Reducing the use of antimicrobials

The use of a vaccination can significantly reduce the use of antimicrobials in pig farming. Recent studies show that even with a reduction of antimicrobial use, pigs can grow faster and more consistently when compared to that of control groups.

By Harm Voets

In the past few years, the political stance of antimicrobial use in agriculture has changed. Despite the fact that antibiotics are a valuable tool for fighting acute diseases, there is an increasing presence of consumer groups on the Internet and other open sources which question the way in which food producing animals are kept and raised. Meaning, consumers want food produced without antibiotics. In Europe, the results of the ban on antimicrobial growth promoters (AGP) showed a drastic reduction in the overall tonnage of preventive antimicrobials, but also a massive shift to more therapeutic uses of antimicrobials especially against enteric diseases.

Since then, an increase in overall antibiotic usage has been reported in Europe. Besides the environmental improvements in animal farming, a vaccination may be best for the reduction of the total antibiotic use in pork production. Taking a widespread enteric disease like ileitis into account, the effect of the vaccination Enterisol® Ileitis (by Boehringer Ingelheim) for example, on the use of antimicrobials is reviewed. The company did several field trials all around the world to test the effect in different climates.

Field cases
In a 4,000 sow multiple-site production system in northern Mexico, a total of 11 weekly production batches were evaluated; seven control groups and four vaccinated groups. The control groups used a pulse feed medication programme during the entire finishing phase:

- Tylosin 110 ppm; carbadox 55 ppm
Feed grade tylosin vs. ileitis vaccine

May 01
Jan 02
May 02
Jan 03
May 03
Jan 04
May 04
Jan 05
May 05
Jan 06
May 06

Date

Tyllosin (x 1000 Lb.)

Ileitis vaccine - Total dose (x 1000)

Research into oral vaccination at a farm in Northern Mexico resulted in 15% faster growth.

<table>
<thead>
<tr>
<th>Number of pigs (n)</th>
<th>Control</th>
<th>Vaccination</th>
<th>Difference</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>14,752</td>
<td>8,145</td>
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<table>
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<tr>
<th>Average daily gain (g/day)</th>
<th>Control</th>
<th>Vaccination</th>
<th>Difference</th>
<th>%</th>
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<tbody>
<tr>
<td>738</td>
<td>766</td>
<td></td>
<td>+ 28 **</td>
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<table>
<thead>
<tr>
<th>Feed conversion ratio (g/g)</th>
<th>Control</th>
<th>Vaccination</th>
<th>Difference</th>
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<tbody>
<tr>
<td>3.16</td>
<td>2.98</td>
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<td>- 0.18 **</td>
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<table>
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<th>Antibiotic use (kg/group)</th>
<th>Control</th>
<th>Vaccination</th>
<th>Difference</th>
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<td>2.23</td>
<td>1.03</td>
<td></td>
<td>- 0.53**</td>
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* Antibiotic use for therapeutic treatment of enteric diseases
** Significantly different with a p-value <0.001

Table 1. Production parameters and percentage in improvement

Table 2. Vaccinated pigs versus non-vaccinated controls

(12-25 kg)

- Tylosin 88 ppm; carbadox 27.5 ppm (25-40 kg)
- Tylosin 40 ppm; salinomycin 60 ppm (40-60 kg)

Groups were vaccinated at five weeks of age in the nursery by oral administration. Additionally a reduced pulse medication programme was implemented:
- Tylosin 88 ppm; carbadox 55 ppm (25-40 kg)
- Salinomycin 60 ppm (40-60 kg)

This resulted in vaccinated pigs growing nearly 15% faster than conventionally medicated pigs whereas their antibiotic treatment regime was more then halved (Table 1).

Different production system

A second and different production system requires health control tools like any management programme would. Tools need to be standardised, simple to apply and be able to deliver consistent results.

The system, located in Mid-West USA, raises approximately 2.5 million pigs per year with the nursery, with finishers housed separately off site. Both the chronic/Proliferative Intestinal Adenomatosis (PIA) form and acute/Porcine Haemorrhagic Enteropathy (PHE) form were present in the system. Control of *Lawsonia intracellularis* in finishing was based on several combinations of tylosin, either at 100 ppm followed by 40 ppm, or 40 ppm continuously from 35 to 60 kg. Breaks on this medication programme occurred frequently. The goals of the vaccination were to reduce overall in-feed and water medication use, and with similar cost, improve clinical control of the disease. The vaccination was first given to finishing pigs in 2002, with pigs vaccinated at 12-14 weeks of age.

The results show that the vaccination has dramatically altered the feed medication programme in finishing pigs.

Third experience

A third field experience came from a 1,600 sow and 10,000 finisher, farrow-to-finish farm in Germany. The 30,000 animals included were divided in 32 batches of antibiotic treated control groups and 27 batches of vaccinated animals.

This resulted in a 53% reduction of antibiotics used in the vaccinated animals compared to the non-vaccinated animals. The producer emphasised that an improved level of control in pig production is seen since the vaccination.

These studies demonstrated that producers may have the option of eliminating finishing dietary antimicrobial use while reducing input costs and maintaining performance similar to or better than continuously medicated, non-vaccinated pigs. An overall reduction of 35 to 100% of in-feed antibiotics was realised. As restrictions on antimicrobial use continue to increase, pork producers will need more options for controlling diseases. A vaccination proves to be biologically feasible, environmentally responsible and an economically attractive alternative to continuous feeding of antimicrobials. PP