Low protein rations halve bacon pig profits

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Medina Pig Research Station trial results

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For many years the Department of Agriculture has recommended that pig producers include meat meal or other protein concentrate in pig rations based on cereal grains. However, it is still common for pigs to be raised on cereal grains with little or no protein added.

Recent trials at the Department of Agriculture’s Medina Pig Research Station have demonstrated the losses which can result from feeding pigs on low-protein cereal rations.

Growing pigs fed barley without a protein supplement were less than half as profitable as those fed barley with added meat meal.

Lower feed conversion efficiency, higher total feed cost and lower financial returns on carcasses were recorded when barley was fed without meat meal.

Although a barley ration containing 15 per cent meat meal cost 9 per cent more than an all-barley ration, nearly 40 per cent more of the all-barley ration was required to produce a baconer pig.

The pigs used

Eighty Large White x Landrace grower pigs of about 20 kg live-weight were equally divided into two blocks of four groups each on the basis of sex (gilt or castrate), liveweight and breeding. Each group of ten pigs was housed in a partially slattered pen in the Research Station’s grower house. The pigs were fed ad lib in self feeders until they reached about 45 kg liveweight. They were then rationed on the floor to a restricted feeding scale, until they were sold for slaughter as baconers at 85 kg average pen liveweight.
During the trial the pigs were weighed fortnightly. At slaughter the carcasses were halved and 'chops' removed at the last rib for measurement of fat depth and eye muscle area, and were photographed. Feed consumption for each pen group was recorded during the trial.

Rations
Table 1 details the four rations used in the trial.
Ration 1 consisted entirely of barley, with a standard vitamin and mineral element supplement.
Ration 2 was similar, except that appropriate supplements were added to overcome deficiencies of salt, calcium and phosphorus.
Ration 3 contained half the recommended amount of meat meal added to the barley.
Ration 4 contained the total recommended amount of meat meal.

No additions of calcium or phosphorus were required in Rations 3 and 4 because the meat meal in these rations contained enough of these elements to satisfy the needs of growing pigs.

The table gives the protein contents of the four rations, Ration 4 containing the 16 per cent protein recommended amount of meat meal.

As the rations improved nutritionally, so the cost increased from $83.50 to $91.12 per tonne. These costs were based on the prices ruling at the time of the trial, when barley was $80 and meat meal $125 per tonne.

Results
Table 2 gives the results of the trial.
Growth rate improved from a slow 350 grams per day for pigs fed the all-barley diet, to a reasonable 581 g per day for pigs fed 15 per cent of meat meal with barley. Meat meal at this level therefore improved growth rate by 66 per cent.

The differences in growth rate are reflected in the time taken to reach baconer weight. Pigs fed no meat meal (Treatment 1) were eight months old when they finally reached baconer weight, while those fed adequate meat meal (Treatment 4) reached baconer weight in only 5.5 months.

The consequences of slow growth rate on the throughput of a piggery are obvious.

Feed conversion efficiency was similarly affected. Each kilogram of liveweight gain required 5.15 kg of Ration 1, compared with only 3.56 kg of Ration 4. Although Rations 1 and 2 were cheaper per tonne of feed, the feed cost per kilogram of liveweight gain for pigs fed them was much higher than for pigs fed Rations 3 and 4, which contained meat meal.

It was cheaper to produce baconer weight carcasses with the higher priced rations. Although pigs fed minerals and salt with grain (Treatment 2) performed better than those fed grain only (Treatment 1) they were still greatly inferior to pigs fed meat meal with grain.

Carcass value
Carcasses were evaluated by measuring fat depth and eye muscle area on carcass sides cut at the last rib. Fat depth was measured at a point 6.5 cm from the mid-back, representing the degree of fat cover over the eye muscle.

Table 2 shows that Rations 1 and 2 produced significantly more fat than Rations 3 and 4, and this is well illustrated in the photograph. Ration 4, with the highest level of meat meal, produced less fat than Ration 3, with half the recommended amount of meat meal.

Feeding meat meal dramatically increased the eye muscle area, from 19.6 sq cm for Ration 1, to 30.6 sq cm respectively for Rations 3 and 4.

Table 1.—Percentage composition of the four ration treatments.

<table>
<thead>
<tr>
<th>Ration</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>99.75</td>
<td>97.07</td>
<td>91.95</td>
<td>84.45</td>
</tr>
<tr>
<td>Meat meal</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Mineral vitamin supplement</td>
<td>1.00</td>
<td>0.65</td>
<td>0.73</td>
<td>0.30</td>
</tr>
<tr>
<td>Salt</td>
<td>10-0</td>
<td>10-0</td>
<td>13-7</td>
<td>16-0</td>
</tr>
<tr>
<td>Ground limestone</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2.—Performance, carcass characteristics and profit margins of pigs receiving the four ration treatments.

<table>
<thead>
<tr>
<th>Ration</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liveweight gain (grams/day)</td>
<td>350</td>
<td>405</td>
<td>551</td>
<td>581</td>
</tr>
<tr>
<td>Age at 85 kg liveweight (days)</td>
<td>249</td>
<td>223</td>
<td>181</td>
<td>175</td>
</tr>
<tr>
<td>Feed conversion (kg feed/kg liveweight gain)</td>
<td>4.0</td>
<td>4.9</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Feed cost per kg gain (cents)</td>
<td>43.0</td>
<td>41.1</td>
<td>32.2</td>
<td>32.4</td>
</tr>
<tr>
<td>Back fat (mm)</td>
<td>29.0</td>
<td>30.0</td>
<td>25.8</td>
<td>22.2</td>
</tr>
<tr>
<td>Eye muscle area (cm²)</td>
<td>19.6</td>
<td>19.0</td>
<td>23.5</td>
<td>30.6</td>
</tr>
<tr>
<td>Carcass value (c/kg)</td>
<td>66.0</td>
<td>66.0</td>
<td>88.0</td>
<td>95.0</td>
</tr>
<tr>
<td>Gross return on carcass ($)</td>
<td>42.24</td>
<td>42.24</td>
<td>56.32</td>
<td>60.80</td>
</tr>
<tr>
<td>Feed cost per pig ($)</td>
<td>33.27</td>
<td>32.04</td>
<td>26.25</td>
<td>26.38</td>
</tr>
<tr>
<td>Gross margin over feed cost ($)</td>
<td>8.97</td>
<td>10.20</td>
<td>30.07</td>
<td>34.42</td>
</tr>
</tbody>
</table>
It is difficult to place a reasonable economic value on the carcasses because the method of selling and the carcass grading system can influence the price paid.

If the carcasses had been sold through live auction there may have been little difference in the prices paid for the pigs raised on the four rations, since before slaughter there was little visual difference in the quality of the pigs.

However, if the pigs had been sold on a weight-and-grade basis the values per kilogram of carcass shown in Table 2 would probably have applied, with the carcasses from Ration 4 returning 29 c per kilogram more than the overfat carcasses from Rations 1 and 2.

Financial loss

If the different prices per kilogram of carcass from the four ration treatments are applied to a standard 64 kg carcass, a gross return per carcass can be calculated, as in Table 2.

The feed cost per pig can then be calculated from the feed cost per tonne and the amount of feed required to produce a baconer weight pig from the four rations. By deducting feed cost per pig from the gross return on the carcass, the gross margin over feed cost can be calculated.

Although the gross margin does not take into account various other fixed and variable costs of production, nor the time taken to reach baconer weight, it usefully indicates the magnitude of the differences between the feeding treatments.

Table 2 shows that the inclusion of meat meal more than trebled the gross margin over feed cost. Although the all-barley diets were cheaper per tonne, they were far less economical because they produced poorer feed conversion efficiencies and low grade carcasses.

Feeding an all-cereal diet to growing pigs represents a financial loss to the producer compared with the returns that may be easily achieved by including a supplementary source of protein such as meat meal. Both cost of production and carcass quality are severely affected by poor feeding.