

Transverse diameter of pelvic urethra is 6.5 mm, and for the extra pelvic one is 7 mm.

In cranial intra pelvic portion of urethra, seminal vesicles, prostate lobes, vases deferens and urinary vesicle are opened. Between intra and extra pelvic urethra portions, at demarcation place, bulbous-urethral glands are opened.

The *penis* is formed by extra pelvic urethra that is the anatomical base, by two cavernous corps, a sponges corps, vases and nerves, and it have a caudal orientation in repose.

Because of sub-ischiocavernous muscle, in erection, the free extremity becomes cranial. In repose, the length of the penis is 27-29 mm and the diameter between 6.5 and 9 mm.

Ondatra males have two voluminous *seminal vesicles*, formed by a straight portion at the base, and a crutch-like shape proximal portion. The crutch-like shape portion is anchored on the straight one, with a mezo. Extern wall of seminal vesicles is boselated especially on concave site of "crutch". The straight portion of each gland has 62-78 mm length and between 6.5 and 9 mm in diameter. The crutch-like shape portion has 28-44 mm length and between 5 and 7 mm in diameter.

In ondatra, the *prostate* is a complex gland formed by many lobes symmetrically disposed with urethra sides; it has 2 ventral lobes, 2 dorsal lobes and 2 lateral lobes.

Ventral lobes, pear-like shape, have cranio-caudal orientation, and their length is between 25 and 28 mm. Dorsal lobes have 18-25 mm in length, covering basal portion of seminal vesicles on their dorsal side. Lateral lobes, named in the other species (rats) coagulant glands, are disposed on caudo-lateral straight portion of seminal vesicles, having a length of 40-60 mm. Probably, in ondatra the lateral lobes secretion determine (like in rats) the coagulation of seminal vesicle products and formation of vaginal stopper. It is no morphological evident prostate corps, in ondatra.

Bulbous-urethral glands, are pare organs, reddish, blackberry-like shape, symmetrical disposed at the passage way level between intra and extra pelvic urethra. At this last mentioned level, bulbous-urethral glands is opened through a fine duct, having 10-11 mm in length. Each lobe has between 8.5-11 mm in length and 5-7.1 mm in diameter. These glands are placed lateral by rectum, surrounded by a conjunctive tissue, between ischio-cavernous and bulbous-cavernous muscles.

Preputial glands have cream color and there are opened in preputial place, having a musk good smell. There are between 38 and 67 mm in length and their transverse diameter is between 8.8-9 mm and 15-17.5 mm at base and medio-cranial portions, respectively.

References

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PROTECTION OF GASTROINTESTINAL TRACT OF SUCKLING PIGLETS AND WEANED PIGS AGAINST THE INVASION OF BASIC ENTEROPATHOGENS BY PROBIOTIC PREPARATION IMUGUARD P A.U.V.

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Summary

There was performed a study with three groups of pigs (323, 324 and 312 animals in the each group) from the delivery till the age of 56 days in the pig fattening farm DONA Ltd. (Veľké Revišťa, Slovak Republic). Initially, there were used probiotic preparations on the basis of the lactic acid producing bacterium *Enterococcus faecium* M-74 containing $2 \times 10^9 \cdot g^{-1}$ germs in the form of paste (Medipharm CZ Ltd., Czech Republic): a) control group – Lactiferm paste Fe (vitamins A, D3, E and Fe^{2+} ions added), b) 1st experimental group – Lactiferm paste (vitamins A, D3, E added), c) 2nd experimental group – Imuguard P-paste (vitamins A, D3, E and IgY antibodies against pig rotavirus and *Escherichia coli* K88, K99, 987-P, F-18 added). The pastes were applied three times on the 1st, 3rd and 5th day after the delivery of pigs. There were added the following feed premixes containing the germs of *Enterococcus faecium* M-74 into the starter feed mixture COS-6118-Anprovimi for a) the 1st experimental group Lactiferm premix L-5 ($5 \times 10^9 \cdot g^{-1}$ germs), b) the 2nd experimental group Imuguard P-premix ($0.6 \cdot 10^9 \cdot g^{-1}$ germs and 920 mg pasteurized dried activated egg matter containing the same IgY antibodies as Imuguard P-paste). There were measured weight of animals immediately after the birth, on the day of weaning at the age of 28 days and at the age of 8 week. There was observed the health state of pigs and the incidence of gastrointestinal infections.

In the 2nd experimental group (preparation Imuguard P a.u.v. was applied) was lower the total number of diarrhoeic animals in one litter from 1st till 28th day of age by 20.07%, total number of injection application of antibiotic preparations by 48% from the time of delivery till the weaning, mortality of the suckling piglets by 15%. There was observed the lowest number of the diarrhoeic animals in one stall of the 2nd experimental group by 98.48% ($P < 0.05$) and the lowest mortality of the weaned pigs by 33.62% in the period from 28th till 56th day of age.

Introduction

Probiotic preparations are currently an ordinary ingredient of complete diets in which they are applied as a preventive factor against intestinal diseases and positive factor to establish eubiosis (Kumprecht and Zobač, 1998). Positive effects of probiotics on animal growth and feed utilization were also demonstrated in numerous studies. A stabilized strain of the bacteria *Enterococcus (Streptococcus) faecium* M-74 is an efficient ingredient of probiotic preparations Lactiferm and Imuguard P (MEDIPHARM CZ, Ltd., Czech Republic). The useful effect of this bacteria is supported by the IgY antibodies against the basic pig enteropathogens (pig rotavirus and *Escherichia coli* K88, K99, 987-P, F-18) in the preparation Imuguard P. The bacteria *Enterococcus faecium* are Gram-positive cocci. They contribute to sugar fermentation to lactic acid which decreases pH values of the medium to 4.0-4.6. They are a natural component of the intestinal microflora of humans, animals as well as insects. The aim of this study was to determine the relation between the applied probiotic preparation and the occurrence of the infection gastrointestinal diseases and the daily weight gains of suckling and weaned piglets.

Material and methods

The study was performed with three groups of pigs from the delivery till the age of 56 days in the pig fattening farm DONA Ltd. (Veľké Revišťa, Slovak Republic). Piglets were weaned at the age of 28 days. Swine for the production of piglets were chosen before delivery according to the principle of the random selection. There were located 32 swine into each of 3 maternity sections in the equal technological conditions. The suckling piglets (cross-breeds white generous x landras x deutsche pig) from 3 maternity sections were used in the experiment. There were born 323, 324 and 312 animals in the each group, respectively. Initially, there were used probiotic preparations on the basis of the lactic acid producing bacterium *Enterococcus faecium* M-74 containing 2×10^9 g⁻¹ germs in the form of paste (Medipharm CZ Ltd., Czech Republic): a) control group - with the addition of vitamins A, D3, E and Fe²⁺ ions (Lactiferm paste Fe), b) 1st experimental group - with the addition of vitamins A, D3, E (Lactiferm paste), c) 2nd experimental group - with the addition of vitamins A, D3, E and biological substance containing IgY antibodies against the basic pig enteropathogens - pig rotavirus and *Escherichia coli* (K88, K99, 987-P, F-18) (Imuguard P-paste). The probiotic pastes were applied three times on the 1st, 3rd and 5th day after the delivery of pigs. There were added the following feed premixes containing the germs of *Enterococcus faecium* M-74 into the starter feed mixture COS-6118-Anprovimi (nitrogenous compounds 180g.kg⁻¹, metabolizing energy 13 MJ.kg⁻¹, fiber 30-45 g.kg⁻¹, lysine 11.5 g.kg⁻¹, methionine + cysteine 6.5 g.kg⁻¹): a) for the 1st experimental group Lactiferm premix L-5, 5×10^9 g⁻¹ germs (500g.t⁻¹ feed), b) for 2nd experimental group Imuguard P-premix, $0.6 \cdot 10^9$ g⁻¹ germs and 920 mg pasteurized dried activated egg matter containing the same IgY antibodies as Imuguard P-paste (3000 - 3500 g.t⁻¹ feed). The weight of animals was measured three times - immediately after the birth, on the day of weaning at the age of 28 days and at the age of 8 week. The feed and the water were available ad libitum. There were observed the health state of pigs, incidence of gastrointestinal infections as well as weight gains. The content of nutriment was measured in the used feed mixture. There were performed the analysis of some production parameters and the parameters of the health state. The statistical evaluation of the achieved results was performed with the analysis of variation.

Results and discussion

The results demonstrated in Table 1 showed that the both experimental groups of suckling piglets supplemented with the probiotal preparations exhibited a reduced incidence and severity of diarrhoea. The average number of diarrhoeic animals in one litter was lower in the experimental groups (5.74, 6.97) in comparison with the control group (8.72). However, the number of injection applications of antibiotic preparation was lower in the both experimental groups (59, 39) than in the control group (75) from the time of delivery till the weaning.

As far as the occurrence of the diarrhoea in the individual weeks is concerned, the first diarrhoeic animals occurred in the control and in the 1st experimental group in the 2nd week of age. There was observed the statistical difference between the means (65, 8) of the control and the 1st experimental group ($P < 0.05$). On the other contrary, the first diarrhoeic animals were observed in the 2nd experimental group in the 3rd week of age (Table 2).

The percentage of mortality in the 2nd experimental group of suckling piglets was lower (17.63%) compared with the control group (20.74%). As for the weaned pigs, the average number of diarrhoeic animals in one stall was higher in the control and in the 1st experimental group (13.14, 8.33) than in the 2nd experimental group (0.20). The statistical difference was ascertained between the control and the 2nd experimental group ($P < 0.05$). The percentage of mortality in the experimental groups which feed was treated with the probiotic preparations was lower (4.31%, 3.89%) in comparison with the control group (5.86%). The probiotal preparation Imuguard, used in the 2nd experimental group, has a beneficial effect in the prevention and treatment of specific pathologic conditions in the digestive apparatus. There are probably more mechanisms by which the mentioned probiotic enhance the intestinal health, including direct and indirect stimulation of immunity, competition for limited nutrients, inhibition of epithelial and mucosal adherence of pathogenic bacteria as well as inhibition of epithelial invasion. Some of them can be a topic for our future study. The evaluation of the health state data of the animals in the 2nd experimental group indicated that the combination of the probiotic preparation consisting of lactic acid bacteria

Enterococcus faecium M-74 with the biological substance containing IgY antibodies against pig rotavirus and Escherichia coli (K88, K99, 987-P, F-18) are more effective for the prevention of the diarrhoea caused by the mentioned basic pig enteropathogens than the probiotics based only on the lactacidogenic bacterial cells.

Table 1: The health state and the weight gains of pigs

Parameters	unit	group		
		Control	1 st Exp	2 nd Exp
Suckling pigs(1 st day)	pcs	323	324	312
diarrhoeic pigs in one litter	pcs	8.72	5.74	6.97
	SD			pcs 4.52 1.32 1.69
total antibiotic treated animals (inj.)	pcs	75	59	39
mortality	%	20.74	21.29	17.63
starting weight	g	1595	1571	1499
SD	g	255	165	200
daily gain	g.day ⁻¹	241	241	237
SD	g.day ⁻¹	12	15	12
final weight	g	6963	6989	6869
SD	g	354	516	347
Weaned pigs(28 th day)	pcs	256	255	257
diarroeic pigs in one stall	pcs	13.14	8.33	0.20*
SD	pcs	11.36	9.44	0.40
total antibiotic treated animals (inj.)	pcs	0	0	0
mortality	%	5.86	4.31	3.89
final number of pigs (56 th day)	pcs	241	244	247
daily gain	g.day ⁻¹	592	539	544
SD	g.day ⁻¹	103	44	95
final weight	g	14808	12938	13587
SD	g	2578	1730	2370

Legend: * (P<0.05)

Table 2: The average appearance of the diarrhoic state of the suckling piglets in the litters from the birth till the delivery on 28th day of age

Group	Unit	Time			
		1 st week	2 nd week	3 rd week	4 th week
Control	pcs	0	10.83	9.47	7.44
1 st experimental	pcs	0	8.00	10.38	3.67
2 nd experimental	pcs	0	0	10.08	4.91

References

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