

## TOLERANCE OF DECOQUINATE IN THE RABBIT

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### ABSTRACT

Decoquinatate 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 decoquinatate as incorporated in a feed for fattening rabbits. Five lots of 36 rabbits received respectively from weaning: a control feed without decoquinatate, a 72 ppm decoquinatate-supplemented feed, a 120 ppm decoquinatate-supplemented feed, a 200 ppm decoquinatate-supplemented feed and a 340 ppm decoquinatate-supplemented feed. The same mortality, morbidity, feed intake and growth were observed in all 5 lots, whatever the rates of decoquinatate incorporated in the feed. As the 200 ppm decoquinatate 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 decoquinatate incorporated in the feed is wide.

**Key Words:** rabbits, coccidia, decoquinatate, tolerance.

### INTRODUCTION

Decoquinatate 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). Decoquinatate has already been shown to reduce oocyst shedding and improve growth in several ruminant species.

In the rabbit, coccidiosis result in enteritis or most often in subclinical forms: growth delays and degraded feed conversion ratios.

In rabbit farming, the systematical use of robenidone 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 robenidone have appeared progressively.

Salinomycin, a 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 ( /g 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 /m<sup>2</sup>).

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 4<sup>th</sup> 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 decoquinatate is well tolerated by rabbits. The excellent results obtained for mortality, morbidity and growth are interesting when taking into account the incorporation level of decoquinatate 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 decoquinatate as incorporated in a medicated feed is therefore wide.

**Table 1 . Growth control**

	J0		J 14		J 42		J 52 (Slaughter)	
	No of rabbits	Average weight (g)	No of rabbits	Average weight (g)	No of rabbits	Average weight(g)	No of rabbits	Average weight(g)
A0 (Control)	36	525,97	36	1 214,16	36	2 252,50	36	2 439,44
A72 (72ppm Deccox)	36	516,80	36	1 133,05	36	2 191,11	36	2 386,57
A120 (120ppm Deccox)	36	518,06	36	1 188,47	36	2 300,97	36	2 477,50
A200 (200ppm Deccox)	36	513,47	36	1 158,33	35	2 230,00	35	2 408,00
P		NS		NS		NS		NS

## 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.

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