Performance of nursery pigs fed a customized antibiotic-free program, with or without, three different types of feed grade antibiotics

FURST-MCNESS COMPANY

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ABSTRACT

The objective of this study was to evaluate performance of pigs on an antibiotic-free program as compared to a program containing antibiotics in a commercial wean-to-finish research facility with a Fancom feeding system. A total of 938 weaned pigs were used with an average initial BW of 5.7 kg, 27-32 pigs/pen, and 8 replications/treatment. Pigs were blocked by BW, sow farm, sex, location within the barn and immediately placed on their randomly assigned, meal-form dietary treatments, which were: an antibiotic-free diet and no injectable antibiotics (ABF), 73 g/ton avilamycin (AVI), 400 g/ton chlortetracycline hydrochloride + 35 g/ton tiamulin hydrogen fumarate (CT), and 50 g/ton carbadox (CARB). If pigs received feed grade antibiotics, they also received individual antibiotic treatments as needed. Feed disappearance was recorded and pens of pigs were weighed on d 0 and 21, which was used to calculate ADG, ADFI, and FCR. Pigs fed AVI, CT, or CARB that were not responding to injectable antibiotic treatments were removed, tagged, and placed in sick pens. When deemed necessary to receive injectable antibiotic treatment, pigs fed ABF were removed, tagged, and placed in sick pens. Daily injectable treatments were recorded. Dead (% mortality) and pulled (% morbidity) pigs were determined at the end of d 21. Data were analyzed as a completely randomized block design using GLM procedure in Minitab with Fisher's test to determine differences between treatments. For d 0-21, pigs fed CT had a higher ADG (P=0.002) compared to pigs fed CARB or ABF with AVI being intermediate; pigs fed ABF had a lower ADG compared to pigs fed AVI with CARB being the intermediate. The ABF and CARB fed pigs had a lower ADFI (P=0.037) than CT with AVI being intermediate. There were no differences (P>0.10) observed for FCR. There were no differences (P>0.10) for % morbidity/pen; however, pigs fed ABF had a numerically higher % morbidity. Pigs fed feed grade antibiotics had a lower % mortality/pen (P=0.009) in contrast with pigs fed ABF. In conclusion, the results of this experiment provide reference data for antibiotic-free feeding programs.

BACKGROUND

Due to consumer demand, there is an increase in antibiotic-free production in the swine industry. Also, due to the VFD regulations, there are more producers looking for feed grade antibiotic alternatives.

OBJECTIVE

The objective of this study was to evaluate performance and health status of nursery pigs on an antibiotic-free program as compared to three different programs containing feed grade antibiotics, which where avilamycin, chlortetracycline hydrochloride plus tiamulin hydrogen fumarate, and carbadox.

MATERIALS & METHODS

- 938 weaned, commercial nursery pigs (avg. 5.7 kg & 21 d of age)
- Blocked by BW, sow farm, sex, and environment
- Housed in a commercial wean to finish barn
- 21-d study
- 4 dietary treatments (8 reps/trt)
- FANCOM feeding system
- Diets met or exceeded 2012 NRC requirements

MATERIALS & METHODS CONT.

Performance

- Pens of pigs weighed on d 0, 7, and 21
- Feed disappearance measured
- ADG, ADFI, and FCR calculated

Morbidity, Mortality, & Treatments

- Pigs fed feed grade antibiotics
  - Medical treatments recorded daily
  - Pigs unresponsive to injectable treatments
    - Tagged & moved to sick pens
- Pigs fed no antibiotics
  - Fall backs were removed, tagged, and placed in sick pens
    - Received injectable treatments after removed
- Morbidity – tagged pigs that remained as viable pigs
- Mortality – pigs that died

Statistical Analysis

- RCBD
- Minitab
  - GLM procedure
  - Tukey's test to determine differences
- Experimental Unit = pen
- Means reported as Adjusted Means

DIETARY TREATMENTS

- ABF – an antibiotic-free diet and on injectable antibiotics
- AVI – 73 g/ton of avilamycin
- CT – 400 g/ton chlortetracycline hydrochloride + 35 g/ton of tiamulin hydrogen fumarate
- CARB – 50 g/ton of carbadox

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DIETS

Table 1: Composition of Phase 1 (5.9-7.7 kg)

Ingredient	ABF	AVI	CT	CARB
Crumbled Nursery Concentrate	45.76	45.76	45.78	45.83
Corn	34.82	34.79	34.54	34.07
Soybean Meal	15.00	15.00	15.00	15.00
Nursery Premix	2.50	2.50	2.50	2.50
Choice White Grease	1.50	1.50	1.50	1.50
Limestone	0.31	0.31	0.20	-
Salt	0.10	0.10	0.10	0.10
Avilamycin	-	0.04	-	-
Chlortetracycline Hydrochloride	-	-	0.20	-
Tiamulin Hydrogen Fumarate	-	-	0.18	-
Carbadox	-	-	-	1.00
TOTAL	100.00	100.00	100.00	100.00

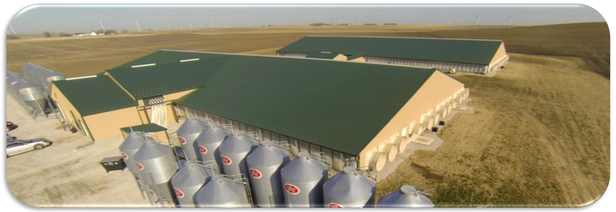

Table 2: Composition of Phase 2 (7.7-11.3 kg)

Ingredient	ABF	AVI	CT	CARB
Corn	48.97	48.92	48.63	49.78
Soybean Meal	25.00	25.00	25.00	25.00
Crumbled Nursery Concentrate	21.63	21.65	21.72	20.27
Choice White Grease	1.50	1.50	1.50	1.50
Nursery Premix	1.25	1.25	1.25	1.25
Limestone	1.08	1.08	0.98	0.58
Salt	0.20	0.20	0.20	0.20
L-Lysine HCl	0.17	0.17	0.17	0.20
VTM	0.08	0.08	0.08	0.08
DL-Methionine	0.07	0.07	0.07	0.09
L-Threonine	0.05	0.05	0.05	0.07
Avilamycin	-	0.04	-	-
Chlortetracycline Hydrochloride	-	-	0.20	-
Tiamulin Hydrogen Fumarate	-	-	0.18	-
Carbadox	-	-	-	1.00
L-Tryptophan	-	-	-	0.002
TOTAL	100.00	100.00	100.00	100.00

RESULTS

Table 3: Summary of Growth Performance and Health Status for d 0-21

	ABF	AVI	CT	CARB	SE	P-value
BW, kg						
d 0	5.8	5.7	5.7	5.7	0.2	0.561
d 7	6.5	6.6	6.6	6.6	0.2	0.152
d 21	10.7[a]	11.0[a]	11.4[b]	11.0[a]	0.3	0.001
Growth Performance						
	ABF	AVI	CT	CARB	SE	P-value
ADG, g	232[a]	254[b,c]	272[c]	248[a,b]	18	0.002
ADFI, g	310[a]	324[a,b]	341[b]	315[a]	21	0.037
FCR	1.34	1.28	1.26	1.27	0.12	0.541
Health Status						
	ABF	AVI	CT	CARB	SE	P-value
Morbidity/pen, %	1.66	0.46	0.00	0.43	1.64	0.244
Mortality/pen, %	1.72[a]	0.00[b]	0.00[b]	0.40[b]	1.03	0.009
Treats/pen	0.0[a]	10.1[b]	9.4[b]	8.8[b]	2.9	<0.001

[a,b]Means with different superscripts in the same row differ at $P < 0.05$.

CONCLUSIONS

- The results of this experiment provide reference data for the first 21 days for antibiotic-free feeding programs.
- In this experiment, pigs fed CT had the highest ADG and ADFI during the first 21 days.
- In this experiment, pigs fed ABF had a higher morbidity and mortality compared to pigs fed any of the feed grade antibiotics.