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Abstract

This file includes the 2022 Swine Day Research Report introduction, standard abbreviations, K-State Vitamin and Trace Mineral Premixes statement, biological variability and chances of error explanation, and acknowledgments of our supporters. We hope that the information in the 2022 Swine Day Research Report will be of benefit as we attempt to meet the needs of the Kansas swine industry.

Keywords

Kansas State University swine research, swine, sows, nursery pigs, finishing pigs, feed safety, swine health, disease management, nutrition

Foreword

It is with great pleasure that we present the 2022 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.

2022 Swine Day Report of Progress Editors

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Standard Abbreviations

AA = amino acids
ADF = acid detergent fiber
ADFI = average daily feed intake
ADG = average daily gain
AI = artificial insemination
avg = average
bu = bushel
BW = body weight
cm = centimeter(s)
CP = crude protein
CV = coefficient of variation
cwt = 100 lb
d = day(s)
DDGS = dried distillers grains with solubles
DE = digestible energy
DM = dry matter
DMI = dry matter intake
F/G = feed efficiency
ft = foot (feet)
ft^2 = square foot(feet)
g = gram(s)
µg = microgram(s), .001 mg
gal = gallon(s)
GE = gross energy
h = hour(s)
HCW = hot carcass weight
in. = inch(es)
IU = international unit(s)
kcal = kilocalorie(s)
kg = kilogram(s)
kWh = kilowatt hour(s)
lb = pound(s)
Mcal = megacalorie(s)
ME = metabolizable energy
mEq = milliequivalent(s)
min = minute(s)
mg = milligram(s)
mL = cc (cubic centimeters)
mm = millimeter(s)
mo = month(s)
MUFA = monounsaturated fatty acid
N = nitrogen
NDF = neutral detergent fiber
NE = net energy
NFE = nitrogen-free extract
ng = nanogram(s), .001 Fg
no. = number
NRC = National Research Council
ppb = parts per billion
ppm = parts per million
psi = pounds per square inch
PUFA = polyunsaturated fatty acid
s = second(s)
SD = standard deviation
SE = standard error
SEM = standard error of the mean
SEW = segregated early weaning
SFA = saturated fatty acid
SID = standardized ileal digestible
UFA = unsaturated fatty acid
wk = week(s)
wt = weight(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 750,000 IU vitamin A, 300,000 IU vitamin D_3, 8,000 mg vitamin E (dl-alpha-tocopherol acetate or 4,000 mg d-alpha-tocopherol acetate), 600 mg menadione, 1,500 mg riboflavin, 5,000 mg pantothenic acid, 9,000 mg niacin, and 6 mg vitamin B_{12}.

Sow add pack: Each pound of premix contains 750,000 IU vitamin A, 100,000 mg choline, 40 mg biotin, 400 mg folic acid, 180 mg pyridoxine, 4,000 mg vitamin E (dl-alpha-tocopherol acetate or 2,000 mg d-alpha-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.

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Swine Industry Day Committee

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