



Foreword

It is with great pleasure that we present the 2017 Swine Industry Day Report of Progress. This report contains updates and summaries of applied and basic research conducted at Kansas State University during the past year. We hope that the information will be of benefit as we attempt to meet the needs of the Kansas swine industry.

2017 Swine Day Report of Progress Editors

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Standard Abbreviations

| | | | | | |
|-----------------|---|---------------------------|------|---|----------------------------|
| ADG | = | average daily gain | Mcal | = | megacalorie(s) |
| ADF | = | acid detergent fiber | ME | = | metabolizable energy |
| ADFI | = | average daily feed intake | mEq | = | milliequivalent(s) |
| AI | = | artificial insemination | min | = | minute(s) |
| avg | = | average | mg | = | milligram(s) |
| bu | = | bushel | mL | = | cc (cubic centimeters) |
| BW | = | body weight | mm | = | millimeter(s) |
| cm | = | centimeter(s) | mo | = | month(s) |
| CP | = | crude protein | MUFA | = | monounsaturated fatty acid |
| CV | = | coefficient of variation | N | = | nitrogen |
| cwt | = | 100 lb | NE | = | net energy |
| d | = | day(s) | NDF | = | neutral detergent fiber |
| DE | = | digestible energy | NFE | = | nitrogen-free extract |
| DM | = | dry matter | ng | = | nanogram(s), .001 Fg |
| DMI | = | dry matter intake | no. | = | number |
| F/G | = | feed efficiency | NRC | = | National Research Council |
| ft | = | foot(feet) | ppb | = | parts per billion |
| ft ² | = | square foot(feet) | ppm | = | parts per million |
| g | = | gram(s) | psi | = | pounds per square inch |
| µg | = | microgram(s), .001 mg | PUFA | = | polyunsaturated fatty acid |
| gal | = | gallon(s) | SD | = | standard deviation |
| GE | = | gross energy | sec | = | second(s) |
| h | = | hour(s) | SE | = | standard error |
| HCW | = | hot carcass weight | SEM | = | standard error of the mean |
| in | = | inch(es) | SEW | = | segregated early weaning |
| IU | = | international unit(s) | SFA | = | saturated fatty acid |
| kg | = | kilogram(s) | UFA | = | unsaturated fatty acid |
| kcal | = | kilocalorie(s) | wk | = | week(s) |
| kWh | = | kilowatt hour(s) | wt | = | weight(s) |
| lb | = | pound(s) | yr | = | year(s) |

K-State Vitamin and Trace Mineral Premixes

Diets listed in this report contain the following vitamin and trace mineral premixes unless otherwise specified.

- Trace mineral premix: Each pound of premix contains 10 g Mn, 33 g Fe, 33 g Zn, 5 g Cu, 90 mg I, and 90 mg Se.
- Vitamin premix: Each pound of premix contains 1,600,000 IU vitamin A, 400,000 IU vitamin D3, 8,000 mg vitamin E (dl- α -tocopherol acetate or 4,000 mg d- α -tocopherol acetate), 800 mg menadione, 1,500 mg riboflavin, 5,000 mg pantothenic acid, 15,000 mg niacin, and 7 mg vitamin B12.
- Sow add pack: Each pound of premix contains 100,000 mg choline, 40 mg biotin, 300 mg folic acid, 400 mg pyridoxine, 4,000 mg Vit E (dl- α -tocopherol acetate or 2,000 mg d- α -tocopherol acetate), 9,000 mg L-carnitine, and 36 mg Cr.

Note

Some of the research reported here was carried out under special U.S. Food and Drug Administration (FDA) clearances that apply only to investigational uses at approved research institutions. Materials that require FDA clearances may be used in the field only at the levels and for the use specified in that clearance.

Biological Variability and Chances of Error

Variability among individual animals in an experiment leads to problems in interpreting the results. Animals on treatment X may have higher average daily gains than those on treatment Y, but variability within treatments may indicate that the differences in production between X and Y were not the result of the treatment alone. Statistical analysis allows us to calculate the probability that such differences are from treatment rather than from chance.

In some of the articles herein, you will see the notation " $P < 0.05$." That means the probability of the differences resulting from chance is less than 5%. If two averages are said to be "significantly different," the probability is less than 5% that the difference is from chance, or the probability exceeds 95% that the difference resulted from the treatments applied.

Some papers report correlations or measures of the relationship between traits. The relationship may be positive (both traits tend to get larger or smaller together) or negative (as one trait gets larger, the other gets smaller). A perfect correlation is one (+1 or -1). If there is no relationship, the correlation is zero.

In other papers, you may see an average given as 2.5 ± 0.1 . The 2.5 is the average; 0.1 is the "standard error." The standard error is calculated to be 68% certain that the real average (with unlimited number of animals) would fall within one standard error from the average, in this case between 2.4 and 2.6.

Using many animals per treatment, replicating treatments several times, and using uniform animals increase the probability of finding real differences when they exist. Statistical analysis allows more valid interpretation of the results, regardless of the number of animals. In all the research reported herein, statistical analyses are included to increase the confidence you can place in the results.

Index of Key Words

added trace minerals
 alternative
 amino acid
 amino acid ratios
 AminoGut
 antibiotic
Bacillus subtilis
 benzoic acid
 bone mineralization
 calcium (Ca)
 carbadox
 carcass yield
 chloride
 chlortetracycline (CTC)
 choline
 chromium propionate
 cold pelleting
 colostrum intake
 computerized feeder
 copper (Cu)
 copper chelate
 corn
 creep feed
 crude protein
 deoxynivalenol
 diarrhea
 diet sampling
 duration
 Elarom SES
 electronic sow feeder
 enterotoxigenic *Escherichia coli* (ETEC)
 epitopes
 essential oil
 FaeG
 fecal consistency
 feed
 feed additive
 feed efficiency
 feed-grade antibiotic
 finisher
 finishing pig
 fish meal
 fish solubles
 formaldehyde
 gestation
 gilt
 glutamate
 glutamine
 growing pigs
 growing-finishing pigs
 growth performance
 hammermill
 HP 300
 K88
 lactation
 lactation crate size
 linear programming
 low birth weight pigs
 Luminex
 lysine
 lysine requirement
 maternal growth
 medium chain fatty acid (MCFA)
 mitigation
 mixed models
 modeling
 molecular diagnostics
 monosodium glutamate
 mycotoxin
 net energy
 neutral detergent fiber
 nursery
 nursery pig
 particle size
 pelleting
 phase-feeding
 phosphorus (P)
 phytase
 phytogenics
 polymerase chain reaction (PCR)
 Porcine circo virus (PCV)
 PCV2
 PCV3
 Porcine Epidemic Diarrhea Virus (PEDV)
 Porcine reproductive and respiratory syndrome virus (PRRS)
 post-weaning diarrhea (PWD)
 preservatives
 probiotic
 ractopamine HCl
 regression equations
 reproduction
 salt
 screenings
 sodium
 sodium metabisulfite
 sow
 soybean meal
 split suckling
 supplementation
 swine
 thermal processing
 tip speed
 tri-basic copper chloride
 tryptophan
 vaccine
 vomitoxin
 weanling pig
Yucca schidigera
 zinc (Zn)

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| Biowish Technologies, Cincinnati, OH | Kemin Industries, Inc., Des Moines, IA |
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| Dave and Lois Baier, Abilene, KS | Micronutrients, Indianapolis, IN |
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The Livestock and Meat Industry Council, Inc.

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