

A NATURAL WAY TO IMPROVE PRODUCTIVITY OF RABBITS USING PROBIOTIC YEASTURE

Paulius Matusėvičius¹, Raimonda Šliaudarytė¹, Zofia Antoszkiewicz², Anna Bednarska²

¹Department of Special Zootechny, Lithuanian Veterinary Academy, Tilžės str. 18; LT-3022 Kaunas, Lithuania; Tel. +370 37 36 35 05; E-mail: paulmat@lva.lt

²Department of Animal Nutrition and Feed Management Faculty of Animal Bioengineering, University of Warmia and Mazury, Oczapowskiego 5, Olsztyn; 10-719 Poland; Tel. 4889 523 33 79; E-mail: zocha@uwm.edu.pl

Summary. After supplementing the ration of rabbits for 60 days with probiotics, rabbit body mass increased by 16,7-18,0% ($p < 0,05$) while the consumption of feed for a unit of gain decreased by 7,2-8,4% ($p < 0,05$). The preparation used improved the digestibility of crude protein, dry matter and ash. The investigations of the chemical composition of meat indicated that the examined preparation did not have any influence on the amount of dry matter and ash. In the meat of the latter experimental groups the amount of protein increased by 1,8% ($p < 0,05$) and 4,1% ($p < 0,05$) while the amount of fat increased only slightly with 0,2% and 0,7%, in comparison with the control group. The increase in protein in rabbit meat improves the value and quality of rabbit meat. On the other hand, probiotics in the fodder of rabbits did not have a negative influence on the chemical composition of meat. The results of the performed experiments showed that the usage of the probiotics YEASTURE in rabbit feed positively affects their development. The effectiveness of probiotics is influenced by rabbit age and dose preparation. Our results are in agreement with the results of other studies suggesting that the positive effect of probiotics is due to improved digestibility of dry matter and cellular tissues (Fuller 1989; Fernandez-Carmona et al., 1996). The most effective probiotics preparations are those that decompose fermentation products. Exogenic fermentation products decompose undesirable digestive components in the alimentary tract and help to decompose insoluble cellular walls, thereby diminishing the viscosity of the intestines contents. The results of our investigations have confirmed this observation.

Keywords: Rabbits, probiotic, growth dynamics, digestibility, meat quality, amino acids.

NATŪRALUS BŪDAS PROBIOTIKU YEASTURE PAGERINTI TRIUŠIŲ PRODUKTYVUMĄ

Santrauka. Papildžius 1–60 d. amžiaus triušių racioną probiotiniu preparatu, triušių masė padidėjo 16,7–18,0% ($p < 0,05$), o pašarų sąnaudos prieaugio vienetai sumažėjo 7,2–8,4% ($p < 0,05$). Preparatas pagerino žaliųjų baltymų, sausųjų medžiagų ir pelenų virškinamumą. Mėsos cheminės sudėties tyrimai parodė, kad sausųjų medžiagų ir pelenų kiekiui naudotas tiriamasis preparatas įtakos neturėjo. Nežymiai tiriamų grupių mėsoje proteinų padidėjo 1,8% ir 4,1% ($p < 0,05$), riebalų – 0,2% ir 0,7% ($p < 0,05$) palyginti su kontroline grupe. Palyginti su kontroline grupe pastebėta vertingų baltymų daugėjimo tendencija. Nors šių rodiklių pokytis ir nežymus, tačiau jis gerina triušienos vertę ir kokybę. Galima teigti, kad triušių kombinuotuosiuose pašaruose naudojamas probiotinis preparatas neigiamos įtakos triušių mėsos cheminei sudėčiai neturėjo. Bandymų rezultatai parodė, kad probiotinio preparato YEASTURE naudojimas pašaruose teigiamai veikia triušių vystymąsi. Probiotiko efektyvumą nulemia triušio amžius ir preparato dozė. Ši išvada sutampa su rezultatais kitų mokslininkų, kurie teigiamą probiotikų poveikį aiškina pagerėjusiu sausųjų medžiagų ir ląstelių virškinamumu. Ypač efektyvūs probiotiniai preparatai, kurie savo sudėtyje turi fermentų. Egzogeniniai fermentai virškinamajame trakte suskaido nepageidaujamas medžiagas ir padeda skaidyti netirpias ląstelių sienelės, sumažina žarnų turinio klampumą (Fuller, 1989; Fernandez-Carmona et al., 1996). Tai patvirtino gauti tyrimų rezultatai.

Raktažodžiai: triušiai, probiotikas, augimo dinamika, virškinamumas, mėsos kokybė, aminorūgštys.

Introduction. Term “probiotics”, in translation from Greek means “for life”. Many scientists regard probiotics as living microorganisms or their fermented products, which decompose undesirable food matters, increase digestion of fodder. Hence, such probiotic preparations and their compositions added to fodders “widen” the system of fermented digestion. Enzymes are the most important factors of digestion. They are protein molecules, which can catalyse and improve an acceleration of fodder digestion. Enzyme secretion takes place mainly in the stomach, liver and small intestines. The development of enzymes’ secretion system is not a quick process; the animal even with a completely developed digestion system has to overcome an adaptation stage. For this reason a young, small animal being in a stressful state is more sensitive to the illnesses

of digestion process, grows more slowly (Fuller, 1989; Fotso et al., 2000).

It is obvious that the additive of probiotic YEASTURE having a significant synergetic effect, composed of three natural components – yeast extracts; enzymes and useful bacteria can make fodder maximally effective (Konecka, Jazierski, 1997). In the scientific papers by various authors we also looked for the evidence proving the connection between the level of feeding and a production of high quality; the data partially correspond with the results of the investigation we obtained (Fortun-Lamothe et al., 1999; Fernandez-Carmona et al., 1996; Rymkiewicz, Lewczuk, 1999; Lebas F, 2000).

Materials and Methods. The aim of the study was to analyse the use of probiotic’s YEASTURE for rabbits 1 to 60 d. old and suckled females. Crumbled rations, containing 17 % of crude protein and 9.6 to 9.9 MJ of

metabolic energy in 1kg were offered. The fodder for the rabbits of the first experimental group was enriched with 1.5 kg probiotics *YEASTURE*, and the of the second experimental group - with 1.5 to 2.0 kg for 1 tone of the fodder (Table 1. Design of feeding experiments). The rabbits in the control group were fed the same fodder without probiotics. Rabbits were chosen of the New Zealand pedigree for the experiment. Every 10 days they were weighed in order to count their weight increase

during that period. The research with probiotic *YEASTURE* was done on the rabbits' pedigree farm. The probiotic preparation *YEASTURE* made by USA CENZONE company (entitled distributor in Lithuania – UAB “AGROVET”) was used. This is a natural product containing yeast extracts and composition of enzymes' digestion of amilaseses proteaseses, cellulaseses and hemicellulases.

Table 1. Design of feeding experiments, (n=18)

Age, day	Group	The amount of the probiotic preparations mixture, t/kg	Metabolic energy, (MJ)
1-60	Control	–	9.6
1-60	I (experimental)	1.5	9.8
1-60	II (experimental)	2.0	9.8

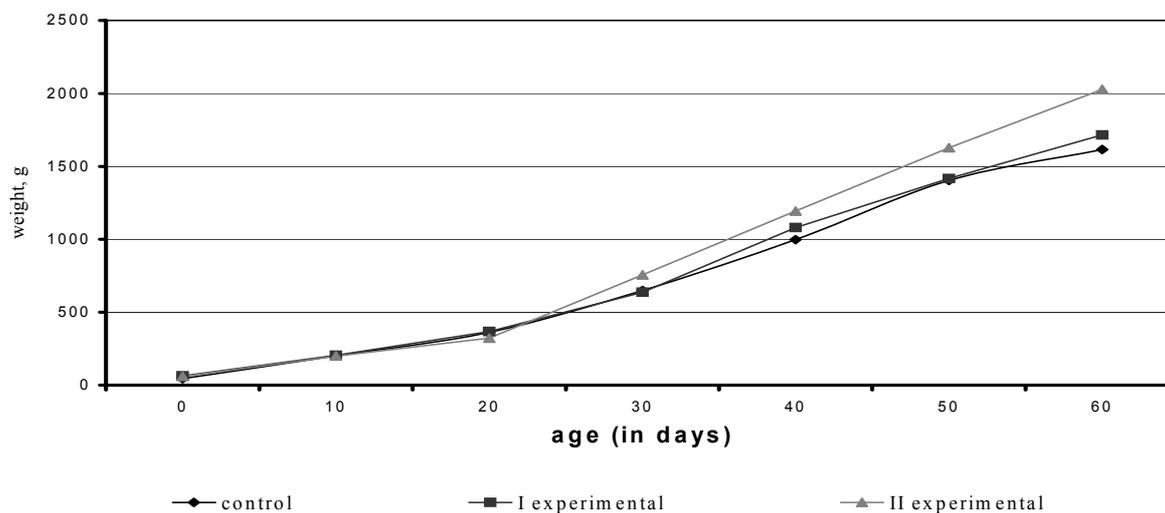
During the experiment of feed nutrient digestibility the rabbits were fed limited amounts of feed, rabbits identically, individually, each having its own feeding trough and stationary watering container. During the investigation, excrements of individual rabbits were collected twice daily, frozen and kept until chemical analysis was to be performed.

The analysis of the basic chemical composition of meat included the determination of the percentage of dry matter, crude protein, fat, ash, soluble protein and (after protein precipitation (Budslawski and Drabent, 1972). Its physicochemical properties, i.e. pH (a pH-meter manufactured by the “Radiometer” company, with an electrode GK 23311C), color brightness (spectrometer at a wavelength of 560 nm), amino acids (Moore and Stein, 1963) and water-holding capacity (Grau and Hamm, 1952) were

also determined.

The results were analyzed statistically, taking into consideration arithmetic means (\bar{x}), standard deviations (s), coefficients of variation (v) and coefficients of simple correlation (r). The differences between the means for groups were determined by an analysis of variance in a non-orthogonal design. A computer program Statistica 7.0 was applied to create a database and for statistical calculations (Statistica für Windows™ 1995).

Results and Discussion. The research results showed that at the end of the research, month old New Zealand pedigree rabbits, fed on composed fodder containing *YEASTYRE* probiotic, weighed 310 g or 18 % ($p>0.05$) more than rabbits of the tested group of fed on composed fodder without any additive (Picture 1).



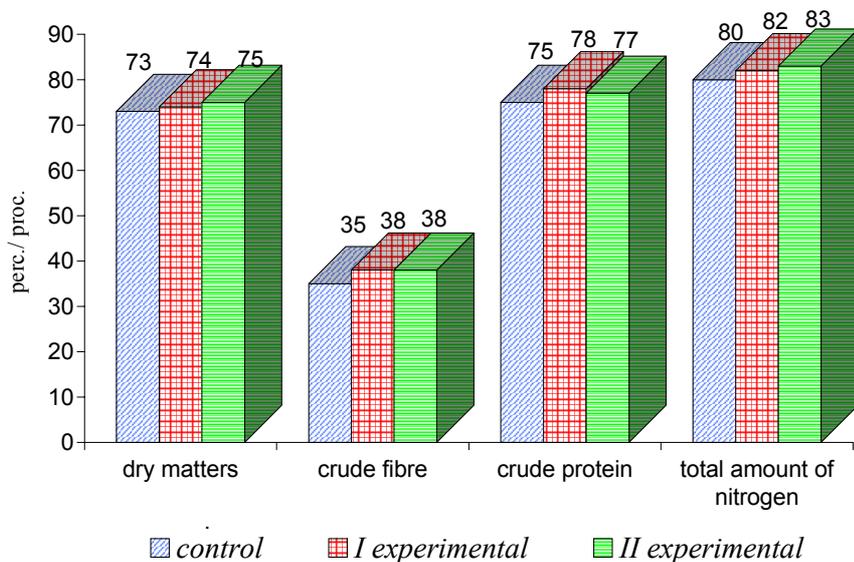
Picture 1. The dynamics of New Zealand rabbits growth

Fertile and suckled does, fed on tested fodder, gave birth to bigger, more vital youngs and had bigger litter. The increase of weight of rabbits during a day and night can be explained. The research on digestion of food matters portion digestion showed that the preparation improved their digestion. It mainly influenced green proteins' green fibre's digestion (Picture 2).

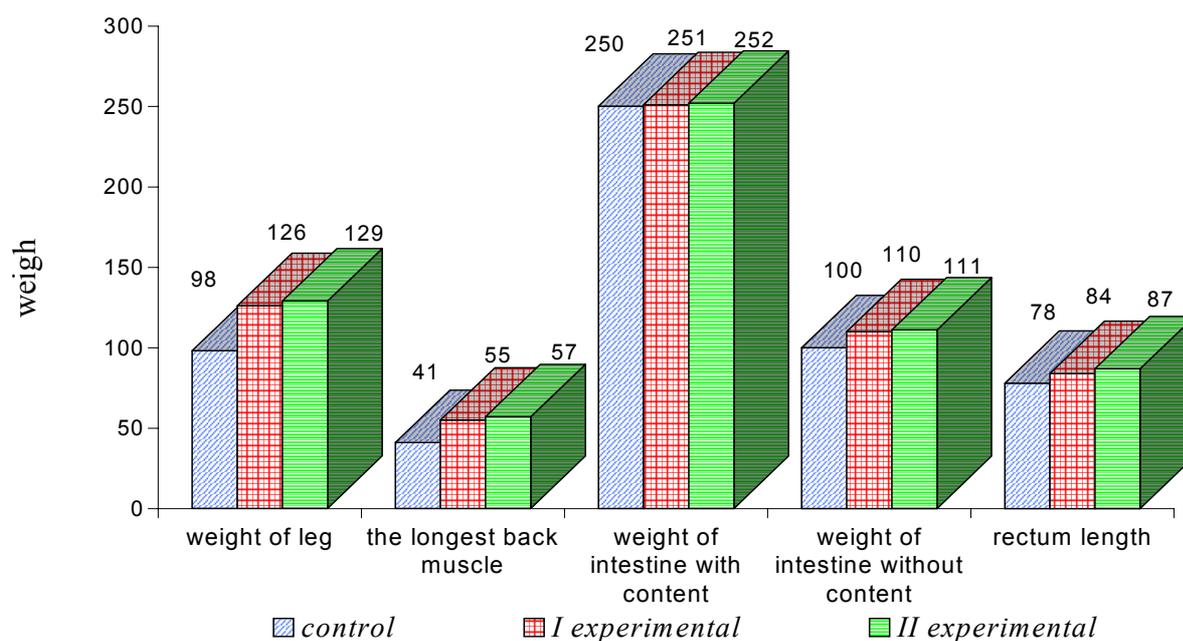
Having tested the meat of rabbits (there chemical analysis of back muscles was done) it was affirmed that the use of probiotic didn't have any influence on the chemical composition of meat. The morphological composition of meat of tested butchered group of rabbits relatively better developed the had longest back muscle and bigger weight of leg (Picture 3).

The meat of New Zealand rabbits between the control and experimental groups did not differ significantly in the value of (tryptophan and oxyprolin) proteins (Picture 4). In the papers by other authors we also looked for the connection between the level of

feeding and rabbit production of high quality, and their data partially corresponded with the results of our investigation (Konecka and Jazierski, 1997; Rymkewicz and Lewczuk, 1999).



Picture 2. The coefficients (in per cents) of fodder



Picture 3. Controlled slaughter data of New Zealand rabbits

Conclusion.

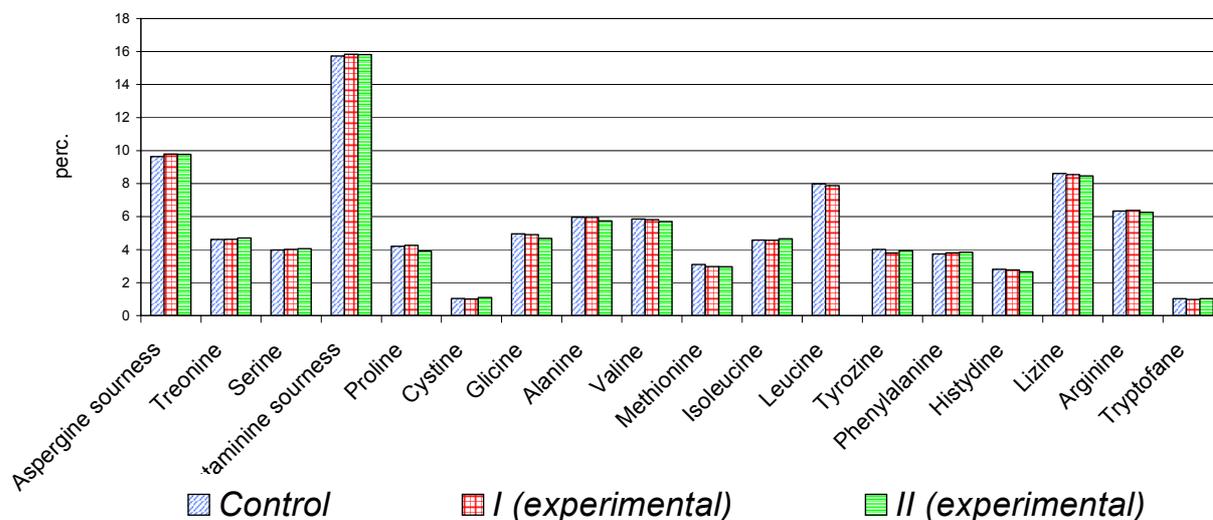
1. Aiming to speed up the growth of the rabbits and improve the digestibility and assimilation of the nutrients of the ration following the data of the performed investigation, we recommend for rabbits of 1 to 60 the production of start and combined fodder supplementing 1 t of fodder by 1 kg of the probiotic preparation used in the experiments.

2. The analyses of the chemical composition of meat indicated that the fodder supplement did not have

any influence on the amount of dry matters and ash. In the meat of the latter investigated groups, the amount of proteins increased by 1.8% and 4.1% and slightly fat – 0.2 and 0.7% in comparison with the control group. The change of these indices influences and has a tendency to improve the quality of the rabbit meat.

One may state that preparation *YEASTURE* used in the compound fodder of the rabbits did not have a negative influence on the chemical composition of the

meat. The obtained differences of the data between the groups are statistically unreliable.



Picture 4. The influence of probiotic on the amount of amino acids in the samples of meat of the rabbits

References

- Fuller R. Probiotics in man and animals, a review. *J. Appl. Bacteriol.*, 1989. 66 p.
- Fernandez-Carmona J., Cervera C., Blas E. Prediction of the energy value of rabbit feeds varying widely in fibre content. *Animall feed Sci. and Technology.* -1996. Vol. 64. P. 61-75.
- Fotso J., Fomunyan R., Ndoping B. Protein and energy sources for rabbit's diets in Cameroon. 1 - Protein sources. *World Rabbit.* -2000. 8 (2). P. 57.
- Konecka A., Jazierski T. Effect of Cholesterol-Enriched Diet on Liver and Heart enzymes in Male Rabbits. *Elsevier Sci. Ins.* -1997. Vol. 118B. P. 505-508.
- Fortun-Lamothe L., Prunier A., Bolet G., Lebas F. Physiological mechanisms involved in the effects of concurrent pregnancy and lactation on foetal growth and mortality in the rabbit. *Livestock Productions Sci.* -1999. Vol. 60. P. 229-241.
- Rymkiewicz J., Lewczuk A. Regression equations for estimating the meat content of carcasses in New Zealand White Rabbits. *Problems of animal and Poultry meat production increasing and quality improvement. International Science Conference.* -1999. P. 159-165.
- Lebas F. Vitamins in rabbit nutrition. *World Rabbit.* -2000. 8 (4). 185 P.
- Budslawski J., Drabent Z. *Metody analizy zywnosci.* WNT, Warszawa, -1972.
- Grau R., Hamm E. Eine einfache Methode zur Bestimmung der Wasserbindung im Fleisch. *Fleischwirt.* -1952. Vol. 4. P. 295-297.
- Moore S., Stein W., *Diskusja o klasycznym sposobie hidrolizy kwasnej.* *Methods. Enzymol.* 6, 1963. 819 P.
- Schram F., More S., Bigwood E. Utlenianie aminokwasów siarkowych kwasem nadmiokowym. *Biochem J.* -1954. Vol. 59. 33 S.
- StatSoft Inc. Tulsa OK: *Statistica für Windows™* (Version 5.0). 1995.