

Wednesday, July 27, 2005

SYMPOSIA AND ORAL SESSIONS

Animal Behavior and Well-being: Swine Transportation Handling & Feed Restriction

449 Effects of albuterol on behavioral and heart rate responses of finishing pigs to handling. J. Marchant-Forde^{*1}, K. McMunn¹, B. Richert², D. Lay Jr.¹, and R. Marchant-Forde¹, ¹USDA-ARS, Livestock Behavior Research Unit, W. Lafayette, IN, ²Purdue University, W. Lafayette, IN.

It has been proposed that a pure form of albuterol will deliver similar positive production effects without negative effects on well-being seen with other β -agonists. This experiment examined the effects of albuterol on behavior and heart rate (HR) during handling. The study used 192 pigs (88.8±0.9 kg BW) housed in groups of six in 32 pens (1.4m x 4.1m) and assigned to one of four treatments: 1) Control - standard finishing ration, 2) ALB-R2 - diet with 2 ppm of the pure R-enantiomer of albuterol, 3) ALB-R4 - diet with 4 ppm of pure R-albuterol, or 4) ALB-RS8 - diet with 8 ppm of a racemic mixture of R- and S-enantiomers. All diets supplied 18.3% CP, 1.1% lysine and 3534 kcal ME/kg and were offered ad libitum for a 4-wk. Behavioral responses to handling during weighing were recorded immediately before assignment to the treatments (wk 0) and at weekly intervals over the subsequent 4-wk period (wk1-wk4). Behavioral and HR responses to a 10-min human presence test in the home pen were measured during wk 0, wk1 and wk3. Finally, HR responses to 5-min loading, 26-min transport and 5-min unloading periods were recorded. Data were analyzed using Proc GLM of SAS, with pen as the experimental unit. Treatment had no effect on overall handling measures (P>0.05), including the number of pigs exiting the pen voluntarily, the time taken to weigh or the number of physical interactions needed by the handler to complete the task. Treatment also had no effect on behavioral responses to human presence (P>0.05), with all treatments willing to spend similar amounts of time close to, and interacting with the human. However, during the human presence test in wk1 and wk3, treated pigs had heart rates around 10 bpm higher (P<0.05) than control pigs, thought to be due to systemic vasodilation rather than direct β 1-receptor stimulation. During all phases of transport, heart rates were similar across treatments (P>0.05). The results indicate that albuterol-treated pigs do not differ markedly from control pigs in behavioral and heart rate responses to handling and transportation.

Key Words: Albuterol, Pigs, Behavior

450 Characterizing hunger in swine utilizing metabolic parameters during 36 h of imposed feed deprivation. M. Toscano^{*1}, D. Lay, Jr.¹, B. Craig², and E. Pajor², ¹USDA-ARS-LBRU, West Lafayette, IN, ²Purdue University, West Lafayette, IN.

Manipulations of diets in modern swine operations is a common technique to reduce costs and improve productivity, although a variety of behavioral and physiological measures suggest swine suffer from hunger. Due to hunger's subjective nature and the ambiguity of the parameters measured, evaluating the impact of specific diets on hunger is problematic. To develop a uniform index of hunger that diets could be compared against, individually penned barrows (90.05 ± 0.73 kg BW) were acclimatized over 5 d to an *ad-libitum*, 3-h feeding routine beginning at 0800. On d 6, pigs began 36 h of feed deprivation (DEP, n=17) or continued their normal feeding routine (CON, n=18). Animals were catheterized and blood was collected from all pigs at 0, 6, 12, 24, and 36 h during the deprivation period and assayed for non-esterified fatty acids (NEFA), insulin, glucose, and glucagon. Differenced between time points, treatment,

and their interaction were assessed using mixed model analysis. Pigs of the CON treatment had greater glucose (87.2 ± 1.0 mg/dL vs. 80.1 ± 1.1 mg/dL), insulin (8.4 ± 0.7 μ IU/ml vs. 3.6 ± 1.1 μ IU/ml) and glucagon concentrations (55.1 ± 2.6 pg/ml vs. 37.4 ± 1.8 pg/ml) than DEP pigs (p < 0.004, for all comparisons), although the NEFA concentrations were greater in DEP pigs (0.29 ± 0.01 mEq/L vs. 0.55 ± 0.02 mEq/L, p < 0.001). A time by treatment interaction (p < 0.002) was found for all metabolites with the exception of glucose (p > 0.1). In contrast to CON pigs, glucagon concentrations of DEP pigs remained unchanged while insulin concentrations fell from a 0 h initial baseline and remained at a reduced concentration. Future efforts should seek to combine physiologic data such as presented here with behavioral and other measures to indicate the severity of specific dietary manipulations on hunger in livestock.

Key Words: Swine, Hunger, Feed Restriction

451 A model for the study of dead and down pigs associated with transport: effects of maternal pheromone on pigs in transit. C. Lewis^{*1,2}, N. Krebs^{1,2}, L. Hulbert^{1,2}, and J. McGlone^{1,2}, ¹Pork Industry Institute, Lubbock, TX, ²Texas Tech University, Lubbock.

The objectives of this study were: (1) to establish a model for the study of dead and down (DD) pigs associated with transport and (2) to evaluate the effects of the maternal pheromone (MP) Suiience (Ceva, France) on DD rates. Human-pig interactions were observed during handling audits at the farm during truck loading and at the packing plant during unloading and movement to stun and kill. 30 trucks were observed which contained a total of 5,169 pigs (~164 pigs per truck). The pigs traveled ~45 min during transport, in the summertime. The truck was the experimental unit. At the farm, observers were blind to treatment and randomly selected trucks to receive MP or a control (CO) containing the solvent used to deliver MP. MP or CO was evenly sprayed on each truck (500 ml). They recorded the number of pigs that slipped/fell (S), vocalized (V), reared (R) and the number of pigs touched with an electric prod (E) (at the farm only; prods were not used at truck unloading) by using live continuous observation methods. The numbers of pigs that were DD at truck unloading, in rest pens or pre-stun were recorded. The completely random design was analyzed as a simple ANOVA with two treatments. The rate of pig death was low (0 on the trucks, and 0.0008±0.0007 & 0.0007±0.0007 respectively in the pre stun area). At truck loading the rate of pig S, V, R, and E for CO and MP were not different (S: 0.014±0.007 & 0.032±0.007, V: 0.87±0.08 & 0.72±0.08, R: 0.048±0.08 & 0.03±0.08, E: 1.15±0.15 & 1.04±0.15, respectively). V were higher (P=0.03) among CO than MP at the pre-stun area (0.14±0.015 & 0.09±0.015 for CO and MP respectively). A power analysis determined that the number of trucks needed to detect a 50% difference for S, V, R, E (at the farm) and NANI (at the plant) were 144, 16, 66, 29, 249, trucks, respectively. While mean improvements in the rate of down pigs and associated pig handling measures are suggested, studies of this type require over 200 trucks to detect meaningful differences.

Key Words: Swine Transportation, Swine Handling, Swine Stress