



RISK FACTORS ASSOCIATED WITH TETRACYCLINE RESISTANCE IN LACTOSE-POSITIVE ENTERIC COLIFORMS FROM FATTENING PIGS

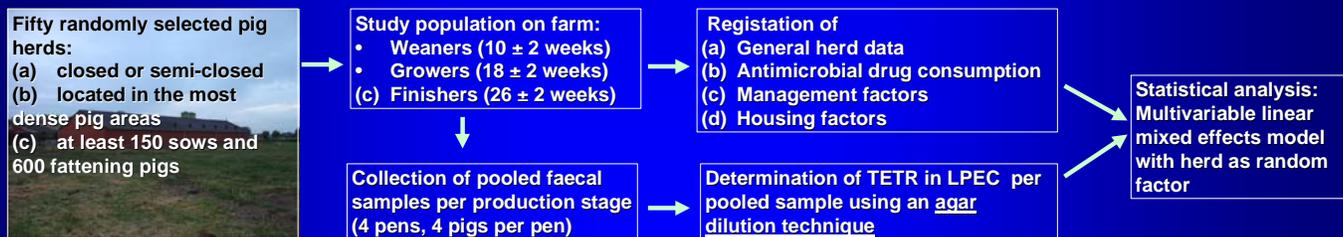
Timmerman T., Dewulf J., Catry B., Duchateau L., de Kruif A., Maes D.

Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium

Introduction

To date, only a few studies evaluating the effects of various husbandry conditions on the development and persistence of antibiotic-resistant bacteria in swine have been reported. The majority of these studies are single factor analyses, focusing on one (or two) possible risk factor(s) like age (Langlois et al., 1988; Mathew et al., 1999), housing conditions (Langlois et al., 1988), transport or overcrowding (Molitoris et al., 1987; Langlois and Dawson, 1999),... . These studies indicate that, besides exposure to antibiotics, also other factors can influence antimicrobial resistance. The aim of this study was to assess the impact of different management and housing conditions on the degree of tetracycline-resistance (TETR) in lactose-positive enteric coliforms (LPEC) associated with fattening pigs kept under commercial farming conditions.

Materials and Methods



Results and Discussion

The overall TETR in LPEC was 56.8% (min. 8.2%, median 56.9%, max. 100.0%; 95% CI 53.2%-60.4%). Results of the univariable and multivariable analyses are shown in Table 1. The multivariable analysis identified tetracycline treatment and inside pen hygiene as significant risk factors.

Table 1: Estimated herd-level TETR and 95% CIs from analyses based on the linear mixed model with herd as random factor. Only parameters which were significant in the univariable analysis and which were not correlated ($r < 0.60$) are shown.

Parameter	TETR	SD	95% CI	P-value univariable	P-value multivariable
Production system					
AIAO	60.8	21.7	56.4-65.3	0.009	
Continuous	50.1	22.3	44.1-56.2		
Moving to other pen/room					
<3 days ago	72.7	21.6	52.7-92.6	0.036	
3-10days ago	60.9	19.1	46.2-75.6		
>10days ago	55.6	22.5	51.7-59.5		
Inside pen hygiene					
Dirty	53.0	22.1	48.7-57.4	0.005	0.017
Clean	65.6	21.0	59.5-71.8		
Tetracycline treatment					
Yes	65.2	20.1	59.3-71.0	0.009	0.014
No	52.9	22.4	48.5-71.0		

Conclusions

- Antimicrobial treatment is the most important risk factor in the development of tetracycline resistance.
- Pigs housed in dirty pens had a lower TETR than pigs housed in clean pens. This is probably caused by intake of susceptible bacteria from the environment which dilute or replace the resistant LPEC.
- Changes in antimicrobial resistance after transport and holding stress in swine have been reported (Langlois et al., 1984; Molitoris et al., 1987). Similar univariable effects were seen after moving pigs to another pen/room, but could not be confirmed in the multivariable analysis.
- In the univariable analysis, animals in a continuous production system have a lower TETR. A possible explanation is that these animals take up susceptible bacteria, originating from older or non-treated animals, which dilute or replace the resistant LPEC.