RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: The effects of increasing niacin supplementation on growth performance, and pork quality of finishing pigs raised in seasonal heat stress. **NPB # 13-093**

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Scientific Abstract:

A total of 1,232 pigs (PIC 337 × 1050; initially 59.4 lb) were used in a 98-d study to evaluate the influence of increasing dietary niacin supplementation on growth, body temperatures, and meat quality of pigs raised in a commercial facility during the summer. There were 28 pigs per pen and 11 pens per treatment. Basal diets contained corn, soybean meal, and dried distillers grains with solubles (DDGS). The four dietary treatments were formed by adding increasing levels of nicotinic acid as the source of niacin (Lonza, Allendale, NJ) at 14, 172, 331, and 490 mg/lb of complete feed. Temperature loggers were placed in the barn to determine daily relative humidity and temperatures. On d 57, 58, and 59, rectal temperatures and skin temperatures on the top of the shoulder and rump were collected from 2 pigs per pen (1 barrow and 1gilt). Temperatures were collected on the same pigs within the pen at 6:00, 9:00, 12:00, 15:00, and 18:00 of each collection day. On d 98, 2 pigs per pen (1 barrow and 1gilt) were visually selected as the heaviest pigs in the pen and were harvested for carcass and meat quality data. Pigs were harvested at a commercial abattoir where carcass traits, pH decline, and subjective loin color and marbling scores were collected. Afterwards, a 15.7 in. segment of the loin (posterior end) was used for meat quality analysis including measurements of ultimate pH, and purge loss. Then 1 in. boneless chops were cut from the loin segment and were used to determine 24 h drip loss, subjective color and marbling, objective lean color values (L*, a*, b*), and muscle niacin concentrations.

Temperature loggers reported average daily temperatures within the barn ranged from 63.8 to 85.5° F throughout the length of the study, with daily low temperatures ranging from 59.9 to 81.0° F and daily high temperatures ranging from 66.1 to 93.3° F. Overall, temperature was cooler than expected for the facility compared to normal seasonal increases associated with the summer months. Humidity was variable throughout the length of the study but was within expected ranges with the average humidity ranging from 44.9 to 85.5%.

Time × day interactions ($P < 0.01$) were observed for rectal, shoulder, and rump temperatures. Increasing dietary niacin increased rectal temperature (linear; $P = 0.02$) at 6:00 on d 57, but at 12:00 on d 57 increasing niacin decreased rectal temperature (quadratic; $P = 0.03$). Shoulder temperatures were increased (linear; $P = 0.04$) with increasing dietary niacin on d 57 at 6:00; however, temperatures were decreased with increasing niacin at 9:00 and 12:00 (quadratic; $P < 0.05$) on d 57, and at 6:00 (quadratic; $P = 0.04$) and 9:00 (linear; $P = 0.05$) on d 58. Rump temperatures were decreased at 9:00 (quadratic; $P = 0.04$) on d 57 and at 9:00 (linear, $P = 0.05$) on d 58 as niacin increased in the diet.

Overall (d 0 to 98), increasing dietary niacin did not influence ADG, or F/G but it tended (linear; $P = 0.07$) to increase ADFI. Increasing niacin supplementation did not influence carcass traits; however, for meat quality, it did increase (linear; $P < 0.01$) pH decline at 45 min and 21 h postmortem. Increases (linear; $P < 0.05$) in a* and b* were observed for chops from pigs fed increasing niacin, but subjective chop color scores were not affected by increasing niacin supplementation.