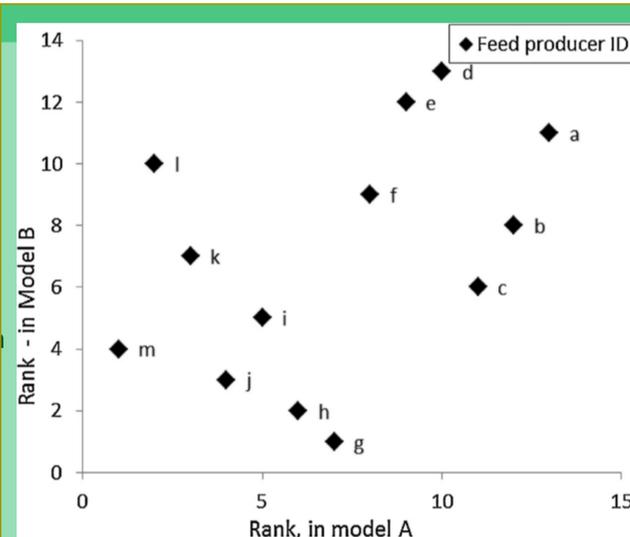
Study 1 : Model A and B should be considered complementary. The effects of *herds size and veterinarian* indicated variations in prescription patterns. Some *specific infectious diseases* were significant in Model B.

Feed producer and season were significant in both models ($p < 0.001$). Ranking of feed producer in the two models were correlated, indicating a higher antimicrobial associated with particular feed producers.

Study 2: Faecal streptococci (44°)

was consistently found to have a significant positive association with antimicrobial use (for all periods in both models).

Significant findings in **Model C/7 days** suggested an interaction between FS and month, and an effect of crude protein.



Comparison of rankings of Feed producer. Increase in rank represent an increase in frequency (X-axis) or treatment proportion (Y-axis)

Discussion and Conclusions

The antimicrobial use in mink farms was significantly associated with

- feed producer
- probably contamination with specific pathogens (eg. influenza) and/or effects on general intestinal health

- Levels of faecal streptococci in the feed

Perspectives:

- Feed quality parameters with **known effects** could be used as quality threshold for improvement of animal health.
- Further research is needed into causality of FS-effect, and additional feed parameters.

Acknowledgements: The studies were funded by Pelsdyragiftsfonden 2013 og 2015 (Fur Animal Taxation Fund).

Study 1 is available online: Jensen VF, Sommer HM, Struve T, Clausen J, Chriél M. 2016 Factors associated with usage of antimicrobials in commercial mink (*Neovison vison*) production in Denmark. *Prev Vet Med.* 2016, PMID: 26907210.

National Veterinary Institute
Section for Epidemiology
Technical University of Denmark

Corresponding author:
Vibeke Frøkjær Jensen
D.V.M., Ph.D



Bülowsvej 27
1870 Frederiksberg C

Phone: +45 35886352
Email: vfje@vet.dtu.dk