

PORK SAFETY

Title: The effect of feed withdrawal on pork quality and the prevalence of Salmonella and gastric ulcers at slaughter – **NPB 97-2001**

Investigator: Morgan Morrow

Institution: North Carolina State University

Co-Investigators: Todd See
Joan Eisemann
Peter Davies
Kelly Zering

Abstract:

To help producers decide whether they should withdraw feed prior to slaughter, we designed a study that examined the effect of feed withdrawal on the proportion of gastrointestinal tract lacerations, prevalence of *Salmonella spp.* in cecal contents at slaughter, prevalence and severity of gastric ulcers, and meat quality as measured by ultimate pH, color, and water holding capacity. Finally, we analyzed the economic impact of the treatments. We assigned treatments to a finishing floor of 1133 National Pig Development barrows that were sent to slaughter in 3 groups. Each marketing group (feed withdrawn once, first group; twice, second group; or three times, third group) had an equal number of pigs that had feed withdrawn for 0 (control) 12, or 24 hours.

Withdrawing feed for 12 or 24 hours improved ultimate pH, Japanese color score, water holding capacity, and color as measured by Minolta L* but reduced carcass weight to 76.4 kg, and 74.5 kg respectively compared to no feed withdrawal (77.4 kg). Repeated feed withdrawal over the three week period reduced ultimate pH, water holding capacity, Minolta L* measure and Minolta b*. Pigs in the first group marketed (feed withdrawn once) had nearly twice the water holding capacity of the second and third marketing groups. These results suggest that on-farm withdrawal of feed for 24 hours prior to slaughter enhances ultimate pork quality. However, because pigs in the third marketing group have lighter carcasses and reduced carcass quality producers will receive less for the hogs if they are paid on a carcass-merit program. Yet, most of the discount may be unrelated to the feed withdrawal immediately prior to slaughter. It might be more associated with the poor performing pigs and decreased growth associated with the severe ulcers seen in pigs in the third marketing group.

Overall, prevalence of severe ulcers in this study was 13.7%. Damage from ulcers increased from the first of the three groups marketed to the third. Overall, prevalence of

These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed

For more information contact:

National Pork Board, P.O. Box 9114, Des Moines, Iowa USA

800-456-7675, Fax: 515-223-2646, E-Mail: porkboard@porkboard.org, Web: <http://www.porkboard.org/>

chronic damage was 19.3% with 57.9% of chronic damage in stomachs from animals in the third marketing group (3 times treatment). Prevalence of esophageal constrictions was 10.4% with 66.7% of esophageal constrictions in stomachs from animals in the third marketing group (3 times treatment). Severity of damage, chronic damage, and esophageal constrictions all increased as carcass weight decreased, most notably for carcasses in the lowest weight quartile. These data show that withdrawal of feed prior to slaughter, for up to 24 hours, did not lead to an increase in stomach damage when compared to the appropriate control group. The relation of severity of damage, chronic damage, and esophageal constrictions to carcass weight suggests that the impact of chronic ulcers on growth of pigs may be greater than is widely appreciated.

Overall, 62% of cecal samples were positive for *Salmonella* but isolation was not associated with hours of feed withdrawal. The percentage of *Salmonella* positive ceca decreased from the first marketing group (73%) to the second (64%), and the third (52%). This indicates that feed withdrawal prior to slaughter did not increase the prevalence of *Salmonella* as reported in previous experimental studies and in this study the prevalence actually decreased over time.

Overall, 15.7% of gastrointestinal tracts were lacerated in one or more sections including the stomach (8.4%), colon (5.7%), small intestine (2.1%), and ceca (0.9%). The withdrawal of feed before slaughter decreased the weight of the gastrointestinal tract. Neither marketing group (feed withdrawn once, twice, or three times) nor the hours feed was withdrawn (0, 12, or 24) affected lacerations. Gastrointestinal tract lacerations were highest (14.4%) in the lightest quartile of carcass weight suggesting that the eviscerator was not able to adjust his work rhythm to account for the lighter, and presumably shorter carcasses. Most (94.1%) gastrointestinal tracts were lacerated in 1 section but 5.9% were lacerated in 2 sections. The proportion of lacerations in this study (15.5%) is higher than previously reported (4.5%). The difference may be due to the higher rate of evisceration (18 pigs per minute), or our more detailed examination of the gastrointestinal tracts.

Excluding meat quality differences, one time feed withdrawal had slightly positive but statistically insignificant effects on net returns from hogs in the first marketing group. Repeated feed withdrawal (twice and three times) reduced net returns from hogs in the second and third marketing groups. It appears that the animals that had feed withdrawn repeatedly had significantly lower carcass weights than controls in the same marketing groups. A question for further research is how much longer would the hogs that had feed withdrawn twice or three times have to remain on feed to attain the same carcass weight as the control hogs in their marketing group. It may be that negative effects of repeated feed withdrawal on net returns could be reduced by leaving the hogs on feed for several more days.