

**EFFECT OF BACILLUS C.I.P. 5832 AND ENROFLOXACIN ON PERFORMANCE  
AND AEROB FAECAL FLORA OF GROWING RABBITS. DEVITATION OF  
IN VITRO SITUATION FROM IN VIVO ONE.**

Vörös, G. - Gaál, Cs.

Research Institute for Animal Breeding and Nutrition  
2101. Gödöllő, Hungary

Introduction

Profitability of rabbit meat production has been often threatened by enteric diseases of weaning rabbits. This so called "enteritis complex" is caused by several infectious and/or non infectious agents (Whitney, 1974; Peeters, 1988). For preventing and curing of these diseases a number of antibiotics, chemotherapeutic products, coccidiostats, etc. have been used in the whole world.

Several antibiotics have toxic side effect on rabbits for example ampicillin and lincomycin applicated per os can cause severe mortality among growing rabbits (Escuola et.al., 1981; Thilsted et.al.). Other chemotherapeutic preparations do not induce mortality but decrease performance of fattening rabbits (Morris, 1976; Okerman et.al., 1982; Schröder et.al., 1982).

Peeters et.al. (1990) reported that a new chemotherapeutic agent enrofloxacin was very effective against enteropathogenic E.coli and at the same time did not decreased the performance of fattening rabbits.

The probiotics which contain live bacteria yeasts or bacterial spores can also prevent enteric diseases of weaned rabbits and able to increase slightly performance of them (Szabó et.al., 1988; Seim, 1988; Vörös et.al., 1990. Duperray, 1991).

Flavomycin and probiotics (Toyocerin or Paciflor) together were tested by Nguyen et.al. (1988) on broilers. It was found that Flavomycin + Paciflor improved weight gain of broilers most significantly.

Data relating to simultaneously used antibiotics and probiotics at rabbits were not available in the literature that is why the aim of this study to investigate effect of an antibiotic (enrofloxacin) and a probiotic (Paciflor) together and separately on performance and faecal flora of growing rabbits.

## Material and Methods

120 New Zealand White, 36±3 days old growing rabbits were involved to this experiment. Individually caged animals were fed by a fattening feed formulated and produced by Környe State Farm (Hungary). The basal feed contained neither antibiotics nor coccidiostat.

Of 120 rabbits 4 groups with the same average weight were randomly formed. The experimental design was as follows.

Rabbits of the group 1 had been fed by fattening pellet supplemented with 100ppm Paciflor ( $10^6$  Bacillus C.I.P. 5832 spores/g feed) for the whole experimental period (6 week) and they had been treated with 50ppm enrofloxacin (Baytril 10% oral solution) via drinking water for 10 days at the beginning of experiment. Animals of the group 2 had consumed 50ppm enrofloxacin in drinking water for the same 10 days. Rabbits of the group 3 had got fattening pellet supplemented 100ppm Paciflor for 6 week. The group 4 served as an untreated control group.

Weight gain and feed intake of experimental animals were measured at the end of 2nd, 4th and 6th week. All died rabbits were necropsied to determine causes of mortality.

Aerobic bacterial flora of fresh droppings were determined on the 6th, 11th and 31th day of experiment at five rabbits per group. Droppings after a ten fold dilution were streaked onto nutrient agar containing 5% defibrinated sheep blood, nutrient agar and McConkey medium. Plates were incubated aerobically at 37°C and examined after 24 and 48 hours.

## Results

Weight gain of the three treated groups (table 1) were not significantly better than that of the control group. Highest weight gain was observed at the group 1 which was treated with Paciflor continuously and with enrofloxacin for 10 days.

Rabbits of the group 1 consumed the biggest amount of feed (table 2) and feed conversion ratio of rabbits of three treated groups was not significantly more favourable than F.C.R. of animals of control group (table 2).

Mortality of treated groups was lower than that of control group. In all of died and necropsied rabbits there were lesions typical for enteric diseases.

The Bacillus C.I.P. 5832 content of aerob faecal flora of rabbits consumed exclusively Paciflor ranged between 28-51% during the most part of experiment (table 3). The same figure for rabbits got both Paciflor and enrofloxacin was between 31-42% during the culturing period.

There was no detectable coliform bacteria in faeces of rabbits treated with enrofloxacin during and immediately afterwards the treating period. Three weeks after application of enrofloxacin coliform bacteria were present in small numbers in faeces of these rabbits. Bacillus C.I.P. 5832 in the feed alone also decreased number of coliforms.

### Discussion

Weight gain, feed conversion ratio and mortality of three treated groups were better than the same values of control group. The best weight gain and lowest mortality were observed at group 1 which was treated with both Paciflor and enrofloxacin. Enrofloxacin treatment did not influence number of *Bacillus C.I.P. 5832* in the faeces. At the same time in our previous study enrofloxacin very strongly inhibited growth of *Bacillus C.I.P. 5832* in vitro thus a significant deviation was observed between in vivo and in vitro situations relating to common application of enrofloxacin and *Bacillus C.I.P. 5832*.

This finding is very similar to results of Nguyen et.al. (1988) and Marie-Laure Tirel et.al. (1990). The previous authors recorded the highest weight gain and most favourable feed conversion ratio at broiler group had consumed both Flavomycin and Paciflor. At the same time flavomycin did not influence the bacillus content of caeca of double treated broilers. Because in vitro flavomycin inhibited *Bacillus C.I.P. 5832* Nguyen et.al. observed discrepancy between in vitro and in vivo situations. Marie-Laure Tirel et.al. tested together different antibiotics, sulfonamids e.t.c. and *Bacillus C.I.P. 5832* in vivo on broilers and pigs and in vitro (determination of M.I.C. of antimicrobial agents against *Bacillus C.I.P. 5832*). They also experienced that in vitro, avoparcin, flavomycin, virginiamycin, bacitracin, trimethoprim+sulfadimethoxine, colistin, spiramycin, oxolinic acid, lincomycin+spectinomycin were able to inhibit *Bacillus C.I.P. 5832*. In vivo, none of these antibacterial agents, at the levels incorporated in feeds, could effect the viable bacillus count in the caecal content of chickens.

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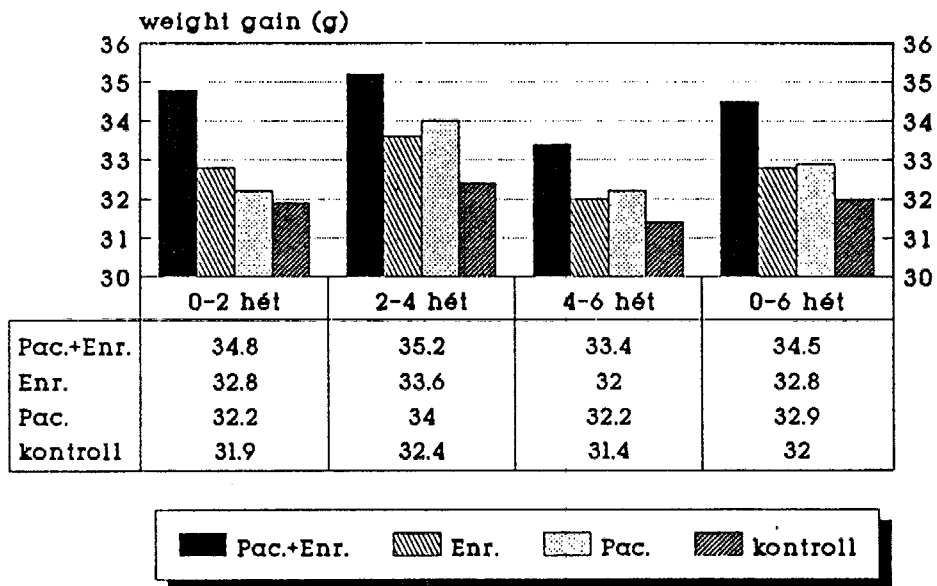
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Table 1

### Effect of enrofloxacin and/or Paciflor on weight gain of growing rabbits



Differences are not significant.

### Effect of enrofloxacin and/or Paciflor on mortality of growing rabbits

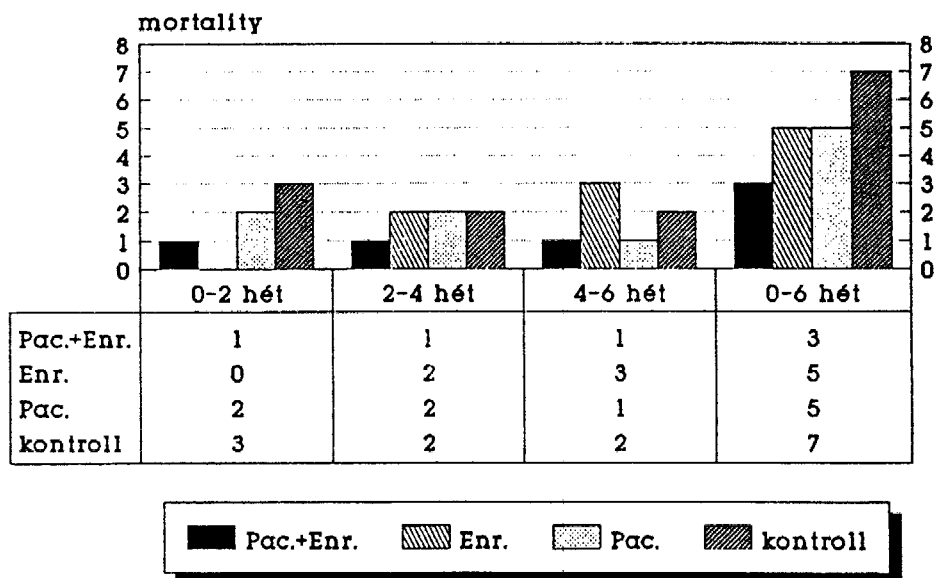
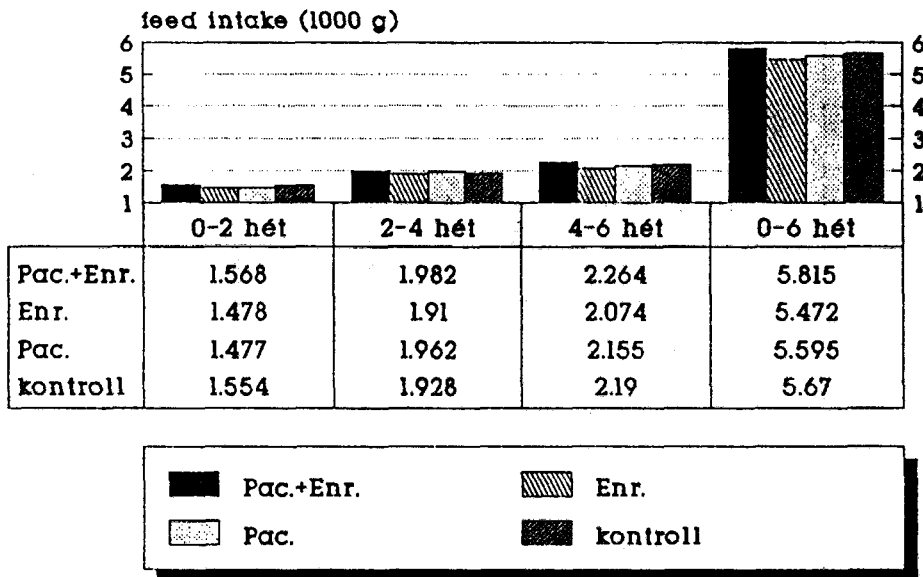


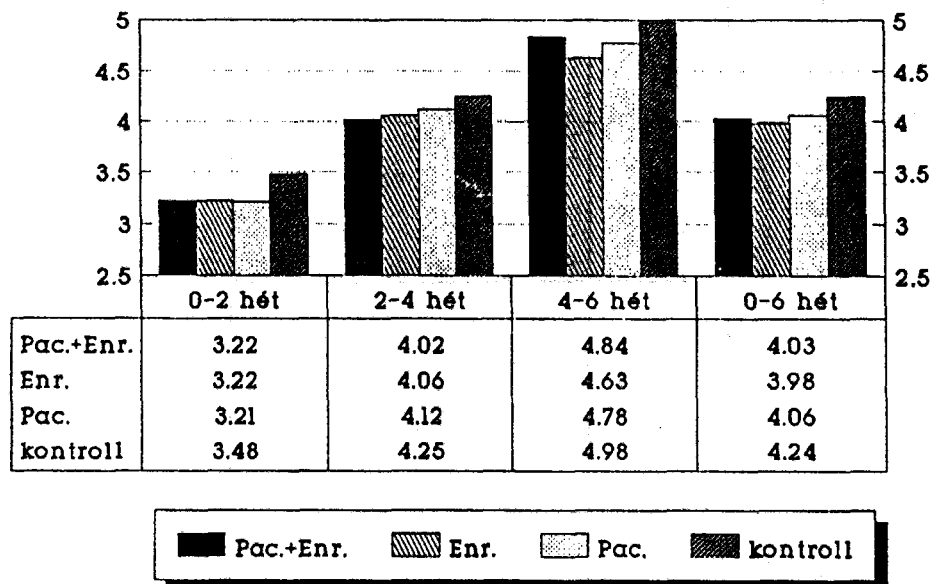
Table 2

### Effect of enrofloxacin and/or Paciflor on feed intake of growing rabbits



Differences are not significant.

### Effect of enrofloxacin and/or Paciflor on the F. C. R. of growing rabbits



Differences are not significant.

Table 3

Effect of enrofloxacin and/or Paciflor on the aerob faecal flora of growing rabbits

Treatment		Aerob flora								
enro- floxacin mg/l	Paciflor mg/feed kg	1.			2.			3.		
		Total aerob bacteria	Bacillus IP 5832 %	Coliform %	Total aerob bacteria	Bacillus IP 5832 %	Coliform %	Total aerob bacteria	Bacillus IP 5832 %	Coliform %
50	100	3.2*10 <sup>7</sup>	34	0	1.2*10 <sup>7</sup>	42	0	3.4*10 <sup>7</sup>	31	2.6
50	---	2.4*10 <sup>7</sup>	--	0	2.4*10 <sup>7</sup>	--	0	4.2*10 <sup>7</sup>	--	2.9
--	100	2.6*10 <sup>7</sup>	28	3.2	6.1*10 <sup>7</sup>	51	0	4.4*10 <sup>7</sup>	37	2.4
--	---	8.4*10 <sup>6</sup>	--	3.8	2.8*10 <sup>7</sup>	--	2.1	1.9*10 <sup>8</sup>	--	4.2

1. on the 6th day of experiment
2. on the 11th day of experiment
3. on the 31th day of experiment