HIGH PHYTASE SUPPLEMENTATION LEVELS IMPROVE PERFORMANCE IN PIGLETS FED P- ADEQUATE DIETS

P WILCOCK, H GRAHAM & G CORDERO

AB VISTA, UK
WHAT IS PHYTATE?

**Hexainositolphosphate** (IP6)

The **main phosphorus (P) store** in plants, present in most feed stuffs

**Possible source of P** for poultry and swine, but monogastrics are inefficient at hydrolysing phytate, which means that the **phytate P is unavailable**.

**Binds with other minerals and proteins**, rendering them unavailable
PHYTATE REDUCES ENERGY AND PROTEIN DIGESTIBILITY IN PIGLETS, IMPACTING ADG AND G:F

Apparent faecal energy digestibility (%)

Low (0.22%)  High (0.48%)

Apparent faecal crude protein digestibility (%)

Low (0.22%)  High (0.48%)

ADG, g (7 to 12 kg piglets)

G:F, g/g (7 to 12 kg piglets)

Ref: Liao et al., 2005; Woyengo et al., 2012
HYPOTHESIS

• By eliminating the anti-nutritive effects of phytate, high doses of phytase (superdosing) could improve the performance of piglets fed a P-adequate diet.
DESIGN

• 88 weaned piglets, mean initial weight 6.1 kg

• 11 pens of 4 pigs per diet

• 2 diets
  1. Control (nutrient adequate)
  2. Control + 2,500 FTU/kg Quantum® Blue (enhanced *E. coli* 6-phytase)
<table>
<thead>
<tr>
<th>Ingredients (kg/t)</th>
<th>P1 (d 1-7)</th>
<th>P2 (d 7-21)</th>
<th>P3 (d 21-42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>39.1</td>
<td>48.7</td>
<td>58.1</td>
</tr>
<tr>
<td>Soybean meal-48%</td>
<td>17.5</td>
<td>25.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Fishmeal</td>
<td>7.50</td>
<td>3.75</td>
<td>3.65</td>
</tr>
<tr>
<td>Whey</td>
<td>20.5</td>
<td>10.6</td>
<td>-</td>
</tr>
<tr>
<td>Soy protein concentrate</td>
<td>9.70</td>
<td>4.90</td>
<td>0.99</td>
</tr>
<tr>
<td>White grease</td>
<td>3.90</td>
<td>4.40</td>
<td>3.65</td>
</tr>
<tr>
<td>Phytase (FTU/kg)</td>
<td>0/2500</td>
<td>0/2500</td>
<td>0/2500</td>
</tr>
<tr>
<td>ME (MJ/kg)</td>
<td>14.8</td>
<td>14.7</td>
<td>14.3</td>
</tr>
<tr>
<td>Crude protein (%)</td>
<td>24.1</td>
<td>22.3</td>
<td>19.9</td>
</tr>
<tr>
<td>Ca (%)</td>
<td>0.79</td>
<td>0.79</td>
<td>0.71</td>
</tr>
<tr>
<td>Digestible-P (%)</td>
<td>0.45</td>
<td>0.40</td>
<td>0.39</td>
</tr>
<tr>
<td>Phytate-P (%)</td>
<td>0.16</td>
<td>0.19</td>
<td>0.26</td>
</tr>
</tbody>
</table>
NURSERY PERFORMANCE
(WEAN TO 42 D)

BODYWEIGHT

Days on Trial

<table>
<thead>
<tr>
<th></th>
<th>Wean</th>
<th>21d</th>
<th>42d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6,1</td>
<td>10,3</td>
<td>21,7</td>
</tr>
<tr>
<td>QB2500</td>
<td>6,2</td>
<td>11,4</td>
<td>23,1</td>
</tr>
</tbody>
</table>

** = P < 0.10
NURSERY PERFORMANCE (WEAN TO 42 D)

**ADG (g/d)**

- Control: 378 g/d
- QB2500: 413 g/d

* = P < 0.15

**ADFI (g/d)**

- Control: 577 g/d
- QB2500: 606 g/d

* = P < 0.15
NURSERY PERFORMANCE
(WEAN TO 42 D)

**FCR (g/g) W – 42d**

- Control: 1.53
- QB2500: 1.44

*** = P < 0.05

**Scour Score (W – d7)**

- Control: 1.26
- QB2500: 1.32

1 = normal faeces, 5 = watery diarrhoea
EXTRA RETURN PER PIG WITH PHYTASE SUPERDOSING

<table>
<thead>
<tr>
<th>Extra Feed Cost Per Pig ($)</th>
<th>Extra Gain (kg)</th>
<th>Extra Value ($1.55 per kg)</th>
<th>Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.79&lt;sup&gt;1&lt;/sup&gt;</td>
<td>+1.42</td>
<td>+2.20</td>
<td>2.8:1</td>
</tr>
</tbody>
</table>

<sup>1</sup> The extra cost was due to the higher feed cost and intake with superdosing phytase. Note that phytase was added to a nutrient adequate diet, with no P and Ca matrix.
DISCUSSION

Phytase superdosing:

1. Tended to improved daily gain (9%)
2. Improved feed conversion efficiency (6 %)
3. Gave a 2.8:1 return on investment
CONCLUSION

• Phytase **superdosing** improved the performance of weaned piglets fed P-adequate diets, presumably through **destruction** of anti-nutritive phytate
THANK YOU VERY MUCH FOR YOUR ATTENTION

Gustavo.cordero@abvista.com