SWINE UPDATE

November 2000 Vol. 22, No. 5

K-STATE Kansas State University

Animal Sciences & Industry

Swine Industry Day 2000 set for Manhattan Nov. 15-16

New technological advancements in the swine industry will be presented in Manhattan at the Kansas State University Swine Day, held in conjunction with Kansas Pork Congress-Trade Show, Nov. 15-16 at the Manhattan Holiday Inn and Holidome.

Highlighting the Nov. 15 agenda is "Adapting to New Environmental Challenges," a producer seminar given by John Baumgartner of Baumgartner Environics Inc., of Olivia, Minn.

On Nov. 16, K-State Swine Day will feature K-State's swine extension group discussing new research to help swine producers improve the net returns of their businesses. K-State agricultural economist James Mintert will discuss the price forecast for 2001.

K-State Agricultural Economist for the southeast area, Sarah Fogelman, will present "Improving Business Success Through People-Oriented Management."

There is no cost to register for the two-day event, but meals need to be purchased through the Kansas Pork Producers Council (KPPC). On Wednesday, the KPPC appreciation luncheon is $15 per person, and the dinner and casino night is $25 per person. Swine Day luncheon tickets may be purchased for $8 per person. Meals must be purchased by Nov. 13.

Contact KPPC, (785) 776-0442, or the Department of Animal Sciences, (785) 532-1267, for more information.

KANSAS STATE UNIVERSITY SWINE INDUSTRY DAY

Thursday, November 16
Holidome—Manhattan, Kansas

8:15–9:15 Trade Show—Holidome Lobby

MORNING PROGRAM—Ballroom

Master of Ceremonies—Pat Murphy

9:00 *Welcome*—Jack Riley

9:30 *Latest Research to Help Improve Net Return of a Swine Business*
K-State Swine Extension Group will discuss practical application of the latest research results to decrease cost of production and increase productivity. Paylean®, marketing, sow productivity,ingredient quality and other new technologies will be covered. Jim Nelssen, Bob Goodband, Steve Dritz, Mike Tokach and Joe Hancock

11:30 LUNCH

AFTERNOON PROGRAM—Ballroom

Master of Ceremonies—Duane Davis

1:15 *Improving Business Success through People-Oriented Management,* Sarah Fogelman

2:00 *Price Forecast for the Year 2001*
Jim Mintert

Irradiation of spray-dried blood meal, animal plasma improves growth

Joel M. DeRouchey, graduate research assistant

Current research shows that the inclusion of spray-dried blood products to nursery diets improves growth performance. However, past research at Kansas State University has shown a large amount of growth performance variation in pigs fed spray-dried blood products. This may be a result of the various types of drying and processing techniques used by different blood coproduct manufacturers. Most commercially available blood products used in swine diets are spray-dried. Further irradiation processing of these blood products may improve pig performance, possibly by decreasing the anti-nutritional factors, producing structural changes within the protein increasing the digestibility and reducing the bacteria concentration within the blood products. It was our objective to determine the effects of irradiation processing on different blood products on nursery pig growth performance.

Procedures

Experiment 1.

In Experiment 1, a total of 60 pigs, with a body weight (BW) of 13.8 and 17 ± 2 days of age, were used in a 19-day growth test. Pigs were blocked by weight and allotted to one of two dietary treatments. There were five pigs per pen and six pens per treatment. All pigs were fed the same pelleted segregated early weaning (SEW) diet to five days postweaning. Then, the pigs were switched to experimental diets containing 5 percent spray-dried blood meal or spray-dried blood meal that had been irradiated. All blood meal used in the experiment originated from the same lot. The spray-dried blood meal was irradiated at an average dose of 9.54 kGy (24 doses with a 7.2 kGy minimum and 11.8 kGy maximum dose.)

Experiment 2.

A total of 180 pigs (BW of 13.1 lb and 17 lb. ± 2 days of age) were used in a 24-day growth test to determine the effects of source, processing technique and irradiation of spray-dried animal plasma on nursery pig performance. There were five pigs per pen and six pens per treatment. Treatment diets were fed in meal form for the first 10 days, with a control diet containing no animal plasma and five additional diets containing 5 percent spray-dried animal plasma from two different sources and processing techniques. From spray-dried animal plasma source one, treatment diets consisted of plasma that had been spray-dried, spray-dried then irradiated, or freeze-dried then irradiated. From spray-dried animal source two, treatment diets consisted of plasma that had been spray-dried or spray-dried then irradiated. The spray-dried animal plasma was irradiated at an average dose of 9.75 kGy (8 doses with a 9.50 kGy minimum and 10.00 kGy maximum dose.)

Table 1. Effects of irradiated spray-dried blood meal on growth performance of nursery pigs and bacteria levels[a]

	Spray-dried blood meal			
Item	Regular	Irradiated[b]	SE	P<
Initial weight, lb	15.16	14.82	.18	.21
d 0 to 7				
ADG, lb	.31	.43	.04	.03
ADFI, lb	.58	.69	.04	.03
F/G	1.87	1.60	.05	.13
d 7 to 14				
ADG, lb	.69	.82	.05	.09
ADFI, lb	.86	.92	.06	.46
F/G	1.25	1.12	.04	.09
d 0 to 14				
ADG, lb	.50	.62	.04	.02
ADFI, lb	.72	.80	.04	.13
F/G	1.44	1.29	.03	.02
Blood meal[c]				
Total plate count	6.6×10^6	9.0×10^1	—	—
Total coliform count	0	0	—	—

[a]A total of 60 pigs (five pigs/pen and six pens/treatment) with an average initial BW of 14.95 lb at the beginning of phase II. All pigs were fed a common SEW diet for the first five days. Thus, day 0 of the experiment is actually 5 days after weaning.

[b]Initial pig weight (day 5 postweaning) was used as a covariate in the growth performance statistical analysis.

[c]Samples obtained prior to manufacturing of complete diet.

Results and Discussion

Experiment 1.

From day 0 to 7, pigs fed the irradiated spray-dried blood meal had improved (P < .03) average daily gain (ADG) and average daily feed intake (ADFI) and tended to have improved feed efficiency (P>.13, Table 1.) From day 7 to 14, both ADG and

Table 2. Effects of source, processing technique, and irradiation of plasma on weanling pig growth performance and bacteria concentrations[a]

Item	No plasma Control	Plasma Source 1			Plasma Source 2		SEM
		Spray-dried	Spray-dried and irradiated	Freeze dried and irradiated	Spray-dried	Spray-dried and irradiated	
Initial wt, lb	13.10	13.09	13.07	13.09	13.02	13.10	
D 0 to 10							
ADG, lb[bc]	.53[e]	.56[ef]	.66[gh]	.64[fg]	.65[gh]	.73[h]	.03
ADFI, lb[bd]	.62[e]	.65[e]	.72[ef]	.68[e]	.72[ef]	.80[f]	.04
F/G	1.17	1.16	1.09	1.06	1.11	1.10	.03
Pig wt, lb							
D 10[bc]	18.39[e]	18.60[ef]	19.62[gh]	19.45[fg]	19.51[gh]	20.37[gh]	.32
D 24[bd]	28.11[e]	29.71[ef]	31.27[f]	29.49[ef]	29.92[ef]	31.31[f]	.77
Spray-dried animal plasma[i]							
Total plate count	N/A	9.0×10^4	4.5×10^1	0	2.6×10^4	3.5×10^2	—
Total coliform count	N/A	0	0	0	0	0	—
Whole diet[j]							
Total plate count	3.7×10^4	1.0×10^4	3.1×10^2	6.8×10^3	1.0×10^4	7.6×10^3	—
Total coliform count	2.8×10^4	6.7×10^3	3.0×10^2	2.1×10^2	6.0×10^3	1.0×10^3	—

[a]A total of 180 pigs (five pigs/pen and six pens/treatment) with an average initial BW of 13.1 lb. • [b]Control vs mean of plasma treatments (P < .05.) • [cd]Spray-dried plasma vs spray-dried and irradiated plasma (P < .05 and .10, respectively). • [efgh]Means in same row with superscripts differ (P < .05.) • [i]Samples obtained prior to manufacturing of complete feed. • [j]Samples obtained at initiation of the feeding experiment.

feed to gain ratio (F/G) (P < .09) improved moderately due to irradiation of spray-dried blood meal, with no effect on ADFI. For the entire treatment period, pigs fed the irradiated spray-dried blood meal had improved (P < .02) ADG and F/G with a tendency to increase food intake (P < .13). Irradiation of the spray-dried blood meal reduced the bacteria concentration from a 6.6×10^6 to 9.0×10^1.

Experiment 2.

From day 0 to 5, pigs fed the irradiated spray-dried animal plasma had increased ADG (P < .05) and ADFI (P < .10) compared to those fed the regular spray-dried animal plasma, regardless of source (Table 2.). In addition, pigs fed source two non-irradiated plasma had improved ADG and F/G (P < .05) compared to those fed the control diet. Those fed spray-dried animal plasma source one did not.

From day 5 to 10, pigs fed spray-dried animal plasma source two plasma had increased ADG and ADFI (P < .05) compared with the control diet without spray-dried animal plasma. For day 0 to 10, ADG (P < .05) and ADFI (P < .10) was greater for pigs fed irradiated spray-dried animal plasma versus animal plasma that was not irradiated. Freeze-dried and irradiated plasma did not improve growth performance compared to plasma from the same source that had been spray-dried then irradiated.

From day 10 to 24, ADFI was improved (P < .05) for pigs previously fed diets containing spray-dried animal plasma that was irradiated versus non-irradiated spray-dried animal plasma. In addition, pigs fed irradiated spray-dried animal plasma were heavier (P < .05) at the conclusion of the trial compared to the control diet. Pigs on the treatment diets with regular spray-dried plasma were not.

Irradiation reduced the bacteria concentration in the spray-dried animal plasma, regardless of source (Table 2.) In addition, this proved to be beneficial in reducing the total bacteria load in the whole diet. However, it is evident that a large amount of bacteria exists in other feed ingredients in the nursery diets.

In conclusion, irradiation of spray-dried blood meal and animal plasma improved growth performance. It is unclear whether the response to irradiated blood products is from a reduction in total bacteria concentration or an increase in digestibility of the protein portion. This needs further investigation. Freeze-dried-then-irradiated plasma showed no improvement over spray-dried-then-irradiated plasma, indicating that protein damage from heat occurring during the spray-drying process is not a concern and that freeze-drying offers no further benefits. Furthermore, differences in source of spray-dried animal plasma were evident in our study.

COOPERATIVE EXTENSION SERVICE
U.S. DEPARTMENT OF AGRICULTURE
KANSAS STATE UNIVERSITY
MANHATTAN, KS 66506-3403

SWINE UPDATE

Kansas State University

Swine Day

Thursday, November 16, 2000

Jim L. Nelssen
Extension Specialist
Swine

Robert D. Goodband
Extension Specialist
Swine

Mike D. Tokach
Extension Specialist
Livestock Production
& Management, NE

Steve Dritz
Swine Specialist
Food Animal Health and
Management Center

Kansas State University
Cooperative Extension Service
Department of Animal Sciences & Industry
Weber Hall, Room 213
Kansas State University
Manhattan, Kansas 66506