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Effect Of Probiotics On Calves, Weaned Pigs And Lamb Growth.

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ABSTRACT

This study presents the results of the effect of compound feed supplemented with "Vitafort" probiotics on calves, weaned pigs and lambs growth performance and general health. Control and experimental groups of animals are selected from different farms of Republic of Bashkortostan. Using of Vitafort probiotic has a positive effect on growth and increases the live weight of calves up to 10.6%, pigs up to 19.6% and lambs up to 8.8%. The protein digestibility in calves and lambs fed with "Vitafort" probitic was higher for 3.8% and 4.1% than in control groups. Compound feed diet supplemented with probiotics increases the number of bifido- and lactobacteria in intestinal tract and inhibits the concentration of pathogenic flora.
Keywords: feed intake, probiotics, calve, pig, lamb, growth performance

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INTRODUCTION

Animal growth and performance depends on the quality of feeding: content of protein, amino acids, macro- and microelements, vitamins. Livestock production is of great importance in national economy of Russia and requires constant supplying of compound feed [1, 2]. One of the ways to increase the nutritive value of compound feed is to add the biologically active ingredients. Developing and studying new compound feed with addition of probiotics became the fast growing area in animal science. The probiotics are the preparations containing live microorganisms and demonstrate the positive effect to animal body [3, 4].

Mortality of newborn animals can be reached up to 40% on the first week of live because of gastrointestinal diseases and weak immune system of newborn animals [5]. Therefore, use of probiotics in the diet of cattle increases the livability of young cattle and improves feed conversion. 80% of immune system function depends on intestinal activity, vitamin and amino acid synthesis, feed digestion [6, 7]. The probiotics can be used for treating such infectious gastrointestinal diseases as colibacillosis and salmonellosis, useful for restoring the balance of the intestinal microbiota [8].

The purpose of this study is to study the effect of “Vitafort” probiotics on the growth performance of calves, lambs and weaned piglets.

MATERIALS AND METHODS

Calves feeding

Control and experimental group of calves (10 calves in each group) were selected from “Bairamgul” agro farm of Republic of Bashkortostan. The black-white Holstein breed calves were fed with compound feed containing “Vitafort” probiotic. On the first stage, we studied the effect of different dose of “Vitafort” probiotic on growth of calves. First control group of calves did not receive “Vitafort” probiotic, while experimental groups 2, 3 and 4 received daily 0.02, 0.1 and 0.5 ml for every 10 kg of live weight of calves.

Weaned pigs feeding

Studying the effect of feeding “Vitafort” probiotics on growth performance of weaned piglets was carried out at “Ilishevskiy” pig farm of “Baskir Bekon” Company (Republic of Bashkortostan). The study will comprise of two groups, a control group and an experimental group of male and female piglets aged 2 month. Diet ration included complete compound feed SK-5-741. Experimental groups of piglets additionally were fed with “Vitafort” probiotics at the dose of 0.05ml/10 kg of live weight for experimental group 2; 0.1 ml/10 kg of live weight for experimental group 3; 0.3 ml/10 kg of live weight for experimental group 4; 0.5 ml/10 kg of live weight for experimental group 5; 1.0 ml/10 kg of live weight for experimental group 6. Test duration was 60 days.

Lamb feeding

The experiment was carried out at the “SPK-Karaidel” and “Nur+R” farmings of Republic of Bashkortostan. Twenty male and twenty female lambs (110 days old) were divided into four groups and fed with compound feed supplemented with 0.02 ml/10 kg live weight (experimental group 2), 0.1 ml/10 kg of live weight (experimental group 3), 0.2 ml/10 kg of live weight (experimental group 3).

Statistics

Statistical processing of the data was carried out by conventional methods of variation statistics using the Microsoft Excel statistical analysis package. The significance of differences in arithmetic mean was estimated using the Student's t-test, the differences were considered statistically significant at $p < 0.05$.

RESULTS AND DISCUSSION

The effectiveness of using probiotics was evaluated by the dynamics of changing live weight and growth of calves, piglets and lambs (Table 1).

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Table 1: The growing parameters of animals (X± Sx)

Group	Live weight. kg		Daily average gain. g	In % to control group At the beginning
	At the beginning	At the end		
Calves (n=10)				
Control group 1	42.2±0.72	83.7±1.06	684.8±10.36	-
Experimental group 2	42.65±1.06	85.3±1.23	703.8±6.74	102.8
Experimental group 3	42.2±0.94	88.1±1.55*	757.4±11.72***	110.6
Experimental group 4	42.6±0.55	87.25±0.90*	736.8±10.37**	107.6
Weaned pigs (n=10)				
Control group 1	18.2±0.13	39.7±0.19	358.0±1.88	-
Experimental group 2	18.0±0.15	40.1±0.41	368.0±6.90	102.8
Experimental group 3	17.9±0.15	40.7±0.38*	380.0±7.85*	106.1
Experimental group 4	17.9±0.09	41.4±0.51**	392.0±9.30**	109.5
Experimental group 5	17.9±0.14	43.6±0.19***	428.0±3.16***	119.6
Experimental group 6	17.9±0.13	40.8±0.38*	382.0±8.08*	106.7
Lamb (n=10)				
Control group 1	5.4±0.07	29.5±0.41	219.0±3.29	-
Experimental group 2	5.4±0.08	29.8±0.18	221.8±1.48	101.3
Experimental group 3	5.4±0.06	31.6±0.53**	238.2±3.98**	108.8
Experimental group 4	5.5±0.08	29.8±0.29	220.9±2.46	100.9

* – p< 0,05; ** – p< 0,01; *** – p< 0,001

Using of Vitafort probiotic had a positive effect to live weight and growth of calves, piglets and lambs (Table 1). Thus, the calves from experimental group 3 which received 0.1 ml of Vitafort to every 10 kg of live weight showed significantly higher (up to 10.6%, p<0,001) daily weight gain comparing with control group (684.8 g versus 757.4 g) at the end of tests. However, the average daily weight gain of calves from the experimental group 4 fed with 0.5 ml of Vitafort to 10 kg of live weight was 7.6% (p< 0,01). Supplementation the calves diet with 0.02 ml of Vitafort to every 10 kg of live weight had not significantly changed the the live weight gain and growth of calves.

Using of Vitafort probiotic in the diet of weaned pigs at a dose of 0.5 ml to 10 kg of live weight of pigs increased the daily average weight gain up to 19.6-21.5% comparing to control groups.

Addition of Vitafort probiotics in diets of growing lambs of experimental groups significantly increased the daily average weight gain up to 8.8% (p< 0,01) from the control group.

The obtained results on growing animals are directly correlated with the digestibility indexes of nutrients. For example, the protein digestibility in calves and lambs fed with Vitafort probitic (0.1 ml to 10 kg of live weight) was higher for 3.8% and 4.1% than in control groups. Addition of this probiotic at a dose of 0.5 ml to 10 kg of live weight to the ration of weaned pigs increased the protein digestibility up to 5.2% and free-nitrogen extract (FNE) to 5.1% comparing with control group.

Table 2: Digestibility indexes of ration nutrients, % (X ± Sx)

Group	Indicators			
	protein	fat	fibre	FNE
Calves (60 days old) (n=3)				
Control group 1	81.1±0.73	72.1±1.56	33.0±5.26	92.6±0.33
Experimental group 2	83.5±1.97	74.8±3.05	33.9±8.34	93.3±1.09
Experimental group 3	84.9±1.76*	74.7±2.85	35.2±8.69	93.3±1.34
Weaned pigs (120 days old) (n=3)				
Control group 1	73.0±0.76	48.3±0.51	42.1±0.22	87.3±0.85
Experimental group 2	75.1±1.80	52.1±1.45	44.5±1.70	90.3±0.90

Experimental group 3	78.2±1.20*	54.0±2.72	45.8±2.15	92.4±1.55*
Experimental group 4	73.0±1.94	48.5±0.45	41.2±1.55	88.1±0.65
Lambs (120 days old) (n=3)				
Control group 1	60.2±0.87	54.8±1.87	46.6±0.78	58.4±0.65
Experimental group 2	60.7±1.15	55.5±1.77	47.4±0.21	59.1±0.15
Experimental group 3	64.3±0.95*	57.0±1.92	49.6±0.65*	60.5±0.25
Experimental group 4	60.9±3.09	56.0±2.01	48.1±0.27	59.3±0.14

* – p< 0,05

The morphological and biochemical parameters of blood of animals were within the limits of physiologically normal state. However, in experimental groups the concentration of hemoglobin, protein, calcium, phosphorous and gamma globulins were higher with lower content of urea.

Using of probiotics has a positive effect to intestinal colonization by *Bifido- and lactobacteria*.

Table 3: Microorganism community in fecal of animals (X±Sx), lg CFU/g

Group	Indicator		
	Lactobacillus	*Bifidobacteria*	*Escherichia*
Calves (60 days old) (n=3)			
Control group 1	5.5±0.76	6.2±0.66	5.2±0.72
Experimental group 2	6.8±0.86	7.4±0.62	3.8±0.78
Experimental group 3	8.2±0.48*	9.2±0.78*	2.9±0.64*
Weaned piglets (120 days old) (n=3)			
Control group 1	5.3±0.28	8.2±0.15	3.8±0.41
Experimental group 2	6.0±0.58	8.2±0.15	3.5±0.29
Experimental group 3	7.2±0.17**	10.0±0.36**	2.5±0.23*
Experimental group 4	6.5±0.50	8.6±0.30	2.6±0.26
Lambs (120 days old) (n=3)			
Control group 1	8.0 ± 0.20	9.3± 0.21	5.3 ± 0.62
Experimental group 2	8.1 ± 0.95	9.7 ± 0.57	5.1 ± 0.59
Experimental group 3	8.9±0.21*	10.1±0.16*	2.7±0.58*
Experimental group 4	8.3 ± 0.73	9.8 ± 0.34	2.8 ± 1.89

* – p< 0,05; ** – p< 0,01

Thus, using of “Vitafort” probiotic at the dose 0.1 ml to 10 kg of live weight in the diet of calves (experimental group 3) and lambs (experimental group 3), at the dose 0.5 ml to 10 kg of live weight in the diet of piglets (experimental group 3) increases the number of bifido- and lactobacteria in intestinal tract and inhibits the concentration of pathogenic flora.

CONCLUSION

The optimal dose of "Vitafort" probiotics in calves and lamb nutrition was 0.1 ml per 10 kg of live weight and at a dose of 0.5 g per 10 kg of live weight in the diets of weaned pigs. These doses proved to increase the full value of rations as well as the growth and development of animals.

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