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Response of weaned pigs to spray-dried porcine plasma and feed-grade antibiotics compared with antibiotic-free vegetarian diet supplemented with three different levels of a source of phytonutrients (Nature's Fuel®).

F. Sandberg*, J. Calderon**, J. England* and D.D. Hall*

*Furst-McNess Company, Freeport, IL; **Department of Animal Science, Iowa State University, Ames, IA.

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Background

The use of antibiotic-free diets that are entirely animal protein free are becoming more common in use. Little data exists comparing traditional (animal protein) type diets with antibiotic-free vegetarian diets in terms of performance and profitability.

Objectives

To compare growth promoting properties of dietary spray-dried porcine plasma (SDPP) and feed-grade antibiotics (Chlortetracycline and Denagard) as a positive control (PC), with a vegetarian diet without any antibiotics or SDPP as a negative control (NC), with NC that had three levels of a blend of phytonutrients Nature's Fuel (NF) added.

Methods

Experiment 1 :

- 1,334 pigs weighing 10.6 lbs.
- 49 days on trial
- Pigs were diagnosed with E.coli scours three weeks on trial, requiring water medication (Amoxicillin) on day 21,

Experiment 2:

- 1,270 21-d old pigs weighing 11.3 lbs.
- 37 days on trial.
- Pigs had therapeutic water medication (Amoxicillin) from day 0.

A commercial wean-finish barn (33 pigs/pen, 8 pens/treatment) with a FANCOM feed system was used for both experiments.

Experimental Diets

The diet was fed in a meal form. The Negative Control (NC) diet was made to represent an industry standard diet less the animal proteins. The Positive Control (PC) included 100 lbs. per ton of Plasma in Phase 1 and 50 lbs. per ton of Plasma in Phase 2. The key ingredient differences are shown below.

Ingredient	NC	PC
Corn	✓	✓
Soybean Meal	✓	✓
Dried Whey	✓	✓
Lactose		✓
Hamlet HP300	✓	✓
Steam Rolled Oats	✓	✓
Animal Plasma		✓
Fish Meal		✓
Acidification	✓	✓
Zinc Oxide	✓	✓
Tri-basic Copper Chloride	✓	✓
Mannan Oligosaccharide	✓	✓
Pro-biotic Bacteria	✓	✓
Flavoring Agent	✓	✓
Enzyme Blend	✓	✓

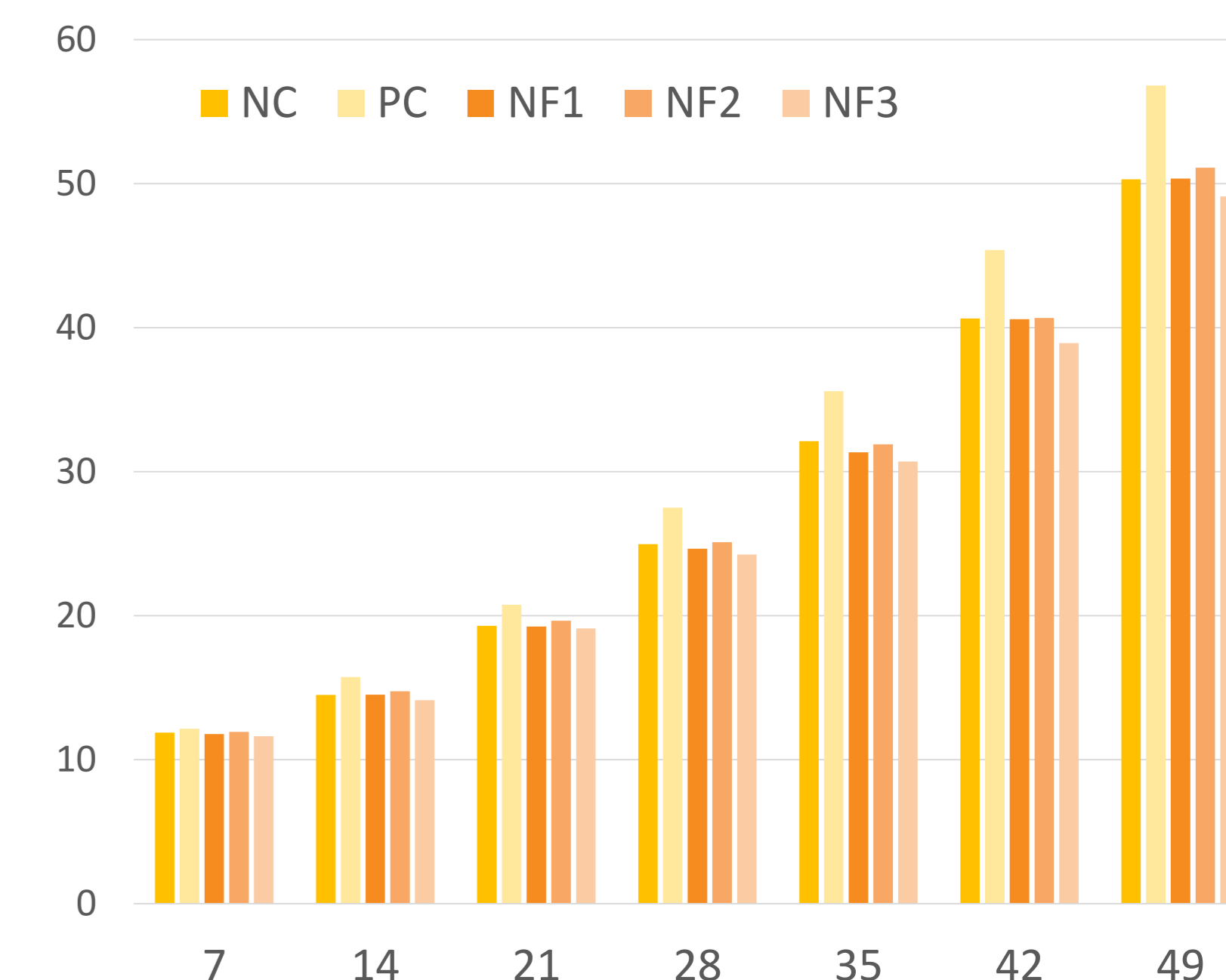
All diets were formulated to NRC (2012) requirements for pigs ranging from 10 to 50 lbs. live weight. All essential amino acids (Methionine + Cystine, Threonine, Tryptophan, Valine, Isoleucine) were balanced in both sets of diets by adding these as crystalline amino acids to replace the animal protein sources.

Results

Table 1: Summary of Performance from Experiment 1 and 2

EXPERIMENT 1 (Water Medication Day 21)						
	PC	NC	NF1	NF2	NF3	SEM
ADG, g/d	413 ^a	358 ^b	367 ^b	359 ^b	341 ^b	9
ADFI, g/d	636 ^a	563 ^b	568 ^b	563 ^b	536 ^b	9
FCR	1.64 ^a	1.63 ^a	1.56 ^b	1.57 ^b	1.47 ^b	0.07
EXPERIMENT 2 (Water Medication Day 0)						
	PC	NC	NF1	NF2	NF3	SEM
ADG, g/d	313 ^a	295 ^{a,b}	291 ^{a,b}	273 ^b	263 ^b	9
ADFI, g/d	468 ^a	440 ^{a,b}	468 ^a	431 ^{a,b}	390 ^c	18
FCR	1.50 ^a	1.54 ^a	1.57 ^a	1.57 ^a	1.43 ^a	0.06

Figure 1: Response in Live Weight by Period



Conclusion

- In Experiment 1 PC consumed more feed and grew faster than all other treatments (P<0.05).
- NF1 had a numerically-greater ADG than NC, and NF treatments improved FCR (P<0.05), but NF3 reduced ADFI that caused a reduced ADG.
- In Experiment 2 there was no difference in ADG or ADFI between PC and NC. ADFI was numerically increased by NF1 over NC, and being equal to PC, but ADFI were numerically reduced at NF2, and significantly at NF3 (P<0.05).
- Careful use of phytonutrients can improve performance in antibiotic-free vegetarian diets, but high levels can negatively affect performance.

