

LARISA CAISIN, NATALIA GROSU, V. HAREA, A. KOVALENKO

THE EFFECT OF PRIMIX-BIONORM K ON THE DIGESTIBILITY OF NUTRIENTS BY BREEDING PIGS

Research Institute of Biotechnology in Animal Husbandry and Veterinary Medicine
Scientific and Production Association „Ariadna”

Key words: pro-prebiotic, nutrients, pigs, fodder, consumption, digestibility.

ABSTRACT. To assess the nutrient digestibility of mixed feed for young pigs supplied with pro-prebiotic preparation Primix-Bionorm K, a physiological experiment has been carried out at the enterprise "Moldsuinhibrid" using 12 Landrace breed gilts. With the gilts in EG3 which have been fed using fodder in which a quantity of 0.45 kg/t of pro-prebiotic has been added based on lacto- and bifidobacteria, there was a higher increase in digestibility of dry substance, organic substance, crude protein, crude fat and crude cellulose respectively by 1.25, 1.39, 0.74, 1.42 and 33.52% compared with the gilts in CG.

SUMMARY. The organization of animal feeding should ensure the conditions for physiological and morphological adaptation of the digestive tract to the efficient use of forage and the regulation of digestion microbiological processes.

The utilization of pro-prebiotics in animal feeding is effective in rations for young agricultural animals. The optimal ratio of microbial flora of gastrointestinal tract of these kinds of animals is easily deflected under the influence of multiple factors such as: the change of the fodder, transportation, treatment with antibiotics, etc [11, 12].

Probiotics are able to survive in the digestive tract, and to improve the digestion and nutrients assimilation processes. They also increase the stamina through improved immune functions [1].

To eliminate the adverse effects of pathogenic microflora and to promote the positive ones, the modification of the composition and catalytic activity of the intestinal microbial flora was proposed via probiotic intake with fodder. Passing along the digestive tract they temporarily colonize it and strengthen the protection functions [3,10].

MATERIALS AND METHODS. To assess the impact of

pro-prebiotic preparation Primix-Bionorm K on the nutrient digestibility in young breeding pigs a physiological experiment was conducted at the enterprise "Moldsuinhibrid".

For the research analogous gilts of Landrace breed were selected, which were grouped into 4 experimental groups: control group (CG) and three experimental groups (EG1, EG2, EG3) [8, 9].

Maintenance and feeding conditions were identical for all experimental animals, except that animals in groups E1, E2 and E3 received an amount of tested preparation to the basic ration of the mixed feed in conformity with the experiment scheme shown in table 1.

The chemical analysis of feed remains and faeces was performed in the laboratory for chemical analysis of the Department of General Animal Husbandry [5].

The results were processed biometrically using the computer program Excel [6, 7].

RESULTS AND DISCUSSION. The feeding was performed using balanced mixed feed according to feeding standards [4].

The structure of the basic mixed feed which was used during the physiological experiment is shown in table 2. The growth rate was determined by weighing individual animals. The data on live weight and average daily gain is shown in table 3.

An absolute gain during the period of record of the physiological experiment was obtained in EG2 and EG3 – it was higher by 4.1 and 8.1% in comparison with the CG. Respective the average daily gain per capita was of 0.82 kg in EG3 which is by 7.8% higher in comparison with CG. During the record period which lasted eight days the intake and faeces were recorded.

Analyzing the intake it was found out that the gilts in the experimental groups EG1, EG2 and EG3 consumed more mixed feed respectively by 3.2, 7.8 and 3.3% in comparison with the CG.

Table 1. Scheme of the physiological experiment

Groups	Number of heads per group	Peculiarities of feeding
CG	3	MF – basic mixed feed
EG ₁	3	MF+0.15kg/t Praymix Bionorm K
EG ₂	3	MF+0.30kg/t Praymix Bionorm K
EG ₃	3	MF+0.45kg/t Praymix Bionorm K

Table 2. Structure of the mixed fodder used in the physiological experiment

Ingredients	%
Barley	27.0
Wheat	16.0
Corn	24.0
Wheat bran	12.6
Soybean meal	10.5
Fish meal	2.5
Soybean oil	4.0
Premix 2231	2.0
Chalk	1.4

Table 3. Live weight and the weight gain of the animals during the physiological experiment

Specification	Groups ($\bar{X} \pm S_x$)			
	CG	EG ₁	EG ₂	EG ₃
at the beginning of the preparatory period of the experiment, kg	37.33±21.58	36.00±20.81	37.33±21.58	37.00±21.39
at the beginning of the experimental period, kg	39.61±22.89	38.27±22.12	39.69±22.95	39.45±22.81
at the end of the experiment, kg	45.67±26.40	44.33±25.63	46.00±26.59	46.00±26.59
absolute gain, kg	6.06±3.50	6.06±3.50	6.31±3.64	6.55±3.64
average daily gain, g	0.76±0.44	0.76±0.44	0.79±0.46	0.82±0.46

The data on excretion it was found out that the gilts in EG₁ and EG₂ excreted a bigger quantity of faeces compared with the control group by 7.8 and 1.1% respectively. The gilts the ration of which was supplemented with pro-prebiotic preparation Praymix Bionorm K at the level of 0.45 kg / t excreted a smaller quantity of faeces – by 0.81% compared with the CG.

The determination of both ingested and excreted nutrients were made at the end of the experiment using media collected samples.

The digestibility of the nutrients of the mixed fodder supplied with pro-prebiotic preparation was assessed by calculating the digestibility coefficients (tab. 4).

Fig. 1. Record of the intake and the excretion in the physiological experiment

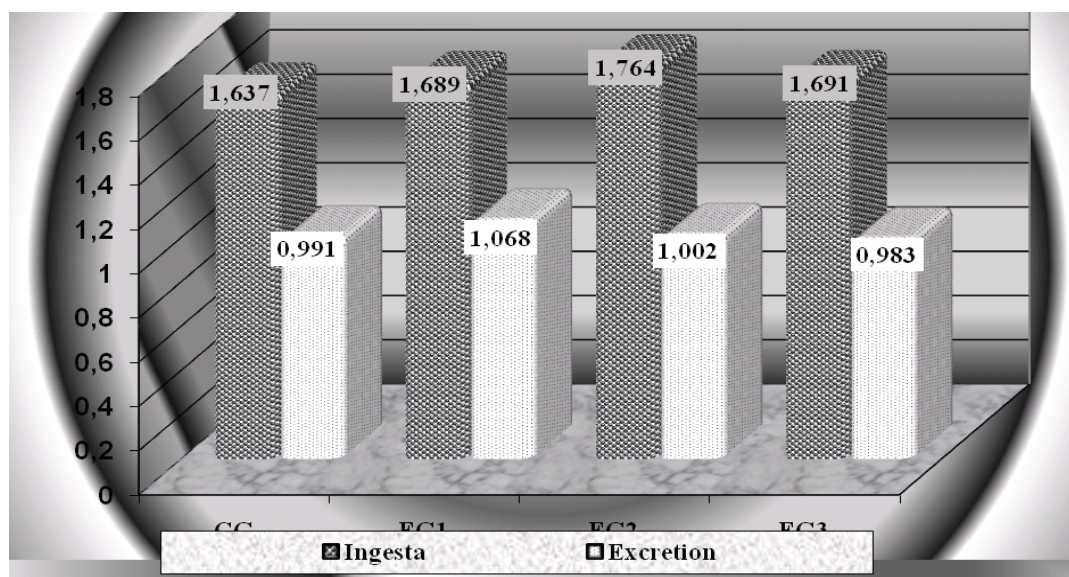
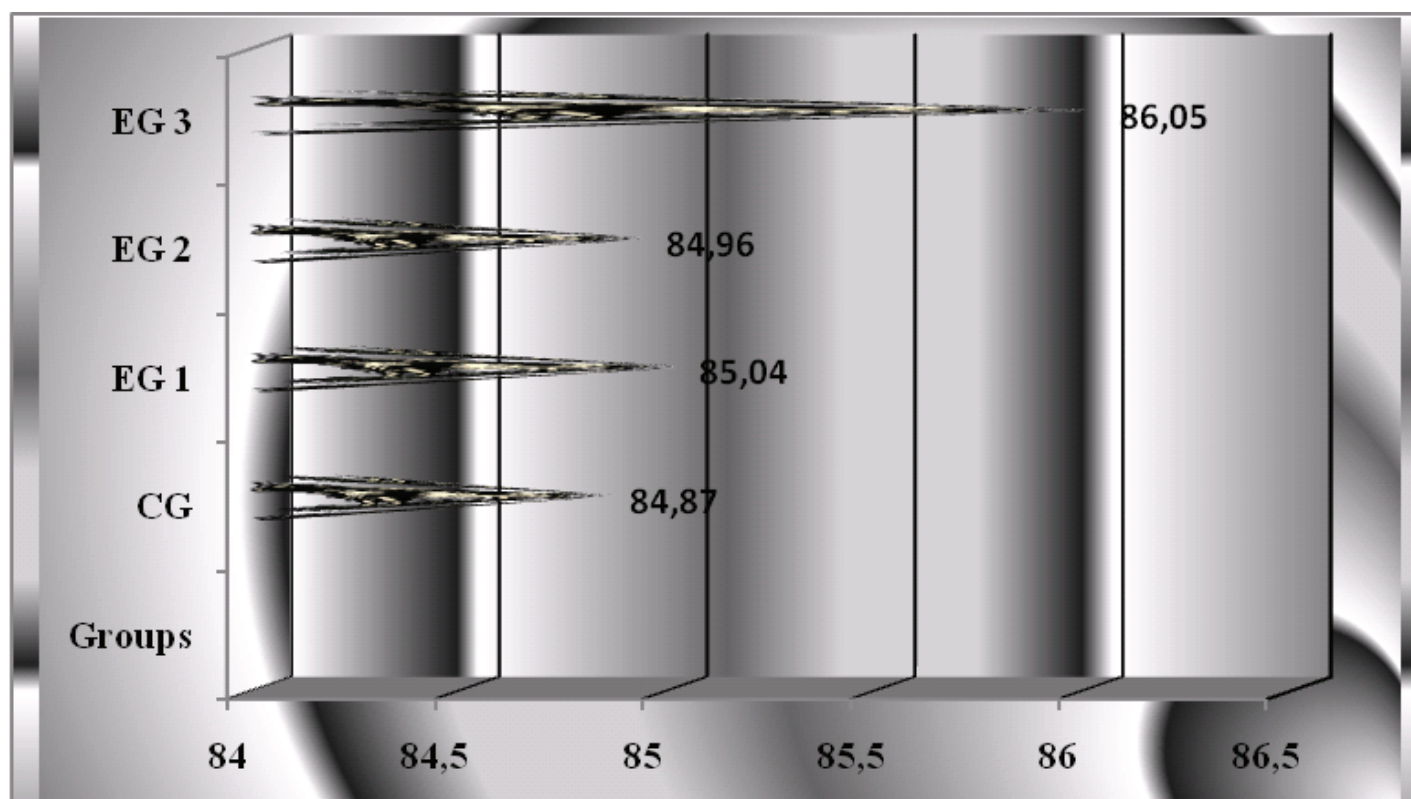


Table 4. Digestibility coefficients of nutrients in the physiological experiment

Groups	Indexes	Organic substance	Crude protein	Crude fat	Crude cellulose	Crude non-nitrogenous extractive substances
CG	$\bar{X} \pm S_x$	84.87±49.06	77.44±44.76	74.06±42.81	36.90±21.33	91.50±52.89
	$S \pm S_s$	0.35±0.14	3.14±1.28	2.58±1.05	1.19±0.49	0.20±0.08
	$C_v \pm S_{C_v}$	0.41±0.17	4.05±1.65	3.49±1.42	3.24±1.32	0.22±0.09
EG ₁	$\bar{X} \pm S_x$	85.04±49.16	75.04±43.38	67.66±39.11	38.30±22.14	93.07±53.80
	$S \pm S_s$	0.259±0.11	2.21±0.90	5.92±2.42	2.05±0.84	0.58±0.24
	$C_v \pm S_{C_v}$	0.305±0.12	2.95±1.20	8.76±3.57	5.35±2.19	0.62±0.25
EG ₂	$\bar{X} \pm S_x$	84.96±49.11	73.85±42.69	69.45±40.15	42.02±24.29	92.76±53.62
	$S \pm S_s$	0.57±0.23	3.30±1.35	3.44±1.41	7.89±3.22	0.80±0.33
	$C_v \pm S_{C_v}$	0.67±0.27	4.47±1.83	4.96±2.02	18.79±7.67	0.87±0.35
EG ₃	$\bar{X} \pm S_x$	86.05±49.74	78.01±45.09	75.11±43.41	49.27±28.48	92.22±53.31
	$S \pm S_s$	0.80±0.31	2.03±0.83	1.99±0.81	2.72±1.11	0.43±0.17
	$C_v \pm S_{C_v}$	0.93±0.38	2.60±1.06	2.65±1.08	5.51±2.25	0.46±0.19

Fig 2. Digestibility of organic substance, %



It was observed that the digestibility of the organic substance was higher in young pigs EG3 by 1.39% and 1.19% respectively compared with the CG and EG1.

Protein digestibility was in the CG 77.44, EG1 – 75.04, EG2 – 73.85, and EG3- 78.01%, which is 0.74% and 3.96% higher than in the CG and EG1.

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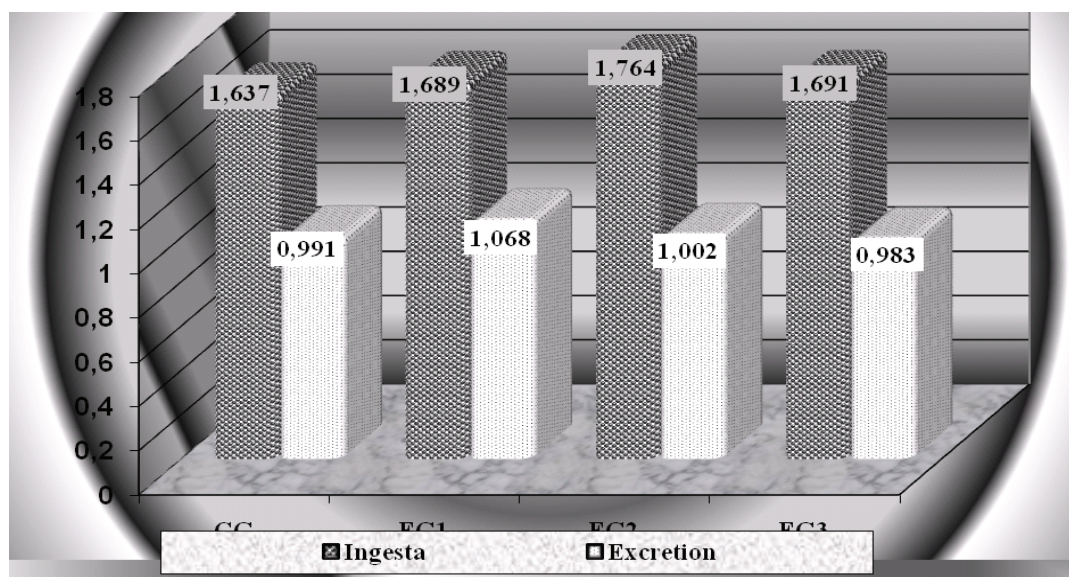


Fig. 3. Digestibility of crude fat and crude protein, %

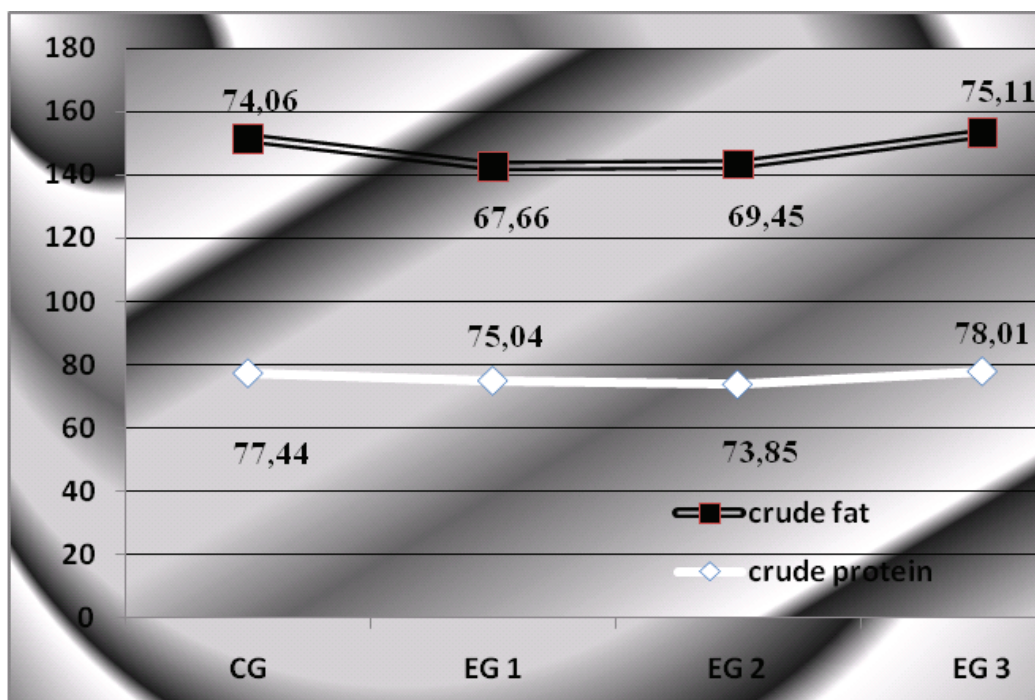
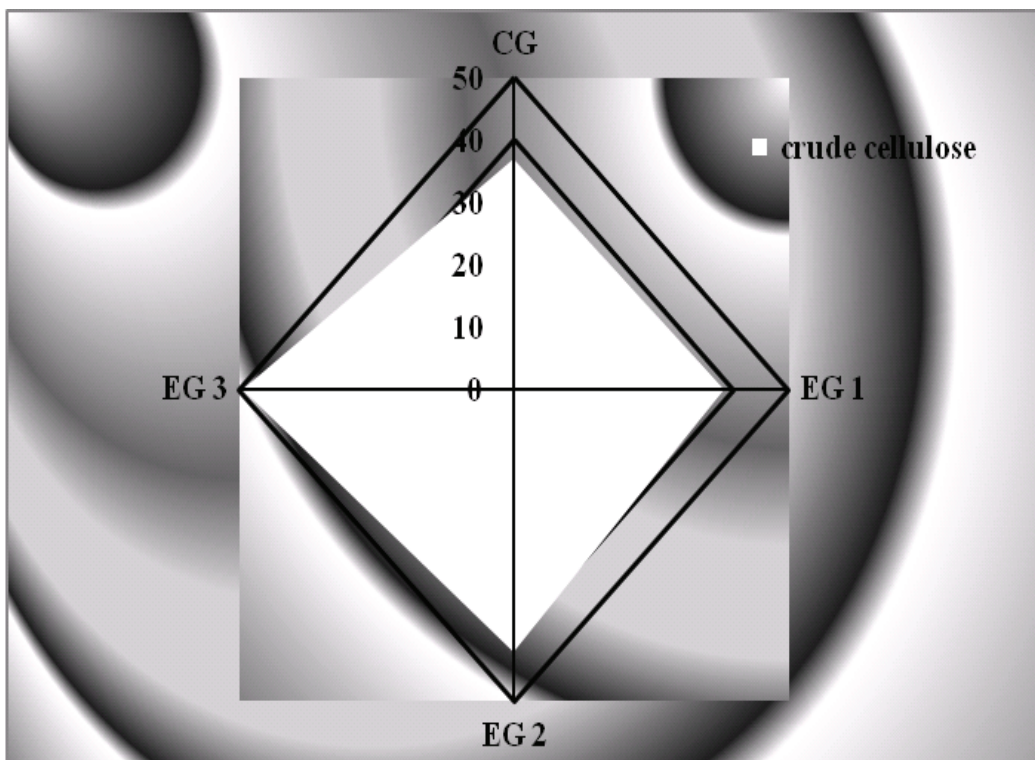


Fig. 4. Digestibility of crude cellulose, %



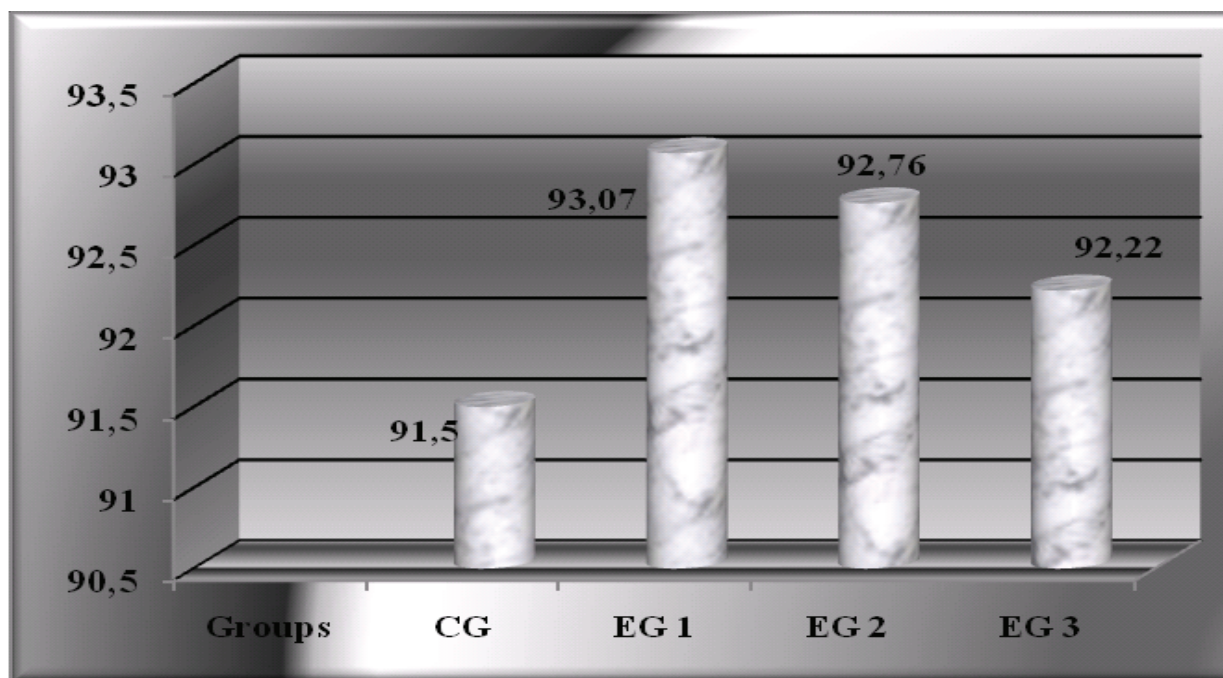
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Protein digestibility was in the CG 77.44, EG1 – 75.04, EG2 – 73.85, and EG3- 78.01%, which is 0.74% and 3.96% higher than in the CG and EG1.

The digestibility of crude fat was lower in EG1 – 67.66%.

The gilts in EG3 which received the preparation Primix-Bionorm K at the level of 0.45 kg/t of mixed fodder showed a higher digestibility – by 1.42% compared with the CG, by 11.01% compared with EG1, and by 8.15% compared with EG2, the ration of which was supplemented with the tested preparation at the level of 0.30 kg/t.

Fig 5. Digestibility of non-nitrogenous extractive substances



It was observed that the digestibility of crude fibre was the highest in the gilts in EG3 – 49.27%, which was by 33.52% and 28.7% higher than in the CG and EG1 respectively.

Data on the digestibility of non-nitrogen extractive substances showed that the gilts in EG1 achieved the coefficient of 93.07%. The gilts in the CG and EG2 achieved the coefficient of 91.50% and 92.76% respectively, which was by 1.69% and 0.3% less than in EG1.

CONCLUSIONS

1. As a result of the supplementation of the basic mixed fodder with pro-prebiotic preparation Praymix Bionorm K at the level of 0.45 kg / t (EG3) during the growth of

the breeding sows, an absolute increase in weight has been obtained during the physiological experiment, and namely by 8% higher compared with the CG and EG1.

2. The digestibility of dry substance has increased by 1.25% in EG3 compared to the CG, and of the organic substance by 1.39% respectively. The crude protein and crude fat digestibility have been 78.01 and 75.11% in EG3, which is 0.74% and 1.42% higher compared to the CG. The level of 0.45 kg / t of the preparation Praymix K Bionorm has a positive influence on the digestibility of crude cellulose at the level of 49.27% in EG3, which is higher by 33.52-28.7% in comparison with the CG and EG1.

REFERENCES

1. Ängovatov V., 2008. New antimicrobials – an alternative to antibiotics. Свиноводство. № 6. p. 27 – 29.
2. Cucu I. ş .a. , 2004. Scientific research and elements of experimental technique. – Ed. Alfa Iaşi, ISBN 973-8278-36-8, 388 p.
3. Crasnicova L., 1992. Bifidobacteria and their use in dairy industry. – M.: АгроНИИТЭИ, - 248p.
4. Kalaşnicov A., 2003. Standards and rations of animal feeding. – M.: Колос, -374 с.
5. Lebedev P., 1970. Usovici A., Research methods of fodders, and animal organs and tissues. – Moscow: Rossel'hozizdat, 475p.
6. Ovseanikov A., 1976. Fundamentals of experimental work in animal husbandry. Колос, Moscow, - 304p.
7. Plohinschii N., 1969. Guide to biometrics for zootechnicians. – Moscow: Izd. Colos, - 255p.
8. Pocerneaiev F., 1977. Research methods in pig breeding. – Haricov.
9. Victorov P., 1983. Methodology of experimental work in animal husbandry. – Krasnodar, 97p.
10. Stegnii B., 2005. Prospects for the use of probiotics in animal husbandry. Ветеринария, №4. p. 10-11.
11. www.pig333.com/nutrition/pig_article/3758
12. www.jas.fass.org/content/early/2010/06/18/jas.2009-2308full