

PROBIOTICS IN GILT NUTRITION¹

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Content: Possibility of use of probiotics in nutrition of pregnant and lactating gilts, as well as suckling piglets. Obtained results showed that gilts fed diet containing probiotics farrowed by 5,7% more piglets whose body mass at farrowing was by 7,9% higher, also by 6,8% more piglets were raised compared to parameters obtained with regular nutrition without additional probiotics. Level of utilization of nutritive substances was also better and value of realized piglets higher by 14% at farrowing and by 6,8% at weaning through use of investigated probiotic.

Key words: probiotic, gilts, suckling piglets

Introduction

Modern and profitable pig production demands high level of knowledge in organization of such production. One of the important factors is high standard of hygiene and ability of piglets to adapt to changes of the environment and especially of nutrition.

One of the ways to solve this problem is adapting of the intestine micro flora in order to realize optimal production results of piglets during lactation. Prevention of the effect of pathogen strains such as *Echerichia coli* which is most dangerous in pig production is important. It occurs as consequence of reproduction of non pathogenic bacteria produced through action of lactic acid or can be introduced to organism through food.

Considering increasing limitations in regard to use of antibiotics as growth stimulators, more attention is directed towards "alternative" growth stimulators such as probiotics which have positive effect on animal health (Reuter, 2001; Sinovec, 2001).

Since we already obtained positive results and experience with the use of probiotics in nutrition of sows and piglets (Živković et al., 2003), weaned piglets (Živković et al., 2001) and pigs in fattening (Živković et al., 2004), objective of this paper as continuation of the research of same issues was to study the possibility for use of probiotic Digestaze based on strains of *Bacillus subtilis*, *Lactobacillus bufidus* and *Lactobacillus acidophilus* in nutrition of gestating gilts and gilts in lactation, as well as suckling piglets.

Material and methods

Investigation was carried out on Experimental pig farm of the Institute for Animal Husbandry, Belgrade-Zemun. Trial included total of 12 breeding gilts divided into two groups. According to the technology used on the pig farm, all gilts are inseminated after onset of estrus and after insemination groups were formed and investigation began. Based on standard criteria, origin and initial body mass animals were divided into two groups, 6 gilts in each group, and two nutrition treatments. Nutrition of animals was ad libitum and it consisted of meal mixtures with 16% of crude proteins during gravidity and nursing period and 22% of crude proteins during supplementary feeding of piglets. Water was supplied through automatic waterers.

First group of gilts, control, was fed diet of standard composition used on the experimental pig farm (table 1). Second group of gilts was fed diet of same composition but with additional probiotic Digestaza 1000 produced in USA and imported by West Chemie from Belgrade in concentration of 0,004%. Gilts were fed during gravidity with 3,0 kg/head daily, and during lactation as well as supplementary feeding of piglets were ad libitum.

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Table 1. Scheme of the experiment with gilts

Group	1	2
<i>Gestating gilts</i>		
Probiotic during gestation period, %	-	0,004
Feed/head/day	3,0	3,0
<i>Lactating gilts</i>		
%, Probiotic during lactation	-	0,004
Feed/head/day	ad libitum	ad libitum
<i>- Suckling piglets</i>		
%-Probiotic during lactation	-	0,004
Feed/head/day	ad libitum	ad libitum

Probiotic Digestaza 1000 was added in mixture both gilts and suckling piglets in concentrations 0.004% /

As criteria for evaluation of obtained results following parameters were used: consumption of food per sow and feeding day, body mass of sows prior to farrowing, number of farrowed piglets, losses at farrowing, body mass of piglets at farrowing, body mass of piglets at weaning, body mass of sows at weaning, gain of piglets during lactation, level of utilization of nutritive matters at the end of gravidity and economical justification for use of investigated probiotic in mixtures.

Obtained data was processed using traditional methods of statistical processing, variance analysis and data on average values with t-test.

Results and discussion

In this trial, the possibility of introduction of probiotic Digestaza 1000 to nutrition of gilts was investigated.

Production results

Obtained results (table 2) showed that gilts of the first – control group fed diet without investigated probiotic in mixture, at the end of gravidity in average weighed 155 kg, whereas gilts from the second group, trial group, fed diet containing the investigated probiotic weighed in average 169 kg. At the end of nursing period no significant difference in body masses of gilts could be established. Greater loss of body mass during lactation of 16,63% against 10,01%, in gilts of trial group on probiotic can be attributed to better utilization of nutritive matters.

Table 2. Performance of gilts and suckling piglets in experiment

Group	1	2
<i>Gestating gilts</i>		
% – Probiotic during gestation period	-	0,004
kg – Body mass of gilts before farrowing	155,0	169,20
<i>Lactating gilts</i>		
Probiotic during lactation	-	0,004
Average daily feed consumption, kg	3,77	3,75
Body mass of gilts at weaning, kg	139,5	140,7
Loss of body mass of gilts during lactation, %	10,01	16,63
<i>Suckling piglets</i>		
% - Probiotic during lactation	-	0,004
Duration of lactation, days	39	38,0
Aver. Number of born piglets/litter	8,83	9,33
Aver. Number of weaned piglets/litter	7,17	7,67
Losses at farrowing, head/litter	1,66	1,67
Aver. body mass of piglets at farrowing	1,39	1,50
kg-Aver. body mass at weaning	7,04	7,01
g – Av. daily gain of suckling piglets	146	145

Probiotic Digestaza 1000 was added in mixture both gilts and suckling piglets in concentrations 0.004% /

During lactation, no significant difference in food consumption between gilts in two groups was established.

It was established that investigated probiotic in mixture influenced more live born piglets by average 0,50 piglets or 5,66% in litter compared to control group.

If investigated probiotic is used, body mass of piglets at farrowing increases by 0,11 kg or 7,91% compared to piglets from sows fed same mixtures but without additional probiotic.

Losses of piglets during lactation were almost the same in both groups.

At the end of lactation use of probiotics caused more weaned piglets in average by 0,49 piglets or 6,83% compared to control group. No significant difference in body mass of piglets at weaning between two groups was established.

Level of utilization of nutritive matters

Obtained results regarding this parameter showed that introduction of investigated probiotic into mixture improves the level of utilization of dry and organic matter, crude proteins, fat and fiber in gestating gilts (table 3).

Table 3. Digestibility of nutrients for gestating gilts, %

Group	1	2
Probiotic during gestation period	-	0,004
<i>Nutrients</i>		
Dry matter	76,06	78,04
Organic matter	80,01	81,20
Crude protein	67,51	71,85
Ether extracts	64,59	74,76
Crude fiber	52,30	52,53
Nitrogen free extracts	87,01	86,79

Probiotic Digestaza 1000 was added in mixture both gilts and suckling piglets in concentrations 0.004% /

Economical indicators

Economical analysis of cost of mixture (table 4) showed that by introduction of probiotic Digestaze 1000 into mixtures increases the cost of diet for gilts during gravidity by 3,28% compared to mixture without this additive. During nursing period this increase is 3,28%, and during the period of supplementary feeding of piglets it was established that use of probiotics increases the cost of mixture by 1,96%.

In all investigated stages of production within the trial use of probiotic Digestaze 1000 caused increase of cost of nutrition by 2,64%.

Based on value of realized piglets at farrowing it can be concluded that use of probiotic Digestaze 1000 improved piglet production by 14,02% at farrowing and 6,83% at the end of nursing period compared to parameters obtained in control group – piglets realized in group of gilts receiving standard mixture without additional probiotic.

Obtained results indicate positive effects of inclusion of probiotic into mixtures for sows (Zani et al., 1998) expressed through better production, (Pupavac et al., 2000; Ignatova, 2004) better fertility and reduced occurrence of MMA in sows (Young et al., 2002; Alexopoulos et al., 2004) as well as reduced occurrence of diarrhea in piglets (Toride et al., 1998). This is attributed to ability of probiotic to survive inside the stomach and small intestines (Reuter, 1997), increase of fatty acids of short chain (Jadamus et al., 2002), alkali protease (Kumprecht et al., 1994), as well as increase of glucose content in small intestines of piglets (Ruchen and Simões-Nunes, 1995).

Table 4. Economic analysis of the use probiotic in the experiment

Group	1	2
<i>Gestating gilts</i>		
Probiotic during gestation period	-	0,004
% - Price of diets	100,00	103,28
Feed consumption/head/day	3,0	3,0
% - Feed value/head	100,00	103,28
<i>Lactating gilts</i>		
Probiotic during lactation	-	0,004
% - Price of diet	100,00	103,28
Feed consumption/head/day	3,77	3,75
% - Feed value/head	100,00	101,13
<i>Suckling piglets</i>		
Probiotic during lactation	-	0,004
% - Price of diet	100,00	101,96
Feed consumption/head/day	0,84	0,84
% - Feed value/head	100,00	101,96
<i>Total costs before farrowing of piglets</i>		
% - Total cost of feed	100,00	102,64
% - Value of produced piglets. %	100,00	114,02
<i>- Total costs before weaning of piglets</i>		
% - Total cost of feed	100,00	102,64
% - Value of produced piglets. %	100,00	106,83

Conclusion

In trial carried out on gilts during gestation period and lactation, as well as suckling piglets possibility for use of probiotic Digestaze 1000 in nutrition of mentioned categories of pigs was investigated. Obtained results have shown that:

- There was no difference in consumption of food in gilts during lactation. Nutrition of gilts with mixture containing probiotic caused increase in number of farrowed piglets by 5,7%, higher body mass at farrowing by 7,9% and more raised piglets by 6,8% compared to results achieved by animals fed diet without additional probiotic. Level of utilization of nutritive matters was better when probiotic was used. Cost of mixture increased with use of probiotic in average by 2,6%, but value of realized piglets also increased by 14,0% at weaning and by 6,8% at weaning.

In general, obtained research results have shown that introduction of investigated probiotic was justified and its use in nutrition of gilts is recommended.

PROBIOTIK U ISHRANI KRMAČA I PRASADI NA SISI

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Rezi me

U ogledu izvedenom na nazimicama tokom suprasnosti i laktacije kao i prasadima na sisi ispitivana je mogućnost korišćenja probiotika pod nazivom Digestaza 1000 u ishrani ove kategorije svinja. Dobijeni rezultati su pokazali sledeće:

Nije bilo razlike u konzumaciji hrane kod nazimica tokom laktacije. Ishrana nazimica smešom sa probiotikom je dovela do za 5,7% većeg broja oprasene, sa 7,9% većom telesnom masom na prašenju, kao i za 6,8% više odgajene prasadi u poređenju sa pokazateljima ostvarenim na obroku bez dopunskog probiotika. Stepem iskorišćavanja hranljivih materija obroka je bio bolji uz korišćenje probiotika. Cena smeše sa probiotikom se povećava u proseku za 2,6%, ali se povećava vrednost realizovanih prasadi, za 14,0% na prašenju i za 6,8% na zalučenju.

U celini dobijeni rezultati istraživanja su pokazali da se uvođenjem ispitivanog probiotika pokazalo opravdanim, te se preporučuje njegovo korišćenje u ishrani nazimica.

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