

Estimation the effectiveness of probiotics as a factor influencing the results of fattening rabbits

MARIAN BRZOZOWSKI, PAWEŁ STRZEMECKI

Department of Animal Breeding and Production, Warsaw University of Life Sciences – SGGW

Abstract: *Estimation the effectiveness of probiotics as a factor influencing the results of fattening rabbits.* The aim of this study was to establish the influence of addition *Bacillus cereus* var. *toyoi*, as probiotics factor, on young rabbits fattening results. The level of 400 mg per 1 kg of probiotic preparation was used in experimental group (EG, $n = 34$) as factor affecting fattening results. The control group (CG, $n = 32$) was fed commercial feed. Experiment started at weaning (35 days) and finished at 84 days. The following data were collected: body weight at weaning; body weight every week up to 84 days of age; feed intake during fattening, health status fattened rabbits, dressing percentage. The positive impact of used preparation on health status and yield results of fattened fryers was observed.

Key words: rabbits fattening, probiotics factor, *Bacillus cereus* var. *toyoi*

INTRODUCTION

The digestive process is very complex and fragile in rabbits. Young rabbits are especially exposed to negative impacts of pathogen bacteria. Breeders need any factor, that can to prevent pathogen bacteria growth in digestive tract. Probiotics are the usual bacteria that all animals need for their digestive well-being. By probiotics using we can improve the growth and development of the normal, desirable microbial population in the gut, allowing them to maintain domination over the undesirable

organisms (Fuller 1989, Bielecka et al. 2002). There are studies showing positive effect of probiotics addition as a diet supplement in poultry and swine feeding (Barrow 1992, Jin et al. 1997, Jadamus et al. 2000, Jadamus et al. 2002). There are also many studies show positive effect of probiotics using on young rabbits productivity – growth results and health condition (Gippert et al. 1992, Maertens et al. 1994, Kamra et al. 1996, Tachikawa et al. 1998, Voros and Voros 1998, McNitt et al. 2000, Kustos et al. 2004, Kermauner and Struklec 2005, Brzozowski et al. 2007a, Brzozowski et al. 2007b, Combes et al. 2012).

The aim of this study was to establish the influence of addition *Bacillus cereus* var. *toyoi* as probiotics factor, on young rabbits fattening results.

MATERIAL AND METHODS

New Zealand White young rabbits were used in the study. There were two groups of fattening rabbits: control group (CG, $n = 32$ kits) and the experimental group (EG, $n = 34$ kits).

The rabbits from CG were fed by standard feed mixture produced by De Heus Koudijs Hima. EG was fed by the same feed with addition *Bacillus cereus* var. *toyoi*, as probiotics factor. The use

of *Bacillus cereus* var. *toyoi* is ideal because it has an advantage due to its good heat stability that is important because relatively high values of temperature occur during pelletizing of animals' feed. The vegetative form of *B. toyoi* spores quickly germinates in the intestinal tract. The rapid germination rate of *B. toyoi* has been demonstrated in piglets (Thelen and Pallauf 1996). 1 g of used preparation contains $1 \cdot 10^9$ cfu (colony forming units) *Bacillus cereus* var. *toyoi*. The level 400 mg of preparation per 1 kg feed was used in experimental group.

Experiment started at weaning (35 days) and finished at 84 days.

The following data were collected:

1. Body weight at weaning and than every week up to 84 days of age.
2. Surviving rate from weaning to the end of fattening.
3. Feed intake during fattening.
4. Dressing percentage.

The results were statistically evaluated by analysis of one-way variance using SPSS 14.0 PL for Windows (SPSS 2006).

RESULTS AND DISCUSSION

The body weight changes during fattening are presented in Table 1.

Animals, that were randomized to the experimental group (EG), were heavier than those in the control group (CG). The difference was statistically significant and was maintained during the first period of fattening (up to age of 56 days). The average weight of animals at the end of fattening proved to be similar in both groups. Weight gain during the fattening period were significantly higher in the control group. This results indicates, that the used preparation did not have positive impact to the rabbits growth and body gain.

The fattening results of rabbits are presented in Table 2.

On rabbit farms, it is estimated that the mortality of young weaned is about 10–12% (Bielański et al. 2002). In the experimental group this result was much more favorable (3%), which may result from the application of probiotics. It was also observed better health status of the

TABLE 1. Body weights and gain during fattening ($\bar{x} \pm \text{sd}$)

Rabbits age (days)	Average body weight (g)	
	Control group	Experimental group
35	771 ^a ±120	869.30 ^a ±165
42	1 016.32 ^A ±152	1 138.94 ^A ±180
49	1 218.84 ^a ±229	1 350.73 ^a ±256
56	1 395.68 ±283	1 468.06 ±268
63	1 629 ±278	1 680.76 ±232
70	1 874.64 ±277	1 891.09 ±247
77	2 119.40 ±290	2 125.55 ±259
84	2 387 ±310	2 342.55 ±266
Body gain from 35 to 84 days (g)	1 616 ^a ±256	1 473.25 ^a ±203

A – data in rows differ statistically at $p < 0.01$; a – data in rows differ statistically at $p < 0.05$.

TABLE 2. Health status of fattening rabbits in control and experimental groups

Items	Estimated groups	
	Control	Experimental
Number of weaned kits	32 (100%)	34 (100%)
Number of kits with diarrhea	9 (28.12%)	8 (23.53%)
Number of kits, which falls	4 (12.5%)	1 (2.94%)
Number of fattened kits	28 (87.5%)	33 (97.06%)

animals in the experimental group (less cases of diarrhea).

The results of feed intake during fattening are presented in Table 3.

TABLE 3. Feed intake

Group	Control	Experimental
Average feed intake during fattening (kg per 1 kg of gain)	3.66 ±0.32	3.73 ±0.27

There was no impact on the efficiency of the preparation of the feed conversion: in both groups the average feed consumption per 1 kg of gain did not differ statistically.

The group of 21 animals in the CG and 27 in the EG were slaughtered; for this group of animals were calculated average final mass and dissection's indicators (Table 4).

TABLE 4. Dissection results of fattening rabbits (average for groups, x ±sd)

Items	Estimated groups	
	Control (n = 21)	Experimental (n = 27)
Body weight before slaughter (g)	2 298 ±260	2 295 ±258
Weight of the head (g)	152 ±17	146 ±13
Weight of the skin (g)	356 ±53	351 ±58
Weight of the gastrointestinal tract (g)	338 ± 26	334 ±49
Weight of meat offal (g)	94 ±13	92 ±15
Weight of carcass (g)	1 243 ±159	1 258 ±160
Weight of cooled carcass (g)	1 137 ±161	1 157 ±155

Dressing percentage (yield) was calculated according to the formula:

$$\frac{\text{weight of cooled carcass}}{\text{body weight before slaughter}} \times 100 (\%)$$

The results are presented in Table 5.

TABLE 5. The results of average dressing percentage of fattening rabbits

Group	Control	Experimental
Average dressing (%)	51.81 ^a ±1.8	52.94 ^a ±24

a – data in rows differ statistically at p < 0.05.

There was observed a higher dressing percentage in experimental group at the same body weight in both groups: it shows the higher share of edible parts in the experimental group of rabbits. The difference in slaughter efficiency may also result in higher average body weight

at weaning of young rabbits in the experimental group.

CONCLUSIONS

The used preparation, containing *Bacillus cereus* var. *toyoi* as probiotics factor, improved:

- the health status rabbits from experimental group,
- the yield results fryers from experimental group.

The used preparation did not influenced to:

- final weight of fattened rabbits,
- feed intake.

REFERENCES

- BARROW P., 1992: Probiotics for chickens. In: Probiotics. Ed. E. Fuller Chapman and Hall, Dordrecht, 225–257.
- BIELAŃSKI P., NIEDŹWIADEK S., ZAJĄC J., 2002: Chów królików. Wyd. Fundacji Rozwój SGGW, Warszawa.
- BIELECKA M., BIEDRZYCKA E., MAJKOWSKA A., WASILEWSKA E., ZDUŃCZYK Z., JUŚKIEWICZ J., JE-DRYCHOWSKIL., WRÓBLEWSKAB., ROTKIEWICZ T., ROTKIEWICZ Z., 2002: Probiotyki, prebiotyki i synbiotyki – wpływ na mikroekosystem przewodu pokarmowego zwierząt zdrowych i infekowanych bakteriami *Salmonella*. *Pediatrica Współczesna* 4/1, 94–94.
- BRZozowski M., ROKICKA A., ANTUSZEWICZ W., 2007a: The effect of *Bacillus cereus* var. *toyoi* (probiotic) on rabbits growth and survivability up to weaning. Proc. of 15th Int. Symp. of Housing and Diseases of Rabbits, Furbearing Animals and Pet Animals, Celle, 158–162.
- BRZozowski M., ANTUSZEWICZ W., ROKICKA A., 2007b: Results of *Bacillus cereus* var. *toyoi* (probiotic) use in fattening of rabbits. Proc. of 15th Int. Symp. of Housing and Diseases of Rabbits, Furbearing Animals and Pet Animals, Celle, 103–107.
- COMBES S., FORTUN-LAMOTHE L., CAUQUILL., GIDENNE T., 2012: Controlling the rabbit digestive ecosystem to improve digestive health and efficacy. Proc. 10th World Rabbit Congress, Sharm El-Sheikh, 475–494.
- FULLER R., 1989: Probiotics in man and animals. *J. Appl. Bacteriol.* 66, 365–378.
- GIPPERT T., VIRAG G., NAGY I., 1992: Lacto-Sacc in rabbits nutrition. *J. Appl. Rabbit Res.* 15, 1101–1104.
- JADAMUS A., VAHJEN W., KUHN I., 2000: The effect of probiotic toyocerin in fattening poultry. *Lohmann Information* 23, 3–6.
- JADAMUS A., VAHJEN W., SCHAFER K., SIMON O., 2002: Influence of the probiotic strain *Bacillus cereus* var. *toyoi* on the development of enterobacterial growth and on selected parameters of bacterial metabolism in digesta samples of piglets. *J. Anim. Physiol. Anim. Nutr. (Berl)* 86, 42–54.
- JIN L.Z., HO Y.W., ADULLAH N., JALALUDIN S., 1997: Probiotics in poultry: modes of action. *World's Poultry Science Journal* 53, 351–368.
- KAMRA D.N., CHAUDHARY L.C., SINGH R., PATHAK N.N., 1996: Influence of feeding probiotics on growth performance and nutrition digestibility in rabbits. *World Rabbit Sci.* 4 (2), 85–88.
- KERMAUNER A. STRUKLEC M., 2005: Effect of feed additive “Kanne Fermentgetreide”(FPB) on fattening and some digestive parameters of growing rabbits. Proc. 14th Symp. on Housing and Diseases of Rabbits, Furbearing and Pet Animals, Celle, 57–68.
- KUSTOS K., KOVACS D., GODOR-SURMAN K., EIBEN C., 2004: Effect of probiotic BioPlus 2B® on performance of growing rabbit. Proc. VIIIth World Rabbit Congress, Puebla, 874–879.

- MAERTENS L., RENTERGHEM Van R., GROOTE De G. 1994: Effects of dietary inclusion of Paciflor® (Bacillus CIP 5832) on the milk composition and performances of does and on caecal and growth parameters of their weanlings. *World Rabbit Sci.* 2 (2), 67–73.
- Mc NITT J., PATTON N.M., LUKE-FAHR S.D., CHEEKE P.R., 2000: Rabbit production. Interstate Publishers, Danville, IL.
- SPSS, 2006: 14.0 for Windows user's guide. SPSS Inc., USA.
- TACHIKAWA T., SEO G., NAKAZAWA M., SUEYOSHIM., OHISHI T., JOH K., 1998: Estimation of probiotic by infection model of infant rabbit with enterohemorrhagic *Escherichia coli* O 157:H7. *J. Japanese Association Infectious Diseases* 72 (12), 1300–1305.
- THELEN U., PALLAUF J., 1996: Effect of *Bac. cereus* on the composition of the gut flora in early weaned piglets. *Proc. Soc. Nutr. Physiol.* 5, 144.
- VOROS G., VOROS A., 1998: Effect of ToyoCerin® on performance, mortality and caecum flora in growing rabbits (in Hung.). *Proc. 10th Rabbit Day*, Kaposvar, 81–88.
- Streszczenie:** Ocena efektywności probiotyku jako czynnika poprawiającego wyniki tuczu królików. Celem badań było określenie wpływu dodatku *Bacillus cereus* var. *toyoi*, jako czynnika probiotycznego, na wyniki tuczu młodych królików. W doświadczeniu zastosowano poziom 400 mg preparatu na 1 kg paszy w żywieniu królików z grupy doświadczalnej (EG, grupa liczyła 32 osobniki). Grupa kontrolna (CG, licząca 34 osobniki) była żywiona mieszanką pełnoporcjową bez dodatku preparatu. Doświadczenie rozpoczęto u królików w wieku 35 dni wraz z odsadzeniem i zakończono w wieku 84 dni. Zbierano następujące dane: masa ciała przy odsadzeniu; masa ciała co tydzień do wieku 84 dni; spożycie paszy podczas tuczu; stan zdrowotny młodych w czasie tuczu; wydajność rzeźna. Stwierdzono pozytywny wpływ stosowanego preparatu na stan zdrowotny i wydajność rzeźną.

MS. received November 2013

Author's address:

Marian Brzozowski
Wydział Nauk o Zwierzętach SGGW
Katedra Szczegółowej Hodowli Zwierząt
ul. Ciszewskiego 8, 02-786 Warszawa
Poland
email: marian_brzozowski@sggw.pl