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Swine Day 2015 Supplements

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Abstract
It is with great pleasure that we present the 2015 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.

Keywords
swine

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Authors
Foreword

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2015 Swine Day Report of Progress Editors
Bob Goodband, Mike Tokach, Steve Dritz, Joel DeRouchey, and Jason Woodworth
### Standard Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG</td>
<td>average daily gain</td>
<td>Mcal</td>
<td>megacalorie(s)</td>
</tr>
<tr>
<td>ADF</td>
<td>acid detergent fiber</td>
<td>ME</td>
<td>metabolizable energy</td>
</tr>
<tr>
<td>ADFI</td>
<td>average daily feed intake</td>
<td>mEq</td>
<td>milliequivalent(s)</td>
</tr>
<tr>
<td>AI</td>
<td>artificial insemination</td>
<td>min</td>
<td>minute(s)</td>
</tr>
<tr>
<td>avg</td>
<td>average</td>
<td>mg</td>
<td>milligram(s)</td>
</tr>
<tr>
<td>bu</td>
<td>bushel</td>
<td>mL</td>
<td>cc (cubic centimeters)</td>
</tr>
<tr>
<td>BW</td>
<td>body weight</td>
<td>mm</td>
<td>millimeter(s)</td>
</tr>
<tr>
<td>cm</td>
<td>centimeter(s)</td>
<td>mo</td>
<td>month(s)</td>
</tr>
<tr>
<td>CP</td>
<td>crude protein</td>
<td>MUFA</td>
<td>monounsaturated fatty acid</td>
</tr>
<tr>
<td>CV</td>
<td>coefficient of variation</td>
<td>N</td>
<td>nitrogen</td>
</tr>
<tr>
<td>cwt</td>
<td>100 lb</td>
<td>NE</td>
<td>net energy</td>
</tr>
<tr>
<td>d</td>
<td>day(s)</td>
<td>NDF</td>
<td>neutral detergent fiber</td>
</tr>
<tr>
<td>DE</td>
<td>digestible energy</td>
<td>NFE</td>
<td>nitrogen-free extract</td>
</tr>
<tr>
<td>DM</td>
<td>dry matter</td>
<td>ng</td>
<td>nanogram(s), .001 Fg</td>
</tr>
<tr>
<td>DMI</td>
<td>dry matter intake</td>
<td>no.</td>
<td>number</td>
</tr>
<tr>
<td>F/G</td>
<td>feed efficiency</td>
<td>NRC</td>
<td>National Research Council</td>
</tr>
<tr>
<td>ft</td>
<td>foot(feet)</td>
<td>ppb</td>
<td>parts per billion</td>
</tr>
<tr>
<td>ft²</td>
<td>square foot(feet)</td>
<td>ppm</td>
<td>parts per million</td>
</tr>
<tr>
<td>g</td>
<td>gram(s)</td>
<td>psi</td>
<td>pounds per square inch</td>
</tr>
<tr>
<td>µg</td>
<td>microgram(s), .001 mg</td>
<td>PUFA</td>
<td>polyunsaturated fatty acid</td>
</tr>
<tr>
<td>gal</td>
<td>gallon(s)</td>
<td>SD</td>
<td>standard deviation</td>
</tr>
<tr>
<td>GE</td>
<td>gross energy</td>
<td>sec</td>
<td>second(s)</td>
</tr>
<tr>
<td>h</td>
<td>hour(s)</td>
<td>SE</td>
<td>standard error</td>
</tr>
<tr>
<td>HCW</td>
<td>hot carcass weight</td>
<td>SEM</td>
<td>standard error of the mean</td>
</tr>
<tr>
<td>in</td>
<td>inch(es)</td>
<td>SEW</td>
<td>segregated early weaning</td>
</tr>
<tr>
<td>IU</td>
<td>international unit(s)</td>
<td>SFA</td>
<td>saturated fatty acid</td>
</tr>
<tr>
<td>kg</td>
<td>kilogram(s)</td>
<td>UFA</td>
<td>unsaturated fatty acid</td>
</tr>
<tr>
<td>kcal</td>
<td>kilocalorie(s)</td>
<td>wk</td>
<td>week(s)</td>
</tr>
<tr>
<td>kWh</td>
<td>kilowatt hour(s)</td>
<td>wt</td>
<td>weight(s)</td>
</tr>
<tr>
<td>lb</td>
<td>pound(s)</td>
<td>yr</td>
<td>year(s)</td>
</tr>
</tbody>
</table>
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 12 g Mn, 50 g Fe, 50 g Zn, 5 g Cu, 90 mg I, and 90 mg Se.

- Vitamin premix: Each pound of premix contains 2,000,000 IU vitamin A, 300,000 IU vitamin D₃, 8,000 IU vitamin E, 800 mg menadione, 1,500 mg riboflavin, 5,000 mg pantothenic acid, 9,000 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, and 900 mg pyridoxine.

Note

Some of the research reported here was carried out under special 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 $2.5 \pm 0.1$. 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

adsorbents
amino acid
amino acid ratio
analysis
antibiotics
bacon
bioassay
birth weight
boar exposure
by-product
carcass fat quality
chemical treatment
conditioning temperature
copper
copper sulfate
corn
creep feeding
crystalline AA
decontamination
deoxyxynivalenol
dried milk
dry
energy
extrude
feed
feed line
feed matrix
feed mill
feed preference
feed safety
feed truck
fines
finishing pig
fish meal
floor space
formaldehyde
gene expression
gilt
grain
grinding cost
growth
growth performance
intermittent suckling
iodine value
lactational estrus
litter separation
lysine
lysine requirement
mash
meal
method
methodology
minimum infectious dose
mycotoxins
nursery pig
oregano
particle size
particle size analysis
PCR
PDI
PEDV
pellet
pelleting
pellet size
performance
phosphorus
phytase
phytase stability
pig
pork
prediction equation
protein quality
Ractopamine
roller mill
sequencing
sodium metabisulfite
sorghum
sow
sow nutrition
space allowance
split-weaning
spray-dried bovine plasma
stocking density
survey
swabs
swine
swine industry
thermal mitigation
topping
trace minerals
tribasic copper chloride
tryptophan
ulcer
valine
vitamins
vitamin D
zinc
25(OH)D₃
3-sieve
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Biomin USA, San Antonio, TX
DFS Inc., Newell, IA
DNA Genetics, Columbus, NE
DSM Nutritional Products, Parsippany, NJ
Elanco Animal Health, Indianapolis, IN
Farmland Foods LLC, Crete, NE
Feedlogic Corporation, Willmar, MN
Gourley Bros., Webster City, IA
Holden Farms, Northfield, MN
Hord Livestock Company, Bucyrus, OH
Hubbard Feeds, Mankato, MN
ILC Resources, Urbandale, IA
International Ingredient Corporation, St. Louis, MO
JYGA Technologies, St. Nicolas, Quebec, Canada
Kalmbach Feeds, Upper Sandusky, OH
Kansas Pork Association, Manhattan, KS
Kansas Swine Alliance, Abilene, KS
Kemin Industries, Inc., Des Moines, IA
Livestock and Meat Industry Council, Manhattan, KS
Micronutrients, Indianapolis, IN
Midori USA, Cambridge, MA
Midwest Livestock Systems, Inc., Beatrice, NE
National Pork Board, Des Moines, IA
Natural Foods Holdings, Sioux City, IA
New Fashion Pork, Jackson, MN
New Horizon Farms, Pipestone, MN
Novus International, St. Charles, MO
Nutraferma, Dakota Dunes, SD
PIC USA, Hendersonville, TN
Purco, Edgerton, MN
Tech-Mix, Stewart, MN
Triumph Foods, St. Joseph, MO
United Sorghum Checkoff Program, Lubbock, TX
USDA National Institute of Food and Agriculture, Washington, D.C.
Zinpro Corp., Eden Prairie, MN
Zoltenko Farms Inc., Hardy, NE
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