

Evaluation of intestinal sampling sites in pigs at slaughter for assessing antibiotic resistance level in swine herds

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Background:

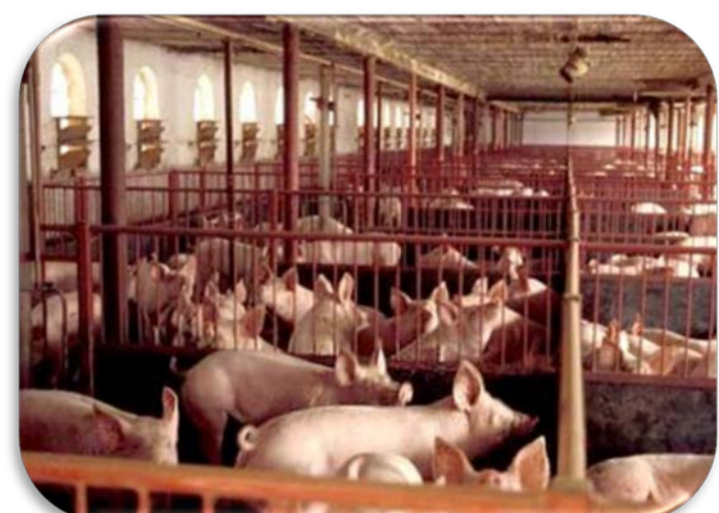
In the EU project SafeOrganic, the objective is to compare the level of antibiotic resistance in conventional pig herds with the level in organic pig herds, where a restricted use of antimicrobials is expected to result in less resistant bacteria. For such survey, sampling at the abattoir opposed to at each individual herd would reduce the work load and costs significantly.

However, due to the potential oral exposure to bacteria in the environment during transport and lairage of pigs, intestinal content sampled at the slaughterhouse may not represent the bacterial status of the pig back in the herd.

Aim:

To investigate if the proportion of tetracycline resistant *Escherichia coli* in individual pigs measured at herd level remains stable when measured in different colon segments at slaughterhouse or it may change due to oral exposure during transport and lairage using plastic particles as marker for the intestinal position of such exposure.

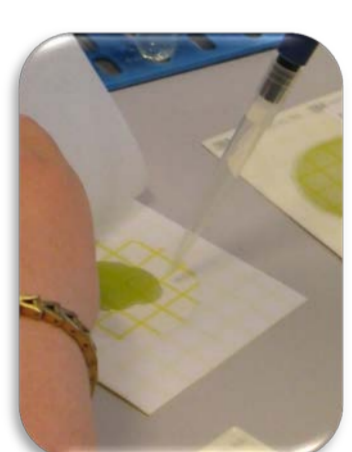
Experiment:



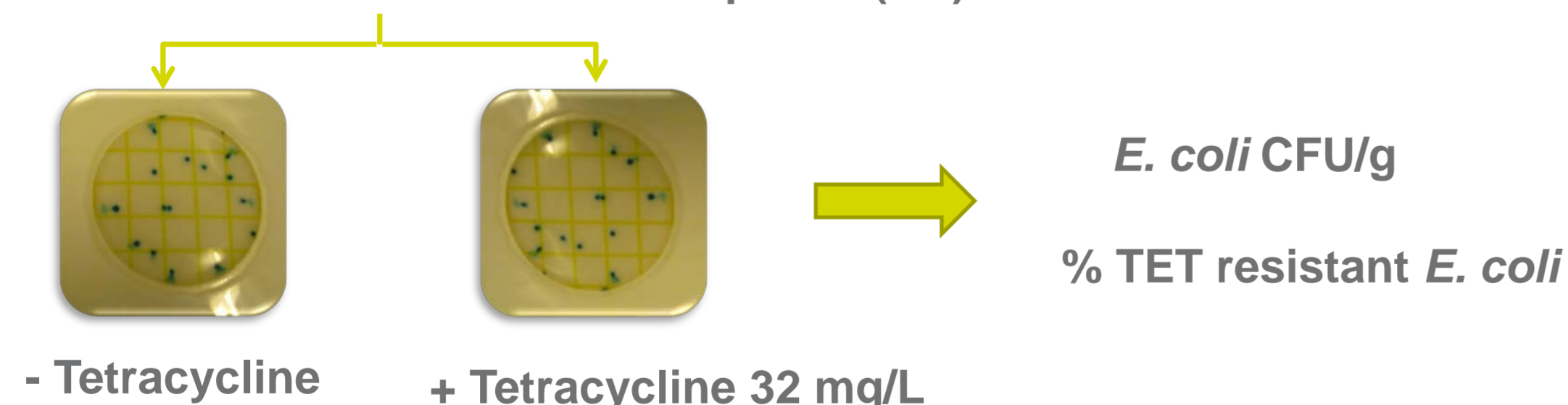
At Farm:
Collection of rectal swabs from 12 slaughter pigs
Sesame seed/plastic particles (2 kg) are fed to these pigs immediately before transport to the slaughterhouse



At Slaughterhouse:
Pigs were slaughtered 2, 4, 6 and 8 h after feeding
Faeces was collected from caecum, mid-colon and rectal part of colon



E. coli enumeration:
10-fold dilution series of faeces plated on Petrifilm™ Select *E. coli* count plates (3M)



Results:

Table 1. Numbers of *E. coli* and the proportion of tetracycline resistant *E. coli* in intestinal segments of slaughter pigs and location of particles^c

Hours after feeding	Pig no.	<i>E. coli</i> Log ₁₀ CFU/g (mean)				Proportion of tetracycline resistant <i>E. coli</i> (mean)			
		Sampling point ^a				Sampling point ^a			
		Rec ^b	Cae	CoM	CoR	Rec	Cae	CoM	CoR
2	1	1.8	5.8	7.0	6.9	9.09	3.38 ^c	1.50	2.77
	2	2.2	6.8	7.3	7.2	3.90	1.95	3.27	2.47
		(2.0)	(6.3)	(7.1)	(7.1)	(6.49)	(2.67)	(2.38)	(2.62)
4	3	3.8	7.2	7.3	6.5	5.65	1.44	3.02 ^c	2.97
	4	1.9	6.1	7.1	6.9	6.17	1.12	2.50	2.03
		(2.9)	(6.7)	(7.2)	(6.7)	(5.91)	(1.28)	(2.76)	(2.50)
6	5	4.7	7.4	7.8	7.4	2.78	5.25	1.81	1.72 ^c
	6	3.1	7.6	7.8	7.7	2.42	0.39	0.86	1.96 ^c
	7	1.9	5.6	6.6	6.9	3.31	1.91	1.59	1.08
8	8	2.1	7.5	7.3	6.9	5.88	1.37	1.58	1.54
		(2.9)	(7.0)	(7.3)	(7.2)	(3.60)	(2.23)	(1.46)	(1.58)
	9	4.0	7.2	7.1	6.6	2.90	4.20	3.58	1.90 ^c
8	10	4.1	6.7	7.0	6.9	3.22	1.05	1.00	0.87 ^c
	11	3.6	6.1	6.4	6.2	0.29	0.42	1.67	0.50 ^c
	12	5.7	7.7	7.4	7.4	5.60	3.10	3.81	3.68
		(4.3)	(6.9)	(7.0)	(6.8)	(3.00)	(2.19)	(2.52)	(1.74)

^a Rec: rectal swab sampled at farm; Cae: caecum; CoM: mid colon; CoR: rectal end of colon

^b Numbers is not CFU/g as the rectal swabs contained only small amounts of faecal material for analysis

^c Particles fed to the pigs in the morning before transport had reached this intestinal segment at the time of slaughter

Results and Discussion

Four hours after feeding, the particles was located as far as the mid-colon in some pigs indicating a relatively short intestinal passage time after ingestion and then the risk of finding bacteria not originating from the host pig but from the environment (Table 1). Despite this, the proportion of the TET resistant *E. coli* in the large intestine appeared relatively stable over time. Although the proportion was observed mostly to be a little higher in rectal swabs compared with intestinal samples, the results indicate that testing for the level of TET resistant *E. coli* at slaughter can allow for comparison of the presence of TET resistance also at herd level.