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Short communication

EFFECT OF PROBIOTIC *FARM PACK Y* ON MORBIDITY AND MORTALITY AT SUCKLING PIGLETS

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After the EU had decided to ban antibiotics as feed additives, from 1st January 2006, onwards, many experiments were taken to establish other substances with beneficial effect on animals via modification of the gut microflora. Probiotics are one of the most used group of feed additives, so called "alternatives to antibiotics", with prebiotics, organic acids and essential oils. Therefore, the aim of this investigation was to evaluate the effect of probiotic *FARM PACK Y* on the health status and performance of sows and their litters. The trial was taken at an industrial pig farm, on 30 sows and 329 suckling piglets from their litters. The animals were allocated into three groups, according to the different concentration of probiotic: C group was fed without the probiotic supplementation, O_1 group with 0,1% probiotic and O_2 with 0,2% probiotic in the balanced creep feed. This probiotic supplementation started at 100th day of gestation in sows, and terminated at weaning, at 28th day post partum. Piglets of O_1 and O_2 group were fed with probiotic administered in prestarter, from 5th day of birth, till weaning. The results of this trial showed that morbidity and mortality decreased in probiotic groups of piglets.

Key words: probiotic; sows; suckling piglets; morbidity; mortality

ЕФЕКТОТ НА ПРОБИОТИКОТ *FARM PACK Y* ВРЗ МОРБИДИТЕТОТ И СМРТНОСТА КАЈ ДОЈНИ ПРАСИЊА

Откако ЕУ одлучи од 1 јануари 2006 год. да ги забрани антибиотиците како додаток во крмата, беа реализирани повеќе експерименти со цел да се внесат други супстанции со позитивен ефект врз животните преку модификација на микрофлората. Пробиотиците, т.н. „алтернатива на антибиотиците", се едни од најкористените додатоци во храната заедно со пребиотиците, органските киселини и есенцијалните масла. Целта на овој експеримент беше да се оцени ефектот на пробиотикот *FARM PACK Y* врз здравствениот статус и перформансите на маториците и нивните легла. Опитот беше изведен во индустриска фарма за свињи кај 30 маторици и 329 дојни прасиња од нивните легла. Животните беа поделени во 3 групи, зависно од концентрацијата на пробиотиците: групата Ц беше хранета без додавање пробиотик, групата O_1 со 0,1% пробиотик и групата O_2 со 0,2% пробиотик во балансираната исхрана. Додавањето на пробиотикот започна на 100-иот ден од спрасноста на назимките и беше даван до одбивање, т.е. до 28-иот ден по прасењето. Прасињата од групите O_1 и O_2 беа хранети со пробиотик кој беше внесуван во претстартерот од 5-иот ден од раѓањето сè до одбивање. Резултатите од овој опит покажаа дека морбидитетот и смртноста се намалиле кај оние групи прасиња кај кои се употребуваа пробиотици.

Клучни зборови: пробиотик; маторици; дојни прасиња; морбидитет; смртност

INTRODUCTION

Intestinal mucosa is a system, which provides health status of animals, in great deal. It supplies the organism with nutritional ingredients, on the one hand, but it's the barrier which regulates relations between the inner and the external environment. The epithelium of intestinal mucosa has dif-

ferent roles such as digestion and absorption of nutritional ingredients, transport of water and electrolytes, and protection of the host organism from the microorganisms located in the digestive tract (Mahida, 2004). But, epithelial barrier is a dynamic structure that prevents, but not excludes the entrance of pathogens from lumen of the intestine to the tissue. The main task for maintenance of health is decreasing the number of pathogens in the digestive tract, by keeping eubiosa in the intestine. The number and the content of bacterial population in the digestive tract are variable, and depend on the part of the intestine (Jensen, 1998), animal species, age, diet, environment (Pluske et al., 2007), stress and medication (Fuller, 2005). The digestive tract of newborns is sterile, but bacterial species, from faecal content of their mothers, colonize it in a very short period after birth (Demeckova et al., 2002; Taras et al., 2005). That very complex population of microorganisms, colonized in the gut, interacts within itself, but with the host animal, too. If symbiotic microflora is overall, health status and performance of the host animal can be improved. That fact is used as a main reason for applying probiotic for enhancing the health status and performance of animals.

Probiotics are defined as "organism and substances which contribute to intestinal microbial balance" (Parker, 1974), and later Havenaar et al. (1992) applied this definition to human and animal, either, and modified it to "a live microbial feed supplement which beneficially affects the host animal by improving its intestinal microbial balance". Two main mechanisms of their action are nutritional effect and sanitary or health effect (Fuller, 1999). They stimulate the transepithelial movement of glucose in the small intestine and increase significantly the precaecal digestibility of amino-acids (Kovacs-Zomborsky et al., 1994; Simon, 2005), by higher activity of protease in the small intestine (Keuzer, 1994).

Probiotics, applied at late pregnancy to sows, increase serum cholesterol and total lipid concentration in blood, milk fat, protein contents at mid lactation (Stamati et al., 2006) and γ-globulins concentration in colostrums (Karput et Pudenko, 1996).

Probiotics modulate the immune response (Fuller, 2005), by increasing macrophage activity and production of systemic antibody (IgG, IgM and interferon) and local antibody at mucosal surfaces (IgA), such as intestine mucosa. In animals in which the neonate is immunologically immature, and totally dependent on its mother for antibodies, such as pigs, probiotics can accentuate the maturation of the piglet's immune system, if they're administrated during the suckling period. The improved immune status leads to a lower diarrhea score (Jurgens, 1997; Karput et Pudenko, 1996; Hadani et al. 2002; Lazaro et al., 2005; Stamati et al., 2006), higher daily weight gain (Alexopoulos et al., 2001; Zeyner and Boltd, 2006; Stamati et al., 2006), higher piglet's body weight at weaning (Alexopoulos et al., 2004, Milenković et al., 2009) and more weaned piglets/litter (Taras et al., 2005; Zeyner and Boltd, 2006; Milanović Valentina et al., 2009).

MATERIALS AND METHODS

The investigation was carried out at the commercial farrow-to-finish pig farm, with capacity of 1300 sows, with the same genetic background. The farm had twelve separated houses, and its own feed mill.

There're 30 sows and 329 piglets from their litters, used as experimental animals. Pregnant sows moved from the gestation house to the farrowing house at the 100th day of gestation, and allocated in three groups: the C group was without the treatment, the O_1 group was fed with probiotic supplementation in diets in a dose of 1 kg per ton of feed, and the O_2 group was fed with probiotic supplementation in diets in a dose of 2 kg per ton of feed. There're ten sows in each group. This probiotic supplementation terminated at weaning, at 28th day after farrowing.

Piglets in litters of the C group of sows were without the treatment, piglets originated from the O_1 group of sows had probiotic supplementation in creep feed in a dose of 0.1 %, and piglets from the O_2 group of sows had probiotic supplementation in creep feed in a dose of 0.2 % of probiotic. The administration of probiotic for piglets started with creep feeding, at 5th day of age, and terminated at weaning, at 28th day of age.

Sows were fed with feed for gestating and lactating sows. Both diets were typical and balanced, based on corn, soybean meal, sunflowers pallets, feed meal, minerals and vitamins. Diets for gestating sows contained 15.23 % of protein and ME 12.93 MJ/kg of feed, and it was given in the amount of 3.5 kg/sow/day. The diet for lactating sows contained 16.05 % of protein and ME 13.10

MJ/kg of feed, and it was given ad libitum to the sows.

Piglets were fed with creep, balanced feed for suckling piglets, based on corn, wheat, soybean meal, feed meal, PRELAC – milk replacer, minerals and vitamins. This diet contained 20.08 % of protein and ME 11.50 MJ/kg of feed, and it was given from 5th day of age, ad libitum.

Pregnant sows were allocated in the farrowing house, in individual pens, which were equipped with commercial crates for the sow, with a slatted floor, and creep area for the piglets. Every pen had nipple drinkers and separate feeders for the sow and piglets. Each farrowing room had vertically and horizontally ventilation, that keeps temperature between 18–22º C, and locally temperature for the newborns was 28–36º C, due to infra-red electric lamps and a plastic coat with a heat source, on the floor. Relative humidity of the air was about 70–80 %.

All conditions were the same for all animals, so the only difference within the groups was administration of probiotic.

The experimental substance, used in this trial, was multy-species probiotic, contained microbial species *Lactobacillus acidophilus*, *Bacillus subtilis* and yeast *Saccharomyces cerevisiae*. It was applied into experimental diets, which were prepared in the feed mill, at this farm.

During the trial, those data were recorded for piglets such as the number of piglets born alive or dead, morbidity, mortality, the number of weaned piglets, the initial body weight, the body weight at weaning, the daily weight gain, the feed intake and feed conversation ratio, for the suckling period. All data was analyzed statistically with the software package Statistica 6.0.

RESULTS AND DISCUSSION

The results of this trial showed that morbidity was significantly different within the O_2 and the C groups of piglets ($p < 0.05$). Mortality was higher for 44.46 % in the C group than in the probiotic O_1 and O_2 groups (Table 1).

Although the number of totally born piglets/litter was higher in the C group, the number of piglets born dead/litter was also higher, so the number of piglets born alive/litter didn't show some differences within experimental groups. As morbidity and mortality were higher in the C group, there were less weaned piglets/litter, consecutively.

Lower morbidity and mortality in probiotic groups of piglets compared to the C group might be the result of improved immune status at newborns through increased γ-globulins concentration in colostrums (Karput et Pudenko, 1996), or colonization of the piglet's gut with beneficial microflora from the faeces of their mothers (Demeckova et al., 2002). The positive effect of oral probiotics administration at early days of the newborns is proven by the significantly lower gastrointestinal disorders (Abe at al, 1995). Also, administration of probiotics in pregnancy and lactation to sows, as in their litters, at the suckling period, led to lower morbidity and mortality in piglets (Lazaro et al., 2005; Stamati et al., 2006).

Table 1

Litter performance parameters

Experimental group of piglets	C	O_1	O_2
Number of piglets totally born/litter	11.3	10.8	10.8
Number of piglets born alive/litter	9.7	9.8	9.7
Number of piglets born dead/litter	1.6	1.0	1.1
Number of sick suckling piglets/litter	3.6	1.5	0.8*
Number of dead sucking piglets/litter	0.9	0.5	0.5
Number of weaned piglets/litter	8.8	9.3	9.2

*Means differ significantly ($P<0,05$) within O_2 and C group

Higher concentration of γ-globulins in dam's milk (Jurgens et al., 1997), total lipid concentration in blood, milk fat and proteins contents, enhanced the milk quality and improved the health status at piglets (Stamati et al., 2006). Those parameters also improved the weight gain at piglets during the suckling period (Alexopoulos et al., 2001; Zeyner and Boltd, 2006), and higher number of weaned piglets/litter (Taras et al., 2005; Živković et al., 2006; Milanović Valentina et al., 2009).

CONCLUSION

The administration of probiotic *FARM PACK Y* during the late pregnancy and lactation in sows, and in the suckling period in their litters, improved

the piglet's health status, and consecutively their performances. The aim of the probiotic approach, repairing the deficiencies in the microflora and restoring the animal's resistance of disease, was proven. The better health status induced less veterinary intervention, which was cost-saving for production. The improved performance of piglets asked lower economical investment, and completed with previous, brought the conclusion that probiotics are an effective feed supplement for farm animals.

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