recently shown to be involved in neuronal plasticity and neuroprotective mechanisms. The precise function of ovothixin in the brain will be a topic for further research.

Key Words: chicken, ovothixin, brain

1944 Vasotocin receptor mRNA expression in the brain and pituitary of broiler breeder hens. K. Shaffer1, J.A. Vizcarra1, D. Baeyens2, N. Alī3, and J.D. Kirby2, 3 Department of Poultry Science, University of Arkansas, Fayetteville, AR, 2 Department of Physiology, University of Arkansas for Medical Sciences, 3Department of Biology, University of Arkansas Little Rock, Little Rock, AR.

Vasotocin receptors (VTR) are members of the seven transmembrane G-protein associated receptor superfamily. Several members of the vasopressin-ovocytotocin receptor family have been characterized in vertebrates. We have previously shown that VTR-1 expression occurs primarily in the brain while VTR-2 expression occurs mainly in the pituitary. Our goal was to evaluate the expression of VTR-1 and VTR-2 mRNA in known sites of expression over the ovulatory cycle of hens. In order to study potential changes in VTR-1 and VTR-2 expression, birds (n=4-5 per time point) were killed at 3 hour intervals relative to oviposition over a 24 hour period. Blood samples were drawn within 2 minutes of handling, prior to cervical dislocation. Brain, pituitary, shell gland, and kidney were immediately removed and frozen in liquid nitrogen. Plasma was stored at -20°C prior to determination of corticosterone levels by RIA. Isolated total RNA from the brains and the pituitaries was transferred to nylon membranes for analysis of receptor steady state mRNA levels by slot blot analysis. Full length cDNAs for VTR-1, VTR-2 and 28S RNA were used to make random primed cDNA probes. VTR-1 and VTR-2 mRNA expression levels were normalized relative to 28S expression for each sample. Corticosterone levels were significantly increased at nine hours post oviposition relative to all other times. Neither VTR-1 nor VTR-2 mRNA levels showed any significant variation over the 24 h cycle, in the brain or pituitary, respectively. Based on these results, we conclude that VTR-1 and VTR-2 steady state mRNA levels do not fluctuate dramatically over the ovulatory cycle of broiler breeder hens. Further work on circadian variations in membrane bound receptor concentrations in the brain and pituitary are currently underway.

Key Words: Vasotocin Receptor, Pituitary and Brain, Corticosterone

1945 Effect of lactic acid and lactosucrose supplementation in diets for nursery pigs. Acie Murry1*, Susan Sanchez2, and Parshall Bush1, 1The University of Georgia, Athens.

Swine producers have been adding organic acids to feed for several years. Acidified feed lower the pH of the pig’s stomach, inhibit certain pathogenic bacteria, increases nutrient digestibility and results in faster weight gain and more efficient feed conversion. Lactosucrose is considered a nondigestible triaccharide produced from lactosucrose and sucrose and may be used as a substrate by intestinal bacteria in humans. The influence of these factors has not been documented in nursery pigs. The objective of this study was to evaluate the effects of lactic acid and lactosucrose supplementation in pig’s diet on growth performance, feed efficiency and nutrient digestibility. Two experiments with twenty cross bred nursery pigs, average initial body weight 9.6 kg and age 28 days were conducted. All pigs were fed a corn-soybean meal basal diet (18% CP) for a 7-d adjustment period. On day seven after the adjustment period, ten pigs were randomly assigned to receive the basal diet supplemented with either lactic acid (1.8%) or lactosucrose (0.2%) for a 14-d experimental period. Daily feed intake was held constant at 5% of body weight for all pigs in an attempt to reduce the effects of different levels of feed intake on nutrient digestibility. Pigs were weighed every three days and feeding was adjusted according to the pig’s individual weight. Pigs fed the lactso sucrose diet were heavier (P < 0.04) at d 21 (15.40 vs 14.95 kg), but there was no effect of treatment (P > 0.50) on average daily gain (0.45 vs 0.43 kg), average daily feed (0.57 vs 0.56 kg), or gain/feed ratio (0.80 vs 0.78 kg) for lactosucrose and lactic acid, respectively. Treatment had no effect (P > 0.20) on apparent digestibility of DM (80.96 vs 82.46%), EE (77.45 vs 79.50%), CP (72.30 vs 74.45%), or GE (69.69 vs 69.33%) for lactosucrose and lactic acid, respectively. However, ash digestibility was greater (P < 0.05) for pigs fed the lactic acid diet than for those fed lactosucrose (50.43 vs 43.15%). The results from this study show that growth performance was better in pigs fed the lactosucrose diet, but ash digestibility was lower when compared with pigs fed the lactic acid.

Key Words: Lactosucrose, Lactic Acid, Digestibility, Pigs


Egg breaking facilities produce substantial quantities of egg by-products each year that are unsuitable for human consumption. Due to the excellent amino acid profile, the potential for spray-dried egg proteins to replace spray-dried porcine plasma (SDPP) in early-weaned pig diets was investigated in two 3-week performance trials. In both experiments, 5 pens containing four piglets (17 ± 1 d old) stratified by sex were assigned to the experimental diets in a completely randomized design. Experiment 1 comprised of four corn-soy diets containing 7% of either SDPP, spray-dried technical albumen (SDTA), heat treated SDTA (hot room storage at 70°C for 72h) or spray-dried whole egg (SDWE). Average daily gain (ADG), average daily feed intake (ADFI) and feed conversion ratios (FCR) were determined. In addition, five piglets per treatment were euthanized to determine ileal amino acid and energy digestibilities. Relative to the SDPP diet, ADG (266, 219, 199,194 g/d), ADFI (323, 304, 278 g/d) and FCR (1.22, 1.38, 1.46, 1.44) were poorer (P<0.05) for SDTA, heat treated SDTA and SDWE, respectively. The SDTA diet had numerically better performance parameters than the other diets containing egg proteins. Apparent ileal digestibility of methionine, lysine and threonine in SDPP and SDTA diets ranged from 80-90% and was generally higher (P<0.05) than in the SDWE diet. Ileal digestible energy content was similar (P>0.05) in all diets (3.1-3.2 Mcal/kg). In the second experiment, the effect of substituting SDPP with 25 or 50% SDTA was investigated. Pig performance was not affected by dietary substitution of SDPP for SDTA as values for control (7% SDPP) and the two SDTA diets were similar (P>0.05) for ADFI (380, 402, 376 g/d), ADG (275, 284, 265 g/d) and FCR (1.38, 1.42, 1.45), respectively. The results suggest that technical albumen can replace 25% of SDPP in early-weaned pig diets without compromising performance.

Key Words: Egg by-products, Nutritive Value, Early-weaned pigs

1947 Comparison of edible grade whey, granular whey, and Dairylac 80 as lactose sources for nursery pig diets. J.M. DeRouchey*, M.D. Tokach, J.L. Nelssen, R.D. Goodband, S.S. Dritz, J.C. Woodworth, and B.W. James, Kansas State University, Manhattan, KS.

A total of 210 pigs (BW of 5.6 kg and 18-22 d of age) were used in a 14-d growth assay to determine the ability of granular whey or Dairylac 80 to replace a high quality, edible grade whey in nursery diets. Pigs were blocked by weight and allotted to one of seven dietary treatments. Treatments included a negative control without lactose and a 2 x 3 factorial consisting of two lactose levels (9 and 18%) and three lactose sources (Edible whey, Land O’ Lakes; Granular whey, International Ingredient Corp.; and Dairylac 80, International Ingredient Corp.). There were five pigs/pen and six pens/treatment. All diets were pelleted and conditioned lactose from d 0 to 14 had greater ADG (P<0.05) and ADFI (P<0.05) than in the SDWE diet. Ileal digestible energy content was similar (P>0.05) in all diets (3.1-3.2 Mcal/kg). In the second experiment, the effect of substituting SDPP with 25 or 50% SDTA was investigated. Pig performance was not affected by dietary substitution of SDPP for SDTA as values for control (7% SDPP) and the two SDTA diets were similar (P>0.05) for ADFI (380, 402, 376 g/d), ADG (275, 284, 265 g/d) and FCR (1.38, 1.42, 1.45), respectively. The results suggest that technical albumen can replace 25% of SDPP in early-weaned pig diets without compromising performance.

Key Words: Egg by-products, Nutritive Value, Early-weaned pigs

ASAS Nonuniform Nutrition: Feed Ingredients and Enzymes

spray-dried technical albumen (SDTA), heat treated SDTA (hot room storage at 70°C for 72h) or spray-dried whole egg (SDWE). Average daily gain (ADG), average daily feed intake (ADFI) and feed conversion ratios (FCR) were determined. In addition, five piglets per treatment were euthanized to determine ileal amino acid and energy digestibilities. Relative to the SDPP diet, ADG (266, 219, 199,194 g/d), ADFI (323, 304, 278 g/d) and FCR (1.22, 1.38, 1.46, 1.44) were poorer (P<0.05) for SDTA, heat treated SDTA and SDWE, respectively. The SDTA diet had numerically better performance parameters than the other diets containing egg proteins. Apparent ileal digestibility of methionine, lysine and threonine in SDPP and SDTA diets ranged from 80-90% and was generally higher (P<0.05) than in the SDWE diet. Ileal digestible energy content was similar (P>0.05) in all diets (3.1-3.2 Mcal/kg). In the second experiment, the effect of substituting SDPP with 25 or 50% SDTA was investigated. Pig performance was not affected by dietary substitution of SDPP for SDTA as values for control (7% SDPP) and the two SDTA diets were similar (P>0.05) for ADFI (380, 402, 376 g/d), ADG (275, 284, 265 g/d) and FCR (1.38, 1.42, 1.45), respectively. The results suggest that technical albumen can replace 25% of SDPP in early-weaned pig diets without compromising performance.

Key Words: Egg by-products, Nutritive Value, Early-weaned pigs
0 to 7, but not overall. For pigs fed Dairylac 80\(^6\), ADG and ADFI were greater (quadratic, P < 0.01) compared to pigs fed the negative control, while gain/feed improved (linear, P < 0.02) as the oat level was increased from 0 to 18%. Pigs fed 9% granular whey and Dairylac 80\(^6\) had similar performance to pigs fed 18% edible whey. In conclusion, there were no differences in growth performance between sources of lactose used in this study.

### Control Edible Granular Dairylac 80\(^6\)

<table>
<thead>
<tr>
<th>Item Lactose, %</th>
<th>0</th>
<th>9</th>
<th>18</th>
<th>19</th>
<th>18</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG, g</td>
<td>238</td>
<td>243</td>
<td>283</td>
<td>263</td>
<td>257</td>
<td>291</td>
</tr>
<tr>
<td>ADFI, g</td>
<td>240</td>
<td>245</td>
<td>294</td>
<td>261</td>
<td>270</td>
<td>296</td>
</tr>
<tr>
<td>G/F, g/kg</td>
<td>960</td>
<td>1000</td>
<td>963</td>
<td>1001</td>
<td>952</td>
<td>983</td>
</tr>
</tbody>
</table>

Day 0 to 14

<table>
<thead>
<tr>
<th>Item Lactose, %</th>
<th>0</th>
<th>9</th>
<th>18</th>
<th>19</th>
<th>18</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG, g</td>
<td>238</td>
<td>243</td>
<td>283</td>
<td>263</td>
<td>257</td>
<td>291</td>
</tr>
<tr>
<td>ADFI, g</td>
<td>240</td>
<td>245</td>
<td>294</td>
<td>261</td>
<td>270</td>
<td>296</td>
</tr>
<tr>
<td>G/F, g/kg</td>
<td>960</td>
<td>1000</td>
<td>963</td>
<td>1001</td>
<td>952</td>
<td>983</td>
</tr>
</tbody>
</table>

### Key Words: Pig, Lactose, Growth

**1949 Productive performance and carcass characteristics of growing and finishing pigs fed different level of oat groats with and without enzymatic compound.** F. Salvador, C. Rodríguez*, F. Nunez, J. Jimenez, O. Ruiz, and A. Alarcon, Universidad Autonoma de Chihuahua, Chihuahua, Chih. Mexico.

An experiment was carried out to determine the optimum level of oat groats and the effect of the addition of the enzymatic compound Alloxyme Vegpro\(^6\) in growing and finishing pig rations on the productive response and carcass characteristics. Thirty two Yorkshire X Landrace pigs distributed in individual metabolic cages with a completely randomized design of a 4x2 factorial arrangement were used. Pigs were fed a ration containing 0, 15, 30 and 45% oat groats during the period by including oat groats in the ration (3.73, 3.46, 3.32 and 3.17 kg and the observation period was of 77-d. Barrows ate more (P < 0.05) the fat content in muscle. It was concluded that the addition of oat groats to diet of growing and finishing pigs improves the animal productive response showing an increase of up to 9.5% in economic return for every 15% addition of oat groats.

### Key Words: Pigs, Oat groats, Enzymes


Nutritive value of grain sorghum, barley and hulless barley was assessed in 2 experiments. In Exp. 1, 4 barrows of initial BW of 40 kg were fed 4 diets formulated to 16% CP: corn-starch+soybean meal (SBM); sorghum+SBM (SSB); hulless barley (HBS, 55.5 and BAS, 54.8%; Met, SBM, 87.9, 67.2 and BAS, 76.7%). Amino acids digestibility was measured using the difference method. A 6-d adaptation period was followed by a 48-h phase, sampling digesta in 2-h intervals. Pigs were fed in 2 meals (0800 and 1700 h). In 2 experiments, 4 barrows of initial BW of 40 kg were fed, 55.5% - 54.8% HBS, 51.6% - 54.8% Met, 87.9% - 76.7% SBM, 55.5% - 54.8% HBS, 55.5% - 54.8% BAS, 54.8% - 66.6% for most of the amino acids. Experiment 2 was a growth performance trial, in which sorghum grain was substituted by hulless barley at 0, 34, 66 and 100% of the total cereal grains in the diet (i.e., 4 experimental diets). Initial weight of the pigs was 39.3±4.8 kg and the observation period was of 77-d. Barrows ate more (P < 0.01) than gilts: 2.57 vs 2.31 kg/d. Avg. of daily gain was similar (P > 0.05), a mean response of 0.751 kg, but gain:feed ratio was progressively improved.