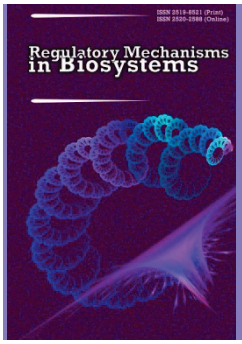

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Productive parameters of rabbits fed with additives containing lactic and succinic acid, amino acid and vitamins

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Prebiotics are an effective technological element of increasing the productivity of animal husbandry. Currently, prebiotics are being broadly used in cuniculture. Those drugs are a promising means of stimulating growth and development of animals. Prebiotics optimize the metabolic processes and increase the level of nutrient metabolism. Our studies revealed the effect of a prebiotic drug, which contains lactic and succinic acids, aminoacids, vitamins A, B_1, B_2, B_3, E, on the growth intensity of rabbits. The studies were performed on the young 34 to 160-days-old rabbits of the Hyplus meat hybrid. Animals of the control group were fed ad libitum with full-diet granulated mixed feeds and had free access to water. Animals of the experimental groups were fed feeds of the control-group diet, supplemented by prebiotic additive Prebiolakt-Kr in the doses of 1.5, 2.0, and 2.5 g/kg of the live weight. Every 14 days during the feeding period, the growth intensity of the rabbits was controlled according to individual live weight and average daily increment. Addition of Prebiolakt-Kr to the rabbits' diet increased the live weight of animals by the end of feeding. We verified and confirmed the positive effect of the prebiotic on the intensity of growth and development of the growing rabbits. According to the absolute increment, the advantage over the rabbits in the control accounted for 7.9–11.9%. Feeding the supplement increased the meat volumes of the rabbits. Also, Prebiolakt-Kr added to the diet caused higher chest girth/diagonal body length index. The animals that were receiving the prebiotic feed supplement used the diet more effectively and had better metabolism of nutrients. The studies revealed a dose-dependent effect of prebiotic on the growth intensity of the rabbits. At the same time, the best stimulating action was displayed by supplementing the diet of the young rabbits by 2.0 and 2.5 g/ind. of Prebiolakt-Kr. The conducted studies have confirmed the benefits of using prebiotic drugs in rabbit husbandry, which improve metabolism and increase bodyweight gain.

Keywords: live weight; increment; digestibility; nutrients; Prebiolakt-Kr; development.

Introduction

Rabbit husbandry is a promising sphere producing high-quality dietary meat and raw material for the fur industry. The rabbits are characterised by high fertility and fast maturation, and therefore a lot of slaughter products can be produced in a short time (Honchar et al., 2020). However, over the recent decade, the rabbit population in Ukraine has tended to decline. While in 2010, 5,354.7 thou rabbits were held, in 2022 this parameter plummeted by 18.4%, down to 4,370.6 thou rabbits. In live weight, 21.4 thou T of rabbits were grown. Rabbit husbandry in Ukraine is still amateur and is mostly oriented at satisfying the individual needs of the population in meat products. Around 99% of the rabbits are concentrated in private subsidiary farms where they are grown without modern maintenance technologies and feeding conditions, which hinders increasing their number, and thus fulfilling the market needs. On such farms, 20.2 thou T rabbits in slaughter weight have been grown. The rabbit husbandry ensures the food safety of Ukraine by producing additional meat. Rabbit meat is considered a dietary meat, though less common than other types of meat. Nutritional and dietary properties of rabbit meat are much higher than many other types of meat, characterized by low calorie content and lower concentration of cholesterol, and also high content of protein, 90% of which is metabolized in the organism (Cullere et al., 2018). In 2021, 10.9 thou T of rabbit meat in slaughter weight was produced, which was 0.45% of the total meat production. Maintenance and breeding of rabbits depends on a number of biological specifics, including fast maturation, fertility and high fodder conversion. Crossbreeding of rabbits can produce crossbred progeny in order to intensify rabbit husbandry (Gavrish, 2017). Such livestock farming positively influences the reproductive parameters of mother rabbits and the future parameters of hybrid rabbits.

Currently, in the rabbit farming, the best studied issue is rabbit maintenance, while nutrition has been studied less, especially the effects of various fodder supplements on the animal organism (Khan et al., 2016). Due to various processes, animals have different needs in nutrition during different age periods (Kalachnyuk, 2004; Fedoruk & Lesyk, 2009; Lieshchova et al., 2020). Rabbits are characterized by frequent consumption of food, and therefore they are given free access to it. Research has confirmed benefits of feeding rabbits of different genotypes with green mass of *Galega orientalis*, lucerne and clover (Darmohraj & Luchyn, 2008). Various kinds of fodder supplements used in animal husbandry have effects on the health of animals and poultry, as well as their productivity (Razanova, 2018; Yaremchuk et al., 2022) and increase in production of high-quality meat (Al-Sagheer et al., 2019; Razanova et al., 2022). Use of the Ladozim Respect Ultra enzymatic supplement in feeding rabbits increased their live weight by 4.9%, survival of progeny by 5.0%, and also improved the hematological parameters, increased the levels of hemoglobin, erythrocytes and leukocytes (Chudak, 2020). Giving young rabbits 9% baker's yeasts fostered the growth intensity, meat productivity and improved food conversion by 4.1%, thereby improving the cost effectiveness by 44.4% (Luchyn & Darmogray, 2016; Luchyn, 2022). Over the recent years, the sphere faced critical problems related to the EU prohibition of usage of antibiotics, used in animal husbandry for prophylaxis and growth stimulation, as well as restriction of their usage due to emergence

of resistance (Regulation (EC) No. 1831/2003). Absence of alternative supplements with the properties of antibiotics made the production non-profitable, imposing losses on farms (Shneiner & Dvorskaya, 2018). Usage of non-antibiotic growth stimulators can have positive effects on pathogenic organisms in the intestines of animals and increase their productivity (Sengupta & Chattopadhyay, 2012; Laxminarayan et al., 2013; Al-Soufi et al., 2022). Usage of a probiotic in nutrition improved the resistance and survival of the animals during their raising, had positive effects on the growth intensity and meat productivity (Korh et al., 2021). Rabbit raising depends greatly on medicines used for reduction of high mortality caused by various diseases, especially during weaning (Gidenne et al., 2002; Zemzmi et al., 2020).

Studies of a number of authors indicate efficacy of prebiotics in animal nutrition (Saettone et al., 2020), which can influence the gut microflora, decrease its pH, improve the immune system and digestibility of nutrients and thus promote live-weight increments, increase slaughter parameters, and have effects on qualitative parameters of carcasses (Hamasalim, 2016; Likotrafiti et al., 2016; Chernikova & Prokopenko, 2019). Introduction of the Actigen prebiotic to mixed feeds of broiler chickens had a positive effect by reducing the amount of conventionally pathogenic gut microflora (Chernikova & Prokopenko, 2019). Antibiotic-free rabbit diets contain the natural supplement inulin as a prebiotic that can selectively promote growth of lactic-acid bacteria (Zhu et al., 2021). As an alternative to supplements for growth stimulation of rabbits, Nwachukwu et al. (2021) used the Biotronic® dietary prebiotics and their combination with the Biovet®-YC prebiotics. They improved the productivity, development of the intestine, hematological blood parameters, and also contributed to better digestion of fodder, metabolism and use of nutrients. A number of scientists have studied the effects of prebiotic supplements against various diseases. Aboelhadid et al. (2021) experimentally confirmed the benefits of prebiotics for controlling the spread of *Escherichia coli* and *Salmonella*, associated with intestinal coccidiosis in rabbits.

Study of growth rates of rabbits is important, since the animals that grow intensely in the same conditions use less nutrients of fodder per increment unit. An important factor for the rates of growth and development of animals is use of various fodder supplements. The results of our study of patterns of growth and development of the animals that had been receiving the supplements with their diet are of scientific interest, which may have an effect on their usage in nutrition.

Materials and methods

The studies on the rabbits were performed according to the recommendations of Refining Rabbit Care (Hawkins et al., 2008), principles of the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (ETS No. 123, Strasbourg, 1986) and the Law of Ukraine On Protection of Animals from Abuse (No. 3447-IV as of 06/21/2006).

The experimental studies were carried out in the vivarium of the Vinnytsia National Agrarian University on the Hyplus meat-hybrid rabbits. For this purpose, after weaning, we selected 100 rabbits at the age of 34 days. According to the group-analogue method by age and live weight, the fed young were divided into 4 groups, 25 individuals each (12 males and 13 females) (Ibatullin et al., 2017). Parameters of microclimate in the vivarium corresponded to all the established norms of keeping rabbits. The fed young were kept in two-storey cages, maintaining the temperature within 25 ± 2 °C and 12 h period of natural daylight per day. To feed the rabbits, we used full-diet mixed feeds. The animals were fed twice a day. To drink, the animals were given regularly changed water from nipple drinkers. The food given to the rabbits was weighed, and the remaining food was weighed the next morning. Rabbits of the control and experimental groups were fed with the main diet, containing dried-grass meal – 10 kg, barley – 7.5 kg, peas – 2 kg; sunflower press cake – 2.5 kg; wheat bran – 1.25 kg; hydrolyzed baker's yeasts – 0.5 kg; molasses – 0.6 kg; meat-bone flour – 0.35 kg; salt – 80 g; edible phosphate – 130 g. The difference between the groups was administration of different doses of prebiotic drug Prebiolakt-Kr: 1.5 g/ind./day in the second group, 2.0 g/ind./day in the third, and 2.5 g/ind./day in the fourth. Prebiolakt-Kr contains dairy and succinic acids, amino acids, and vitamins A, B_1, B_2, B_3 and E.

During the study, the rabbits were weighed and increments in their body weight were measured depending on an experiment period. The dynamics of the live weight were determined by weighing the rabbits individually when introducing them to the experiment, and then every 14 days in the morning and prior to feeding until the end of the experiment. The growth intensity of the rabbits was determined by weighing on electronic scales with up to 1 g accuracy.

To identify how digestible were the main nutrients for the rabbit organism, we performed a balanced experiment on four animals from each group at the age of 150 days. The balanced experiment lasted for 10 days, including 5 accounting days. During the experiment, the rabbits were kept in individual cages. The amount of fodder used and its leftovers were weighed and the amount of produced feces and urine was taken into account. To perform the chemical analysis, we took mean samples of fodder and its leftovers, feces and urine.

The study results were statistically analyzed in the ANOVA. The data in the text and tables are presented as means with the standard deviation (x ± SD). The differences between the groups were considered statistically significant at $P < 0.05$ (taking into account the Bonferroni's correction).

Results

Live weight of the rabbits when introduced to the experiment, at the age of 34 days, was at the level of 950–950 g (Table 1).

Table 1
Dynamics of live body weight (kg) in the young rabbits fed with the Prebiolakt-Kr prebiotic (x ± SD, n = 25)

Age period, days	Group of animals			
	control (MD)	experimental 2 (1.5 g of Prebiolakt-Kr ind./day)	experimental 3 (2.0 g of Prebiolakt-Kr ind./day)	experimental 4 (2.5 g of Prebiolakt-Kr ind./day)
34	950 ± 32	960 ± 41	955 ± 23	950 ± 51
48	1,536 ± 72	1,539 ± 78	1,556 ± 61	1,543 ± 50
62	2,154 ± 23	2,174 ± 44	2,193 ± 96	2,185 ± 44
76	2,506 ± 33	2,679 ± 76*	2,713 ± 73**	2,704 ± 36***
90	2,743 ± 75	2,945 ± 79*	2,999 ± 93*	2,996 ± 79*
104	2,948 ± 48	3,162 ± 35***	3,229 ± 61***	3,233 ± 91**
118	3,153 ± 79	3,378 ± 42**	3,458 ± 94**	3,457 ± 93**
132	3,381 ± 59	3,599 ± 48**	3,688 ± 81**	3,686 ± 78***
146	3,585 ± 34	3,816 ± 47***	3,924 ± 83***	3,917 ± 63***
160	3,801 ± 49	4,032 ± 39**	4,159 ± 87***	4,139 ± 55***

Note: differences between the experimental and control groups are significant at the level of * – P < 0.05, ** – P < 0.01, *** – P < 0.001; MD – main diet.

Changes in live weight of the rabbits between the groups depended on doses in which the supplement was added to the diet. Fourteen days after the rabbits consumed the prebiotic, the difference between the groups according to this parameter was insignificant. On the fourth day of the monitoring, the differences between the groups increased, accounting for 6.9–8.2% at P < 0.05–0.001. In the following age periods, the differences between the groups remained. After 56 days of feeding, at the age of 90 days, the prebiotic-containing diet led to increases in the difference between the control and experimental groups, being significantly higher in the second – by 7.4% (P < 0.05), while being 9.3% (P < 0.05) in the third and 9.2% (P < 0.05) in the forth. Further, there was seen a similar tendency towards increase in live weight of rabbits in the experimental groups, as compared with the control. Inclusion of the prebiotic supplement in the diet of the fed young rabbits – against the background of the main diet – led to increase in the live weight of the animals at the end of feeding period, being 6.1% (P < 0.01) in the second experimental group, 9.4% (P < 0.001) in the third, and 8.8% (P < 0.001) in the fourth, compared with the control. The studies revealed that the highest growth-stimulating effect on the live weight was caused by 2.0 g of Prebiolakt-Kr per ind. a day, added to the diet of the growing rabbits.

The absolute increment in live weight of the fed young rabbits according to the periods suggests different growth intensity (Table 2). The data in Table 2 indicate that the lowest absolute increment in live weight occurred in rabbits of the control group. This tendency was observed throughout the study. Analysis of the growth rates of the animals revealed the most intensive gain in live weight took place in the period

between the 48th to 62nd day. In this particular period, the animals – as compared with the previous period – had the greatest increment in live weight. The absolute increment equaled 642 g. Starting from the 62nd day, we saw a significant difference between absolute increments in rabbits of the control and experimental groups. Advantage by this parameter was 43.7% ($P < 0.001$) in the second group, 47.5% ($P < 0.001$) in the third, and 47.2% ($P < 0.001$) in the fourth. In the subsequent age periods, the inter-group tendency towards increase in the absolute increment of the rabbits remained, but the differences became not so expressed. Throughout the feeding period, the surplus in absolute increment was 7.7% ($P < 0.01$) in the second group, 12.4% ($P < 0.001$) in the third, and 12.1% ($P < 0.001$) in the fourth, compared with the data in the control. As presented, the highest weight gain was in rabbits of the fourth group.

Table 2

Absolute increment (g) in live weight of the fed young rabbits consuming the Prebiolakt-Kr prebiotic (x ± SD, n = 25)

Age period, days	Group			
	Control (MD)	experimental 2 (1.5 g of Prebiolakt-Kr ind./day)	experimental 3 (2.0 g of Prebiolakt-Kr ind./day)	experimental 4 (2.5 g of Prebiolakt-Kr ind./day)
34–48	586 ± 26	579 ± 24	601 ± 28	593 ± 25
49–62	618 ± 23	634 ± 29	638 ± 20	642 ± 28
63–76	352 ± 22	506 ± 39***	519 ± 33***	518 ± 41***
77–90	237 ± 12	266 ± 9*	286 ± 14**	292 ± 14***
91–104	205 ± 6	217 ± 9	231 ± 10*	237 ± 19*
105–118	205 ± 9	216 ± 12	228 ± 11*	224 ± 7**
119–132	228 ± 11	222 ± 21	229 ± 17	229 ± 19
133–146	204 ± 13	217 ± 29	236 ± 9*	231 ± 13*
147–160	216 ± 11	216 ± 20	235 ± 8*	222 ± 19
34–160	2,851 ± 62	3,072 ± 55**	3,204 ± 61***	3,198 ± 36***

Note: see Table 1.

The absolute increment in live weight does not characterize the growth rates, and therefore the growth intensity was identified by relative increment. Relative growth rates of the rabbits decreased with age, because metabolism in an animal organism slows with age. Relative increment in live weight of the rabbits was the highest between 34 to 48-days age and, therefore, starting from the 49th day, gradually decreased compared with the previous age period. Also, there were differences in this parameter between the groups, compared with the control. In the following age periods, we saw decrease in the difference in relative growth rate between the control and experimental groups. In all the groups, relative increment in the rabbits during the period from 90 to 160-days age was characterized by insignificant fluctuations. During this period, there occurred the greatest decrease in growth intensity of animals of all the groups, due to their physiological condition and increase in the level of fat deposition in the rabbit organism. The highest relative increment in live weight of the rabbits was in the third group.

Table 3

Relative increment (%) in live weight of the rabbits consuming the Prebiolakt-Kr prebiotic (x ± SD, n = 25)

Age period, days	Group			
	control (MD)	experimental 2 (1.5 g of Prebiolakt-Kr ind./day)	experimental 3 (2.0 g of Prebiolakt-Kr ind./day)	experimental 4 (2.5 g of Prebiolakt-Kr ind./day)
34–48	47.1 ± 1.8	46.5 ± 1.6	48.0 ± 2.5	47.6 ± 1.8
49–62	33.5 ± 1.9	34.0 ± 1.1	33.9 ± 1.3	34.5 ± 1.7
63–76	15.1 ± 1.1	20.8 ± 1.9***	21.2 ± 1.7***	21.2 ± 1.6***
77–90	9.0 ± 1.7	9.5 ± 0.9	10.0 ± 0.6	10.3 ± 0.9
91–104	7.2 ± 0.8	7.1 ± 0.1	7.5 ± 0.2	7.6 ± 0.9
105–118	6.7 ± 0.9	6.6 ± 0.1	6.8 ± 0.9	6.7 ± 0.8
119–132	7.0 ± 0.4	6.4 ± 0.1	6.4 ± 0.7	6.4 ± 0.8
133–146	5.8 ± 0.2	5.9 ± 0.2	6.2 ± 0.2	6.1 ± 0.2
147–160	5.4 ± 0.3	5.5 ± 0.7	5.8 ± 0.4	5.5 ± 0.2

Note: see Table 1.

A more in-detail knowledge about the growth intensity of the rabbits of various groups can be given by the parameter of mean daily increment. Up to the age of 62 days, a high rate of mean daily increment was seen in the rabbits of all the groups. The following growing periods were characterized by decrease in this parameter, while rabbits of the experimental groups in all the subsequent periods were superior to their peers in the control group. The lowest mean daily increment was seen in the period between days 91 to 118, and also in the final period (days 133–160).

The growing rabbits were well fed, having expressed meat volume, as confirmed by the calculated chest girth/diagonal body length index according to the measurements: chest girth behind the scapulae and torso length (Table 4). At the age of 160 days, rabbits of the experimental groups had longer torso and larger chest. Those animals were found to have higher index of chest girth/diagonal body length ratio than in the control group, in particular, the difference in the second group was 2.4%, and 3.4% ($P < 0.05$) in the third and fourth.

The studies revealed that among the animals used in the balanced experiment, the better digestibility of nutrients was observed in the rabbits that had been consuming the prebiotic feed supplement. Inclusion of Prebiolakt-Kr to the diet improved the coefficients of digestibility of organic matter, protein, cellulose and nitrogen-free extracts in rabbits in the experimental group ($P < 0.05$, Table 5).

Table 4

Parameter of development of rabbits consuming the diet containing the Prebiolakt-Kr prebiotic (x ± SD, n = 5)

Group	Chest girth behind the scapulae	Torso length, cm	Chest girth/diagonal body length index
Control (MD)	62.1 ± 1.4	36.8 ± 1.5	59.2 ± 1.2
Experimental 2 (1.5 g of Prebiolakt-Kr ind./day)	62.5 ± 1.1	37.9 ± 1.2*	60.6 ± 1.3*
Experimental 3 (2.0 g of Prebiolakt-Kr ind./day)	62.9 ± 1.6*	38.5 ± 1.3*	61.2 ± 1.2*
Experimental 4 (2.5 g of Prebiolakt-Kr ind./day)	62.7 ± 1.7*	38.4 ± 1.6*	61.1 ± 3.1*

Note: see Table 1.

Table 5

Digestibility of nutrients (%) of the prebiotic-containing diet of the rabbits (x ± SD, n = 5)

Parameter	Group			
	control (MD)	experimental 2 (1.5 g of Prebiolakt-Kr /ind./day)	experimental 3 (2.0 g of Prebiolakt-Kr /ind./day)	experimental 4 (2.5 g of Prebiolakt-Kr /ind./day)
Organic matter	67.6 ± 4.7	68.2 ± 5.3	68.8 ± 3.5*	68.9 ± 4.4*
Protein	70.8 ± 3.5	71.3 ± 4.3	72.1 ± 5.4	71.8 ± 3.2*
Fat	78.7 ± 2.1	77.4 ± 1.9	78.9 ± 2.1	79.2 ± 3.3*
Cellulose	28.3 ± 1.2	30.1 ± 1.2	31.7 ± 1.1*	31.5 ± 1.2*
Nitrogen-free extracts	75.8 ± 3.6	76.1 ± 3.2	76.5 ± 2.2*	76.4 ± 2.3

Note: see Table 1.

Discussion

In rabbit raising, there should be taken into account specifics of growth and development of the organism that promote the formation of productivity in the future (Bashchenko et al., 2018). The conducted studies of feeding the young rabbits revealed that supplementing the diet by the prebiotic allowed them to use the diet more effectively, i.e. they used the nutrients of fodder for weight gain better. Similar studies regarding the positive effect of prebiotic supplements on growth intensity of animals and conversion of fodder were reported by a number of researchers that per-

formed experiments on poultry and swine. A significant positive effect on the productivity indices of rabbits and the coefficient of conversion of fodder was found in the studies by Ayyat et al. (2018) after feeding the prebiotic with the organic selenium and probiotic, though the supplements had no effects on weight of carcass, liver, liver fat and carcass cuts. The probiotic mixtures with several strains and prebiotics (isomalto-oligosaccharide) improved the productivity parameters of broiler chickens and composition of cecum microbiota, and decreased the morbidity of the poultry (Tarabees et al., 2019). The diet of rabbits supplemented by mannan oligosaccharide and isomalto-oligosaccharide increased the final live weight of the animals and improved the characteristics of the carcasses (Abd El-Aziz et al., 2022). The studies revealed that the prebiotics-containing diets improved the poultry productivity similarly to other fodder supplements, though combined feeding of the broiler chickens with prebiotics and symbiotics was more effective than probiotics in increasing the productivity (Celi et al., 2019; Shirani et al., 2019). The zinc-nanoaquacitrate-containing diet exerted dose-dependent effect on the processes of lipid and mineral metabolisms, manifested in rise in their content in the blood. Intake of the lowest amount of the additive had the greatest effect on the biochemical blood parameters, greater amount of zinc nanoaquacitrate had positive influence on growth and development of the rabbits after weaning (Boiko et al., 2020). Components of the studied probiotic Prebiolakt-Kr are lactic and succinic acid, amino acids, vitamins A, B_1, B_2, B_3 and E. Lactic acid – because of its antiviral, antimicrobial, antiseptic and anti-fermentation properties – has negative effect on the growth of putrefying microflora of the gut and some diseases of poultry and rabbits (Shah et al., 2018; Yang et al., 2023). Properties of succinic acid lie in its metabolic action and are used in animal farming for fostering growth (Nagorna, 2013; Ilnitskyi & Hierdieva, 2014; Lieshchova et al., 2020). Adamson & Fisher (1973) determined that the growing young New Zealand rabbits need essential amino acids for increasing their weight. Sychov et al. (2018) studied the effect of different levels of methionine in mixed feed on the productivity of growing rabbits, finding that maximal weight gains in conditions of moderate food consumption per unit required mixed feed with 0.41% methionine content. Positive effect of Prebiolakt-Kr on the live weight of rabbits depended on its dose in the diet. Better results were seen in the group of rabbits that had been receiving 2.5 mg of Prebiolakt-Kr per kg of live weight.

Semenov et al. (2006) confirmed the stimulating effect of prebiotics on the growth intensity and economic effectiveness of their usage in feeding swine. There was seen a stable tendency towards increase in mean daily increments up to 20.6% against the background of 22.8% decrease in expenditures of fodders per unit increment when supplementing the diet of piglets with Bioacid, Bioacid-2 and TechnoMos. Efficacy of the Prebiolakt prebiotic was studied by Kucheryavy et al. (2013) on young swine. The results revealed a positive effect of the drug on increments in the live weight after addition of Prebiolakt in the doses of 2.5 and 3.0 g/ind./day, at the level of 13.9–14.4%. The results observed for the Prebiolakt-Kr-containing diet confirm the data of other researchers regarding increase in mean daily increments in the live weight. Rabbit diet supplemented by 2.0 and 2.5 g/ind. of this additive stimulated increase in this parameter ($P < 0.001$).

Changes in the dynamics of live weight can indicate how food supplements in a diet contribute to the formation of meat productivity of animals and their development. The conducted studies revealed that adding prebiotic supplement Prebiolakt-Kr to diet of the rabbits positively affected the live-weight gain. At the same time, live weight of the young rabbits at the end of feeding was 6.1–9.4% ($P < 0.05$) higher than in the control. In the animals that had been consuming the prebiotic supplement, we determined increase in relative growth rates ($P < 0.001$) and up to 3.4% ($P < 0.05$) increase in the chest girth/diagonal body length ratio.

Digestibility of nutrients depends on a number of factors, including quality of fodder and structure of the diet. Fodders given to animals contain compounds digested to a different degree, thus having effects on their productivity (Fedorchenko, 2020). Generalization of the results of studying effects of prebiotics on agricultural animals, conducted both in our country and aboard, revealed a multifaceted effect of supplements on the productivity, physiological, and biochemical parameters. Prebiotics positively influence the condition of gut microbiota, which allows increasing the digestibility of nutrients. Also, they are biologically safe. Using Prebiolakt-Kr in feeding young rabbits promoted increase in the level of metabolism of organic compound, protein, and cellulose.

Conclusions

Adding prebiotic Prebiolakt-Kr to diet of the young rabbits led to the positive effect on growth and development of their organism. The highest growth-stimulating effect was exerted by adding 2.0 g of Prebiolakt-Kr per ind./day to the diet of young rabbits. Rabbits of this group had 9.4% increase in live weight and 12.4% increase in absolute increment. The chest girth/diagonal body length ratio increased by 3.4%. Diet with 2.0 and 2.5 g/kg of the prebiotic improved the coefficient of digestibility of nutrients in the diet.

The authors declare no conflict of interest.

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