

Effects of Finishing Pigs in Hoop Structures on Swine Performance, Pork Composition, and Pork Quality

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Summary and Implications

This study was undertaken to determine the extent to which finishing pigs in deep bedded hoop structures affects swine performance, pork composition and pork quality. Pigs finished in Hoop barns pigs gained significantly less per day and required significantly more feed for lean growth than pigs finished in confinement. Carcasses from confinement pigs had lower calculated percent fat free lean than carcasses from hoop finished pigs. Finishing environment did not affect pork quality.

Introduction

An alternative system for finishing pigs utilizes deep-bedded hoop structures. Hoops are large, tent-like shelters with cornstalks or straw for bedding. Items differing between hoops and confinement systems are the use of straw bedding and exposure to the environment. Deep-bedded systems are enrichment strategies that have been shown to stimulate foraging and explorative behavior. Finishing in deep-bedded environments has also supported increased spontaneous exercise. Increased exercise and exploratory behavior may lead to changes in stress susceptibility, influencing performance and ultimate pork quality. Stress during finishing and before slaughter is known to influence the physiological and biochemical processes in pigs, which will affect the perimortem muscle metabolism and thereby meat quality. Few studies have compared growth characteristics from confinement systems to deep-bedded systems. This study was undertaken to compare pigs finished in standard confinement systems to pigs finished in hoop structures and the effects of swine performance, pork quality and adipose tissue composition.

Methodology

Five groups of 600 pigs were farrowed and reared in intensive confinement conditions at the Iowa State University Swine Nutrition Farm, Ames, IA. At four months of age, gilts were separated from barrows, weighed and allocated into groups stratified by weight. From those weight allocation groups, 100 gilts ranging in weight from 59 – 71 kg were randomly assigned to treatments of hoop (n = 50) and confinement (n = 18). Six groups were fed from June through November, 2004.

Beginning weight, 21-day weight and final slaughter weight were obtained for each pig. Average daily gain (ADG, g/day), feed conversion (g:f) were calculated for each pig.

After standard slaughter, carcasses were placed in a 0°C cooler and chilled for 24 hours. Temperature and pH measurements were taken at 1, 6 and 24 hours postmortem on right side loins by a penetration probe. Carcasses were ribbed between the 10th and 11th ribs and were subjectively analyzed for color and appraised for firmness, wetness and marbling. Objective measurements of tenth and last rib backfat and loin eye area were taken, and fat free lean % was calculated. Pork loin was sampled for color, purge loss, drip loss, and star probe analysis.

Results & Discussion

Hoop pigs gained significantly ($P<0.01$) less per day and required significantly ($P<0.01$) more feed for lean growth than confinement pigs (Table 1). Carcass weights and dressing % did not differ between the two groups. Carcasses from confinement pigs had significantly ($P<0.01$) lower lean percentages than hoop pigs. Environment did not affect temperature or pH decline or water holding capacity fresh pork (Table 2). Pork loin from pigs fed in hoop structures had significantly lower marbling scores than pork loin from pigs fed in confinement.

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Table 1. Influence of finishing environment on swine performance and composition.

Variable	Hoop	Confinement	Standard Error
LW (lb)	235	242	5.64
CW (lb)	175 ^a	182 ^b	4.34
Dressing (%)	74.65	74.90	0.37
10 th rib BF (in)	0.54 ^a	0.60 ^b	0.01
LRBF (in)	0.75 ^a	0.80 ^b	0.01
FFL (%)	56.87 ^a	55.50 ^b	0.52
ADG (lb/day)	1.78a	2.35 ^b	0.2
Gain:Feed	0.52 ^a	0.42 ^b	0.09

a-b means with different superscripts are significantly different

Table 2. The effect of finishing environment on fresh pork quality attributes.

Variable	Hoop	Confinement	Standard Error
pH – 1hr	6.21	6.18	0.52
pH – 6 hr	5.61	5.62	0.42
pH – 24hr	5.32	5.40	0.53
LEA (in ²)	6.93	6.96	0.21
Color	1.92	2.07	0.12
Marbling	1.42 ^a	1.78 ^b	0.12
Firmness	1.90	1.88	0.06
Wetness	1.83	1.89	0.07
Hunter L*	54.48	54.40	0.64
Hunter a*	8.06	8.26	0.24
Hunter b*	14.19	14.27	0.35
Drip (%)	3.68	4.64	0.92
Purge (%)	2.74	2.28	0.30

a-b means with different superscripts are significantly different