

# EFFECT OF DIFFERENT DISINFECTANTS ON SURVIVAL OF RABBIT COCCIDIA OOCYSTS

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**Abstract** : Samples of rabbit faeces enriched with coccidia oocysts were treated with Quaternary Ammonium Salts, Bleach and Cresol (6 replication for each treatment). Four doses were tested: 0.0% (control), 0.1 %, 0.3 % and 0.5 % and coccidia were counted after 2, 8, 24 and 48 hours. Bleach was the disinfectant less active and Cresol was the most active. A 0.1% concentration of Cresol reduced the number of oocysts:

- 68.8% after 2 hours, and - 96.6% after 24 hours. When the price of disinfectants, at concentrations with comparative effect, was calculated Cresol appeared to cost 1/3 in comparison to Bleach and 1/9 in comparison to Quaternary Ammonium Salts.

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## INTRODUCTION

Different unconventional rabbit-breeding housing systems have been developed and the need of a not-pharmacological control of diseases have been taken into account both to overcome the lacking or excessive cost, of appropriate drugs in the rural breeding of the Developing Countries (FINZI *et al.*, 1992; FINZI, 1995) and to produce organic meat in the Industrialised Countries (DE LAZZER and FINZI, 1992; AMICI *et al.*, 1992; FINZI *et al.*, 1993).

The structures have been projected in order to make it easy to clean them by the use of pressurized hot water (hydrojet) as it is possible in the industrial countries or pouring inside boiling water in the developing ones. Nevertheless the use of external disinfectant to clean up the cages and the underground cells has been taken into consideration, with peculiar reference to coccidia oocysts which constitute a problem only partially solved by technological means (FINZI and MORDACCHINI ALFANI, 1994 ; FINZI *et al.*, 1995).

## MATERIAL AND METHODS

Cresol (Cr) and Bleach (Bl), which are two very common and cheap disinfectants, have been tested versus Quaternary Ammonium Salts (QA) which are a very up-to-date one. The control was formed also by water. Other disinfectants have been discarded since their ineffectiveness has been already tested (KHEYSIN, 1972), among them formalin which is active only at very high concentrations (ORLOV and AYTUKINA, 1936). Cresol, on the contrary, was indicated as very active but suitable concentrations were not specified. (KHEYSIN, 1972)

Fresh faeces were collected from growing rabbits receiving balanced pelleted feeds not containing anticoccidia as usual in the unconventional breedings. Faeces were enriched with a pool of unclassified oocysts and ruled up; then they were formed 72 samples, containing  $92.6 \pm 2.3 \times 1000$  oocysts/g. Each group of six samples received respectively QA, Bl and Cr. Dilution of commercial product was made in order to obtain the final concentration of 0.0% (control); 0.1%; 0.3%; 0.5% of the active chemicals. Each sample was then analysed for oocysts concentration after 2, 8, 24, 48 hours. A McMaster chamber was utilized. Effectiveness of disinfectants was examined in relation to concentration and time. Cost was also considered.

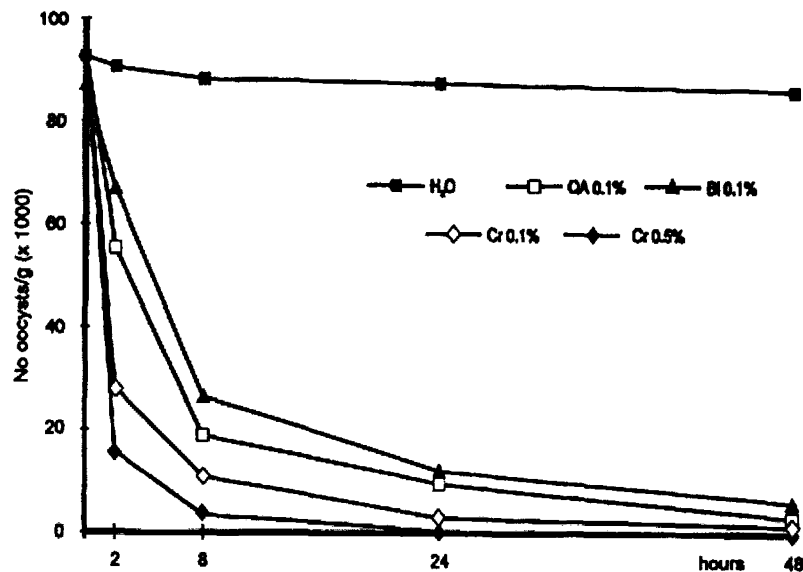
Data were statistically treated by ANOVA. A Tukey HSD multiple comparison was applied.

## RESULTS AND DISCUSSION

The effect of the different disinfectants at the lower concentration (0.1%) is shown in Figure 1. All of them were very effective in reducing the number of oocysts in comparison to water where the oocysts appeared practically unaffected after 48 hours. At this time the number of oocysts was negligible whatever the experimental treatment but, at the short time, clear differences could be seen. After 2 hours Bl had the lesser effect ; QA had an intermediate effect and Cr was very effective reducing by 68.8% the number of oocysts in

comparison to water. After 24 hours with 0.1% of Cresol the oocysts were reduced by 96.6% while, with a concentration of 0.5%, they were practically disappeared (-99.5%).

Figure 1 : Trend of No of oocysts according to time in presence in different disinfectants and in the control



More analytic data are reported in Table 1. Being the initial concentration  $92.6 \pm 2.3 \times 1000$  oocysts/g, after 2 hours it was  $90.6 \pm 2.96$  in the water control. The decrease (-2.1 %) was not significant. At the same time all the treatments showed a very significant ( $P < 0.01$ ) decrease in comparison to water. At the concentration of 0.1 % the number of oocysts was  $55.6 \pm 1.5$ ,  $67.0 \pm 2.0$  and  $28.3 \pm 1.5$  ( $\times 1000$ ) respectively for Ammonium Quaternary Salts, Bleach and Cresol. The relative decrease was -38.6%, -26.0%, and -68.8%. Also the difference between the disinfectants was significant ( $P < 0.01$ ). In comparison to QA, BI was less effective (+20.5%) while Cr was much more effective (-49.1%). With the 0.5% concentration, after 2 hours the number of oocysts was QA :  $32.6 \pm 2.8$ , BI :  $37.6 \pm 2.87$ , Cr  $15.8 \pm 1.47$  and the decrease in comparison to water was -64.0 %, -58.5% and -82, 5% respectively.

Table 1 : Compared effect (No de oocysts x 1000/g) of the different disinfectants according to concentration and time.

Hours	Concentrations		QA		BI (B)		Cr (C)	
			No	No	(B-A)	No	(C-A)	(C-B)
2	0.0 %	$\bar{\chi}$	90.6 <sup>A</sup>	90.6 <sup>A</sup>	-	90.6 <sup>A</sup>	-	-
		DS	2.9	2.9	-	2.9	-	-
	0.1 %	$\bar{\chi}$	55.6 <sup>B</sup>	67.0 <sup>B</sup>	+ 11.4**	28.3 <sup>B</sup>	- 27.3**	- 38.7**
		DS	1.5	2.0	(+20.5%)	1.5	(-49.1%)	(-57.7%)
	0.3 %	$\bar{\chi}$	47.1 <sup>C</sup>	49.8 <sup>C</sup>	+ 2.7 <sup>NS</sup>	20.8 <sup>C</sup>	- 26.3**	+ 29.0**
		DS	0.9	4.7	(+5.8%)	1.8	(-55.8%)	(-58.2%)
0.5 %	$\bar{\chi}$	32.6 <sup>D</sup>	37.6 <sup>D</sup>	+ 5.0*	15.8 <sup>D</sup>	- 16.8**	- 21.8**	
	DS	2.8	2.8	(+15.3%)	1.5	(-51.5%)	(-58.0%)	
24	0.0 %	$\bar{\chi}$	87.6 <sup>A</sup>	87.6 <sup>A</sup>	-	87.6 <sup>A</sup>	-	-
		DS	3.8	3.8	-	3.8	-	-
	0.1 %	$\bar{\chi}$	9.6 <sup>E</sup>	12.1 <sup>E</sup>	+ 2.5**	3.0 <sup>E</sup>	- 6.6**	- 9.1**
		DS	0.4	1.3	(+26.0%)	0.1	(+68.7%)	(-75.2%)
	0.3 %	$\bar{\chi}$	6.6 <sup>F</sup>	9.1 <sup>Fa</sup>	+ 2.5**	1.9 <sup>F</sup>	- 4.7**	- 7.2**
		DS	0.1	0.3	(+37.8%)	0.2	(-71.2%)	(-79.1%)
	0.5 %	$\bar{\chi}$	5.0 <sup>G</sup>	7.6 <sup>Fb</sup>	+ 2.6**	0.4 <sup>G</sup>	- 4.6**	- 7.2**
		DS	0.3	0.9	(+52.0%)	0.2	(-92.0%)	(-94.7%)

\*  $P < 0.05$  ; \*\*  $P < 0.01$  ; NS non significant ; Means with different capital sutperscripts in the same column are significantly different ( $P < 0.01$ ). Small letters ( $P < 0.05$ ). Differences between treatments ( in percent) are reported in brackets.

After 24 hours the treatment with Cresol 0.1 % reduced the number of oocysts to  $3 \pm 0,1$  (x1000). At the concentration of 0.5% the oocysts were only  $0.4 \pm 0.2$  (-99.5% in comparison to water). Again with a 0,1 % concentration, BI was less effective and oocysts were  $12,1 \pm 1.3$  while with QA they were  $9.6 \pm 0.4$ . In comparison to water the decrease was -86.2% and -89.0% respectively for BI and QA.

Analytical data after 8 and 48 hours are not reported. The general trend can be seen in figure I. The number of oocysts was observed to be under 5.0 (x 1000)/g after 8 hours with Cresol 0.5%; after 24 hours with Cresol 0,1% and Bleach and Ammonium Quaternary Salts 0.5% and after 48 hours also with BI and QA 0,1%. Practically to have the same effect the disinfectant must be diluted Cr 0,1 %, QA 0.3% and BI 0.5%. On this base, to get approximately the same effect, the cost of each disinfectant to prepare 10 litres of active solution was calculated as US dollars: BI 0.78, QA 2.25, Cr 0.26

The best disinfectant against coccidia oocysts is Cresol which is very active and much cheaper than the other tested disinfectants. The more advisable concentration is 0,1 % of active chemicals. This concentration costs 1/4 of US \$ to obtain 10 litres of solution which, in comparison to the original figure, can reduce the number of oocysts to 31% after 2 hours, and to 3% after 24 hours.

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## REFERENCES

- DE LAZZER M.J., FINZI A., 1992. Technical and economical efficiency of an unconventional rabbit breeding. *Proc. 5th World Rabbit Congr., Corvallis, USA, Vol. A*, 615-620.
- AMICI A., DE LAZZER M.J., FINZI A., 1992. Produzione di carni cunicole di qualità: prove di ingrasso su pascolo. *Atti Conv. Naz. Parliamo I carni avicole, Fossano, Italy*, 165-172.
- FINZI A., AMICI A., LAZZER M.J., 1993. Engorde sobre pastizal y carries de calidad. *Actas XVIII Symp. & Cunicultura, Grannollers, Spain*, 111-114.
- FINZI A., NYVOLD S., EL AGROUDI M., 1992. Efficiency of three different housing systems in reducing heat stress in rabbits. *Proc. 5th World Rabbit Congr., Corvallis, USA, Vol. B*, 745-750.
- FINZI A., 1995. Sistemas no convencionales de cria del conejo para el desarrollo de la cunicultura rural. *Actas Primer Seminario Latinoamericano de Cunicultura, Guanare, Venezuela*
- FINZI A., MORDACCHINI ALFANI M.L., 1994. A rabbit breeding technology to control coccidiosis. *Cahier Options méditerranéennes*, 8, 505-508.
- FINZI A., MARGARIT R., MORDACCHINI ALFANI M.L., 1995. Control tecnologico de la coccidiosis. *Actas XX Symp. de Cunicultura, Santander, Spain*, 118-124.
- KHEYSIN J.M., 1972. Sporulation of oocysts and their survival in the external environment. In : TODD K S. Jr. *Life cycles of coccidia of domestic animals. University Park Press, Baltimore USA*, 149-260.
- ORLOV N.P., AYTYKINA P.U., 1936. The problem of chemical disinfection in coccidiosis of rabbits. *Tr. Alma-Atinsk Zoovet. Inst.*, 2, 65-71.

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**Efecto de diferentes desinfectantes sobre la supervivencia de los ooquistes de los coccidios del conejo** - Muestras de heces de conejo enriquecidas con ooquistes de coccidios fueron tratadas con sales Cuaternarios de Amonio, Hipoclorito de Sodio y Cresol (6 replicaciones per tratamiento). Cuatro dosis fueron ensayadas: 0.0% (control), 0.1%, 0.3% y 0.5% y los coccidios fueron contados después de 2, 8, 24 y 48 horas de tratamiento. El Hipoclorito de Sodio fue el desinfectante menos active mientras que el Cresol fu el más eficaz. A la concentración del 0.1% el Cresol redujo el número de los ooquistes del 68. 8% después de 2 horas y del 96. 6% después de 24 horas. Cuando el precio de los desinfectantes fue calculado par concentraciones de eficacia comparable, el Cresol resultó costar una tercera parte del Hipoclorito de Sodio y una novena parte de los Sales de Amonio.

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