Assessment of water acidification as a tool to improve performance in wean pigs

Leslie Gentry¹, BS; Jarod Hanson², DVM
¹North Carolina State University; ²Murphy Brown LLC, Kenansville, North Carolina

Introduction
Weaning is an extremely stressful period for the piglet. The stress of weaning itself, transport to a nursery, and the change from a dam's milk to a cereal grain diet can result in detrimental pH and flora changes in the piglet's gut. This time span is also where receptors for diseases such as E.coli become active and can lead to diarrheal disease and associated morbidity and mortality. Piglets going through enteric challenges early in the nursery phase also tend to exhibit decreased ADG and feed conversion throughout life. Currently accepted interventions centered around the weaning event may include: vaccination for likely enteric pathogens, providing many small feedings per day, and/or adding high levels of fiber, zinc oxide, or acidifiers to the diet. The objective of this study was to determine the effect of acidifiers administered via drinking water on average daily gain (ADG) and mortality in newly weaned pigs.

Materials and methods
A 20,000 head continuous flow nursery site downstream from a gilt/P1 parity segregated sow herd was used for this trial. Failure to thrive, poor feed intake, colibacillosis (+/- rotaviral diarrhea), and markedly increased mortality were observed for several months prior to the initiation of this study.

Pigs were assigned to one of the following water treatments using a stratified random method: Activate WD (Novus International Inc, St. Charles, MO), Citric Acid (AgProvision LLC, Kenansville, NC), PKA (Animal Science Products Inc, Nacogdoches, TX), or no treatment for the first fourteen days after placement in the nursery. Each stock solution was mixed to achieve pH < 4 at the water nipple. Stock solutions were initially mixed according to manufacturer's directions when available. After measuring the pH at the water nipples concentrations were adjusted to account for local water conditions. Red food coloring was added to the stock solutions to allow visual confirmation of treatment at the water nipples. Water lines were primed and each water nipple was checked prior to pig placement. Pigs were weighed by pen at placement and 21 days later to determine the effectiveness of the treatments.

Results and discussion
Average pH values were 3.49, 3.59, 3.09, and 8.18 for Activate WD, citric acid, PKA, and control treatment groups respectively. Day 21 and closeout mortality along with true and closeout ADG were tabulated. No statistical differences were seen between any of the treatment groups for any of the parameters assessed. Day 21 mortality values were 1.5%, 2.2%, 1.6%, and 3.4% for Activate WD, citric acid, PKA, and control treatments respectively while closeout mortality values were 7.57%, 6.09%, 6.67%, and 7.73% respectively. Day 21 true ADG values were 0.617, 0.597, 0.563, and 0.597 for Activate WD, citric acid, PKA, and control treatments respectively while closeout ADG values were 0.607, 0.582, 0.551, and 0.574 respectively. Figure 1 shows a comparison of mortality and ADG for treatment groups.

While numerical differences in mortality and ADG results were not statistically significant, this is likely due to the small number of replicates. Additional replicates would be needed to verify the differences seen as well as to obtain water consumption data for each product at various times during the year as we hypothesize that the acidifier(s) have the potential to reduce water consumption and potentially exacerbate dehydration during an outbreak of diarrhea during periods of decreased water consumption.

References
Figure 1: Mortality and ADG

- Day 21 mortality (%)
- Closeout mortality (%)
- Day 21 true ADG (lgs/day)
- Closeout ADG (lbs/day)

<table>
<thead>
<tr>
<th>Treatment groups</th>
<th>Day 21 mortality (%)</th>
<th>Closeout mortality (%)</th>
<th>Day 21 true ADG (lgs/day)</th>
<th>Closeout ADG (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate WD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric acid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PKA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>