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PROBIOTICS IMPROVE PIG PRODUCTION PROFITABILITY

Probiotics are preparations containing live microorganisms belonging to the normal, physiological, and evolutionary-based flora of the intestinal tract, and they are used as feed additives. They have a positive effect on the host organism.

Probiotic preparations include lactobacilli, bifidobacteria, bacilli, yeasts, enterococci, etc. The normal intestinal micro flora is involved in maintaining the colonization resistance of the intestinal mucosa and plays an important role in protecting against disease. The scientists have discovered that probiotics provide a physiological value of many body systems related to the formation of the immune system and the local immunity of intestinal mucosa, hormonal and endocrine systems.

The mechanism of probiotics action is manifested in their ability to actively colonize the gastrointestinal tract, to produce biologically active metabolites which provide them with survival in the fight against pathogens.

The aim of our work was to determine the feasibility of animal production and economic efficiency of probiotic preparations "Bacell," "Monosporin" and "Prolam" in the diets of pregnant and lactating sows as well as piglets from birth to slaughter.

The scientific and economic test was held in the Krasnodar region at the farm "RASSVET" (North-Caucasus Institute of Animal Husbandry). For these purposes sows with farrow were selected, all of them were analogs in terms of productivity, age, weight, number of farrowing, farrow, milk production.

Table 1

Experimental design

Group	Number of sows	Number of piglets	Feeding terms	
			sows	piglets
1 control	5	40-50	BR (base ration)	BR (base ration)
2 experimental	5	40-50	BR + «Bacell» 0,3 % feed weight + «Monosporin» 10 ml per head 10 days prior to farrowing	BR + «Monosporin» 10 ml per head*
3 experimental	5	40-50	BR + «Bacell» 0,3 % feed weight	BR + «Prolam» 3 ml per head 7 /7 days from starting feed eating

* Piglets were administered 2 ml probiotics with feed per head three days before and after weaning for three days.

As can be seen from Table 1, the control group of pregnant and lactating sows received the basic balanced diet. Sows of the second and third experimental groups received the same ration, but with the addition of probiotic "Bacell" 0,3% by weight of feed a month before farrowing. The farrowing sows of the second group received 10 ml "Monosporin" per head 10 days before farrowing.

The use of probiotics "Bacell" and "Monosporin" in the diets of pregnant sows of the second group one month prior to farrowing in an amount of 0,3% by weight of feed has increased the weight of the new-born piglets 10,7% compared to the control. In the third group of sows that received only probiotic "Bacell," this index increased 8%. The number of stillborn piglets was noticeably less in the experimental groups. Milk production in sows of the second and the third groups was slightly increased, 14,4% and 8,8%, respectively, compared with the control. The loss of sow body weight during lactation in the experimental groups was less compared to control (23,6% and 20,3%, respectively).

After farrowing the piglets of the first group received base ration. The experimental piglets (second group) were administered "Monosporin" at the rate of 1 ml per 1 head orally by syringe from the 1st day of life to the 8th day. Then three days before weaning and for three days after weaning, the piglets were administered the preparation at the rate of 2 ml per head with food.

The piglets of the third group were administered "Prolam" added to feed at the rate of 3 ml for 7 days with the same interval before weaning from the date they started getting feeds.

The piglets born to sows treated with probiotics in their ration were larger than their control counterparts (10,8% and 7,7%, respectively, which was significant ($P < 0,05$). The piglets of the first and second groups grew and developed approximately in the same manner. It is noticeable that the third group of piglets receiving probiotic "Prolam" starting from the 21st day of life were growing and developing faster than their peers, the value is significant at $P < 0,05$. The average daily live weight gain of these piglets was 14,7% higher than in the control group.

Piglets daily feed intake of the control group was 4% higher than in the second group, and was 492 g versus 473 g. In the third group this value was 513 g, i.e. 4,3%. higher than of the control group. Accordingly, the used feed per 1 kg of live weight gain in the first group was 1,86 kg, while in the second group it was 1,83 kg, a decrease of 1,4%, and in the third group it was 1,67 kg, i.e. 11,2%.less than the control group.

The survival of piglets receiving probiotic preparations "Monosporin" and "Prolam" was high: 82,6; 85,1 and 90,9%. It should be noted that the control group piglets received antibiotics (trichopol and Biovit-80) to control infections and diarrhea, and the **piglets of test groups were administered only probiotics.**

Cost of 1 kg gain in the control group was 79,26 rubles, in the second group it was 75,87 rubles and in the third – 69,53 rubles. The profitability of growing piglets was, respectively, in each group: 152,4; 163,6 and 187,6%. The economic effect per 1 head from the resulting additional increase in body weight in the second group was 11,4 rubles, and the third – 480,7 rubles.

After weaning piglets at 2 months of age, the study of the impact of probiotics "Prolam" and "Bacell" on fattening pigs zootechnical performance was continued. For this purpose, three groups of analog pigs were formed with similar live weight and growth rate and, they had 15 days of balancing period according to the established procedure.

The experimental design is shown in Table 2. During rearing, at the age from 2 to 4 months, the pigs of the control group received base ration. Piglets of the second experimental group received the base ration with "Bacell" 0,3% by weight of feed. Animals of the third group received the base ration with "Bacell" 0,3% by weight of feed and the probiotic "Prolam" 7 x 7 days at the rate of 5 ml per head.

Fattening pigs of the second and the third experimental groups received the probiotic "Bacell" 0,33% by weight of feed.

The average daily live weight gain during the rearing of pigs of 2-4 months in the first group was 635 g, the second – 708 g ($P \leq 0,05$), which was significant, and the third – 734 g ($P \leq 0,01$) exceeding the values of the control group 11,5 and 15,6%, respectively. Cost of feed per 1 kg of live weight gain In the experimental groups decreased 11,3 and 11,8%, respectively. Cost of 1 kg of live weight gain decreased in the second group 8,6%, in the third 9,5%, compared with the control group.

Table 2

Experimental design

Group	Number of heads	Feeding design
During rearing		
1 control	15	Base ration (BR)
2 experimental	15	BR + «Bacell» 0,3 % feed weight
3 experimental	15	BR + «Bacell» 0,3 % feed weight + « «Prolam» 5 ml per head 7 /7 days
Fattening pigs		
1 control	15	Base ration (BR)
2 experimental	15	BR + «Bacell» 0,33 % feed weight
3 experimental	15	BR + «Bacell» 0,3 % feed weight

The additional profit obtained per each head in the second group was 1008,3 rubles, in the third group it was 1132,9 rubles.

The use of probiotic "Bacell" added to feed in the amount of 0,33% by feed weight is cost-effective. The average daily live weight gain increased in the second group 4,1%, in the third – 16,8%, compared to control. Profitability increased in the second group 5,8%, in the third group it was 9,5%. For each head of fattening pigs additional profit obtained was: in the second group – 102,4 rubles, in the third group it was 234,8 rubles.

At the end of the feeding test three pigs from each group were slaughtered to examine meat and fat production. Before the slaughter pigs were subject to fast.

The main results of the control slaughter are presented in Table 3.

The data in Table 3 show that carcass yield in the second and third groups was significantly higher compared to control animals: 3 and 5%, and the weight at slaughter in the second group was higher 8,9%, and the third - 26%.

Table 3

Pig meat and fat output

Indices	Group		
	1	2	3
Number of animals	3	3	3
Live weight before slaughter, kg	87,3±2,9	91,3±1,9	102,3±1,2***
Destructive mass, kg	62,9±2,5	68,5±1,4*	79,3±1,5***
Slaughter yield,%	72,0±0,6	75±0,03***	77,5±0,5***
Length of a side, cm	99,7±0,9	102,3±1,45	104,7±1,2***
Width of a side, cm	35,3±1,2	37,1±0,7	40,0±0,3***
Back fat thickness, mm: top of shoulder	36,3±3,7	37,7±2,3	38,7±1,3
at the 6-7th thoracic vertebrae	27,7±1,7	33,0±2,0	31,7±4,4
at the 1st lumbar vertebra	26,3±3,2	28,0±4,4*	29,7±3,5
average at the sacrum	23,3±3,3	22,7±3,7	30,0±3,6
Eye muscle area, cm^2	38,0±1,2	39,7±0,3	38,3±1,2

* - P<0,05; ** - P<0,01; *** - P<0,001

The use of probiotics "Monosporin", "Prolam," "Bacell" gave the following results: carcass meat yield was 36,7 kg in the second group of test animals, or 53,6% of carcass weight, in the third group it was 42,2 kg or 52,7%, while in the first group – 32,4 kg or 51,3%.

It is noticed that percentage of fat yield in the experimental animals is lower than in the controls: Group 1 – 35,4%, Group 2 – 33,1%, Group 3 - 34%.

The average cost-effectiveness of adding probiotics to the pig rations is presented in Table 4.

Table 4

Cost-effectiveness of adding probiotics to the pig rations

Indices	Group		
	1	**2**	**3**
Gross body weight per head, kg	93,4	99,16	104,9
Cost of feed, rubles	2770	2735,7	2926,3
Cost of biopreparations and probiotics, rubles	463	515	509
Total cost of feed and preparation per head	3233	3250,7	3435,3
% to control	100	100,5	106,2
General and other costs, rubles	2176	2149,3	2298,7
Total costs, rubles	5409	5400	5734,6
Sold body weight gain, rubles	6818,2	7238,7	7657,7
Profit, rubles	1409,2	1669,7	1736,7
% to control	100	118,5	123,2
Additional profit per head, rubles	-	260,5	327,5
Self-cost of 1 kg live weight gain, rubles	**57,91**	**54,45**	**50,85**
% to control	100	94,0	87,8
Profitability level,%, %	26,0	30,9	30,3

Summing up the study of the influence of "Monosporin," "Prolam" and "Bacell" on growth, development and feed cost it can be seen that the use of probiotics increase the feed costs in the second group 0,5%, in the third – 6,2%. However, the gross increase in body weight in the experimental groups was higher, due to which the production costs were reduced and amounted, respectively, 57,91, 54,45 and 50,85 rubles. Additional profit obtained per head was in the second group 260,5 rubles, in the third group it was 327,5 rubles.

Based on these results, we conclude that the ration of pregnant sows a month before farrowing should include probiotic "Bacell," 0,3% by weight of feed, and 10 days before farrowing they should get "Monosporin" 10ml/head per day. To prevent gastro-intestinal diseases in suckling piglets it is recommended to administer the probiotic "Monosporin" in the amount of 1-2 ml for 8 days and "Prolam" 3 ml with feed according to the above scheme. Joint impact of probiotics "Monosporin" and "Prolam" is more effective against diarrhea of piglets. In order to increase the growth rate of rearing piglets it is recommended to add "Bacell" 0,3% and "Prolam" 5ml 7 / 7 days for 1,5 months. "Bacell" 0,3% -0,33% by feed weight can be effectively administered to fattening pigs.