TOLERANCE OF DECOQUINATE IN THE RABBIT

MERCIER P\textsuperscript{1}, MOREL-SAIVES A.\textsuperscript{2}, VERDELHAN S.\textsuperscript{2}, RICHARD A.\textsuperscript{3}

\textsuperscript{1} INRA Domaine du Magneraud BP 52 17700 Surgères, France
\textsuperscript{2} CYBELIA – Groupe Glon- 104, avenue du Président Kennedy – 75781 Paris Cedex 16 - France
\textsuperscript{3} ALPHARMA,Silic 411, 3 Impasse de la Noisette, 91374 Verrieres Le Buisson, France

ABSTRACT

Decoquinate is one of the molecules that is effective against coccidia in many animal species. Many trials conducted on rabbit farms, at incorporation rates of 60 ppm in the feed, have made it possible to confirm the interest of using it. The study presented here aims to assess the safety margin for the use of decoquinate as incorporated in a feed for fattening rabbits. Five lots of 36 rabbits received respectively from weaning: a control feed without decoquinate, a 72 ppm decoquinate-supplemented feed, a 120 ppm decoquinate-supplemented feed , a 200 ppm decoquinate-supplemented feed and a 340 ppm decoquinate-supplemented feed. The same mortality, morbidity, feed intake and growth were observed in all 5 lots, whatever the rates of decoquinate incorporated in the feed. As the 200 ppm decoquinate dose corresponds to 3 times the necessary and sufficient dose to an efficient treatment of coccidia in the rabbit, it may then be considered that the safety margin for the use of decoquinate incorporated in the feed is wide.

Key Words: rabbits, coccidia, decoquinate, tolerance.

INTRODUCTION

Decoquinate is a non-antibiotic molecule classified in Annex II (Regulation (EEC) N° 2377/90 for its MRL). It means a zero withdrawal period in France for beef and lamb meat. It is of very low acute toxicity by the oral route in a range of avian and mammalian species. It is active against certain protozoa: coccidia (REDMAN et al, 1994), cryptosporidia (MANCASSOLA et al, 1997), toxoplasma (BUXTON et al, 1996), neospora (LINDSAY et al, 1997), (JOURNEL et al, 2001). Decoquinate has already been shown to reduce oocyst shedding and improve growth in several ruminant species. In the rabbit, coccidioses result in enteritis or most often in subclinical forms: growth delays and degraded feed conversion ratios.

In rabbit farming, the systematical use of robenidine as a supplement in the feed for the past 20 years has led to the vanishing of Eimeria intestinalis and Eimeria flavescens, the two most dangerous species. In return, resistances of E. magna and E. media to robenidine have appeared progressively.
Salinomycin, an ionophore additive authorised for use for fattening, is barely used nowadays.
Treatments using sulfamides present a risk of disturbing the digestive balance of the animal and require a rather significant withdrawal period before slaughter.
In the rabbit, decoquinate has proven its efficiency against E. intestinalis, E. pellerdyi (Coudert, 1978), and also against E. media, Eimeria magna and Eimeria perforans (Mercier, 1997), used at an incorporation rate in the feed of 100 ppm. Furthermore, on a much infested rabbit farm, a treatment at 60 ppm decoquinate over 8 weeks in the maternity section (Morel-Saives et al., 2003) reduced oocyst excretion from 396,000 to 3,200 (mg faecal content) and mortality in the fattening section from 15.1% to 11.1%.
Beside this drop in intestinal parasitism, it is interesting to note increased performances of the does (+4% for fertility and +10% for prolificity between the first batch which received no treatment and the second batch which was treated).
These trials have demonstrated the absence of toxicity at doses of 60 to 100 ppm. It is therefore interesting to study the tolerance of decoquinate at higher incorporation rates, hence the study described below.

**MATERIAL AND METHODS**

The trial was set up in June 2001, at the Domaine expérimental INRA de Magneraud (BP 52, 17700 Surgères, France) in a fattening unit under controlled environment conditions.
The animals of the INRA 1067 rabbit strain were placed in collective cages of 6 rabbits each (d = 16.7 rabbits/m²).
Five lots of 36 rabbits (6 x 6 cages) were made up at weaning, at 28 days. The animals were identified and assigned into lots according to their weight at weaning and maternal origin.
The standard formula feed, distributed ad libitum, differed, depending on the treatments, by its decoquinate incorporation levels: AO (Control), A72 (72 ppm) A120 (120 ppm), A200 (200 ppm) and A340 (340 ppm).
An analytical control of the feeds revealed that decoquinate contents matched the theoretical values for samples of AO, A72, A120 and A200 treatments, but had a much lower value for that of the A340 treatment. We therefore decided not to take that lot into consideration in the results analysis.
Zootechnical controls: growth was measured by means of individual weighing operations at D0 (weaning 28 days), D14 and D42, as well as at slaughter at D52. An analysis of the variance was carried out on the weights recorded at each weighing operation.
An individual clinical examination was carried out at each weighing operation (D14 and D42) and the autopsy of dead animals was planned.
Faecal samples were taken to control coccidia oocyst excretion. These analyses revealed low but slightly positive results in all treatments.
RESULTS AND DISCUSSION

Health: the trial was conducted under excellent conditions and neither mortality nor morbidity was recorded. Over the whole experimental period, just one death occurred in the A200 lot during the 4th week of fattening, and none in the other lots. Morbidity particularly observed individually during weighing operations was insignificant in all treatments.

At slaughter (off trial), all lots were healthy and homogeneous and only 3 animals out of the whole batch were culled at this ultimate stage.

Growth control: (see Table 1)
Live weights recorded during weighing operations at D0, D14, D42, and D52 (off trial) show that growth was quite correct and regular over the whole fattening period. At D42, for treatments A0, A72, A120, and A200, the average live weights of the rabbits were respectively 2252.50 g; 2191.11 g; 2300.97 g and 2230.00 g.

No significant differences between treatments could be noted at any times.

Feed intake: no differences either were found between treatments as for estimated experimental feed intake.

The test that was conducted confirm that decoquinate is well tolerated by rabbits. The excellent results obtained for mortality, morbidity and growth are interesting when taking into account the incorporation level of decoquinate in certain treatments. Indeed, the 200 ppm dose corresponds to approximately 3 times the supposed necessary and sufficient dose. The safety margin for the use of decoquinate as incorporated in a medicated feed is therefore wide.

Table 1. Growth control

<table>
<thead>
<tr>
<th></th>
<th>J0</th>
<th>J14</th>
<th>J42</th>
<th>J52 (Slaughter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of rabbits</td>
<td>Average weight (g)</td>
<td>Average weight (g)</td>
<td>Average weight (g)</td>
<td>Average weight (g)</td>
</tr>
<tr>
<td>A0 (Control)</td>
<td>36 525.97</td>
<td>36 1214.16</td>
<td>36 2252.50</td>
<td>36 2439.44</td>
</tr>
<tr>
<td>A72 (72ppm Deccox)</td>
<td>36 516.80</td>
<td>36 1133.05</td>
<td>36 2191.11</td>
<td>36 2386.57</td>
</tr>
<tr>
<td>A120 (120ppm Deccox)</td>
<td>36 518.06</td>
<td>36 1188.47</td>
<td>36 2300.97</td>
<td>36 2477.50</td>
</tr>
<tr>
<td>A200 (200ppm Deccox)</td>
<td>36 513.47</td>
<td>36 1158.33</td>
<td>35 2230.00</td>
<td>35 2408.00</td>
</tr>
<tr>
<td>P</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>
CONCLUSION

By its absence of toxicity in the rabbit species, decoquinate has proven its interest in the fight against coccidiosis and provides an alternative to other products with a wide safety margin for use.

REFERENCES


