

EFFECT OF PROBIODOR SUPPLEMENT ON PRODUCTIVITY OF SOWS FED ORGANIC FEEDS

DJELOVANJE DODATKA PROBIODORA NA PROIZVODNOSTI KRMAČA HRANJENIH ORGANSKIM KRMIVIMA

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SUMMARY

The possibility of improving sows reproductive indexes by supplementation of feed mixtures with Probiodor containing diatomite and bipolarity microelements was investigated in the experiment carried out on 58 sows (PL x PLW) fed ecologically.

Sows in control group (21 animals) were fed restricted standard feed mixture. Sows in the group II in addition to experimental feed mixture received *ad libitum* silage made of whole maize plants, and group III - grass silage. The Probiodor supplement was used for 9 sows in control group, 8 sows in group II and 7 in group III. All piglets were weaned at 42nd day of age and the experiment lasted till 84th day of age.

Results of the experiment show that sows receiving Probiodor chrsad higher body weight gains between mating and farrowing (by 9 - 13 kg) and from mating to weaning (by 1.2 - 10.9 kg). However, bigger body weight loss during lactation was observed in experimental sows when compared with controls. Probiodor supplementation increased the number of born piglets in litter by 0.35 in the control group 0.73 in group II and 1.12 in group III. A little lower mortality was noticed in piglets of sows receiving Probiodor. Their body weight was higher, especially between 42nd - 63rd day of age by 29 g in group II and 113 g in group III.

Key words: sows, piglets, Probiodor, body weight

INTRODUCTION

According to the principles of organic nutrition bulky feeds, most by forages and silages, should be used in dietary rations for pigs. These feeds have a short storage life and contain micro-organisms that cause digestive disorders and increase the amount of harmful metabolites when they multiply. One of

the ways of reducing these unfavourable processes is to feed pigs on acidifiers that reduce the amount of micro-organisms in the digestive tract and on sorbents that absorb many unwanted endogenous

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substances (Kirchgessner and Roth, 1988; Korniewicz et al., 1996; Korol, 1995; Urbańczyk and Hanczakowska, 1995; Wetscherek et al., 1990). Nowadays various preparations containing both an acidifier and detoxifiers which positively affect the performance of piglets are available (Hanczakowska et al., 2000).

The aim of the present study was to determine the possibility of improving reproductive parameters of organically fed sows by Probiodor supplement that contains organic acids, diatomite, and trace polar micronutrients.

MATERIAL AND METHODS

The study's was carried out on 58 (PL x PLW - Polish Landrace x Polish Large White) sows divided into 3 feeding groups:

Group I - the control group (21 sows), given feed rations according to Pig Feeding Requirements of the Polish Academy of Sciences (Normy..., 1993);

Group II - an experimental group (19 sows), given feed rations containing ground cereals, field bean, rapeseed cake, and *ad libitum* maize silage;

Group III - an experimental groups (18 sows), was feed similarly to group II, with maize silage replaced with grass silage.

In each group 7 - 9 sows received a diet containing 0.2 - 0.25 % of the Probiodor preparation. This supplement contains diatomite, salts of lignosulfonic acid, calcium magnesium silicate, organic acids (acetic, malic, tartaric, citric) and trace polar micronutrients. All sows were kept in straw-bedded group pens to 90 days of gestation, and then moved to individual farrowing pens. Piglets were weaned on day 42 of age were reared to 84 days of age in straw-bedded group pens. All piglets received an all-mash feed *ad libitum*, which contained 13.4 MJ ME, 187 g crude protein, 1.10 lysine and 0.63 methionine with cystine. Gross composition of the diets (Table 1) and silages was estimated using standard methods. (AOAC, 1990), and their amino acid composition was determined on o Carlo Erba 3A 29 autoanalyser (Schram et al., 1954). Statistical

analysis was carried out with the STATISTICA 5.1 Software package.

RESULTS

Supplementation of the sows' feed with Pribiodor had no statistically significant effect on their body weight at 100 days of gestation, at farrowing and at weaning of piglets (Table 3). However, their weight gain compared to un-supplemented sows was higher by 11 kg in the control group, by 14 kg in the group receiving maize silage, and by 10 kg in the group given grass silage. From mating to weaning, the respective values were 11.0, 8.0 and 1.0 kg.

Body weight loss during lactation in Pribiodor-supplemented vs. un-supplemented sows was identical in group I, 6 kg higher in group II, and 9 kg higher in group III. Except for the time of weaning in the control group, backfat measurement in sows' was not significantly affected by the Probiodor supplement. No such effect was revealed in blood glucose level of sows, which only differed at weaning in group II.

Probiodor supplemented to sow diets increased the number of born piglets by 0.35 in group I, by 0.73 in group II, and by 1.12 in group III (Table 4). At weaning, these differences increased by 0.38, 0.91 and 1.32 piglets, respectively. To 84 days of age, the number of piglets from sows supplemented with Probiodor was higher by 5.6, 12.4 and 13.0 % in groups I, II and III, respectively. Probiodor also reduced mortality of piglets, not only when they stayed with sows, but also during their growth from 42 to 84 days of age. During the entire growth period (days 1 to 84), mortality of piglets from Probiodor-supplemented sows was 9.7 % compared to 11.8 % for un-supplemented sows. A positive residual effect of Probiodor supplemented to feed mixture for sows was also found after weaning of piglets. From 42 to 84 days of age, piglets from sows receiving Probiodor grew faster by 18 % ($p \leq 0.05$) in group I, by 8 % in group II, and by 35 % ($p \geq 0.01$) in group III compared to un-supplemented sows. This caused an increase in the body weight of these piglets at 84 days of age by 2.09, 0.93 and 5.54 kg, respectively.

Table 1. Composition (%) and nutritive value of feed mixture for sows**Tablica 1. Sastav (%) i hranidbena vrijednost krmne smjese za krmače**

Item - Sastav	Contral sows (group I) Kontrolne krmače (skupina I)		Experimental sows (group II, III) Pokusne krmače (skupina II, III)	
	Mixture for low pregnancy sows Krmna smjesa za nisko bređe krmače	Mixture for hight pregnancy and lactating sows Krmna smjesa za visoko bređe krmače i u laktaciji	Mixture for low pregnancy sows Krmna smjesa za nisko bređe krmače	Mixture for hight pregnancy and lactating sows Krmna smjesa za visoko bređe krmače i u laktaciji
Soybean meal Sojino brašno	-	5,0	-	-
Wheat bran Pšenične posije	10,0	5,0	-	10,0
Rapeseed cake Repičina pogača	4,0	12,0	6,0	16,0
Horse bean Bob	2,0	10,0	4,0	12,0
Wheat Pšenica	20,0	21,0	-	16,0
Barley Ječam	56,9 / 56,7	39,8 / 39,6	82,7 / 82,45	38,5 / 38,25
Grass meal Brašno od trave	5,0	5,0	5,0	5,0
Dicalcium phostate Dikalcij fosfat	-	0,7	0,3	0,4
Limestone Vapnenac	1,6	1,0	1,5	1,6
Premix Kostovit Premiks Kostovit	0,2	0,2	0,2	0,2
Salt Sol	0,3	0,3	0,3	0,3
Probiodor Probiodor	- / 0,2	- / 0,2	- / 0,25	- / 0,25
1 kg of the mixture contained: 1 kg krmne smjese sadržavao je:				
ME (MJ)	12,10	11,34	12,18	11,88
Crude protein (g)	121	165	119	159
Lys (g)	5,00	8,40	5,30	8,10
Met + Cys (g)	4,90	6,10	4,80	6,00
Thr (g)	4,60	7,00	4,90	6,70
Try (g)	1,90	2,10	1,60	2,00
Ca (g)	7,10	8,20	7,40	8,60
P (g)	4,50	6,20	4,60	6,00

Table 2. Daily feed rations for sows during reproductive cycle (kg/sow)**Tablica 2. Dnevni obroci za krmače u reproduktivnom ciklusu (kg/krmača)**

Low pregnancy sows (1 - 100 day) - Krmače u niskoj bređosti (1 - 100 dana)			
	Feed mixture - Krmna smjesa	Maize silage - Kukuruzna silaža	Grass silage - Travna silaža
Group I - Skupina I	2,40	-	-
Group II - Skupina II	1,80	<i>ad libitum</i>	-
Group III - Skupina III	2,00	-	<i>ad libitum</i>
High pregnancy sows (100 - 114 day) - Krmače u visokoj bređosti (100 - 114 dana)			
	Feed mixture - Krmna smjesa	Maize silage - Kukuruzna silaža	Grass silage - Travna silaža
Group I - Skupina I	3,20	-	-
Group II - Skupina II	2,60	<i>ad libitum</i>	-
Group III - Skupina III	2,80	-	<i>ad libitum</i>
Lactating sows (1 - 42 day of life piglets) - Krmače u laktaciji (1 - 42 dan života prašćića)			
	Feed mixture - Krmna smjesa	Maize silage - Kukuruzna silaža	Grass silage - Travna silaža
Group I - Skupina I	5,5 - 6,5	-	-
Group II - Skupina II	4,6 - 5,4	<i>ad libitum</i>	-
Group III - Skupina III	5,0 - 6,0	-	<i>ad libitum</i>

DISCUSSION

The present results show a positive effect of the Pribiodor supplementation in sow diets. Although it had no statistically significant effect on the body weight of sows at mating and after weaning, those sows grew faster than un-supplemented sows. Higher weight gains of the sows were partly reflected in the higher blood glucose level and also (except for group III) in the thicker backfat at weaning. The Probiodor supplemented had a marked effect on the increase in the number of born and reared piglets per litter in all feeding groups of sows, which is considered highly beneficial. Mache (2003) also reports that in practice in some German farms, two piglets per litter and sow were obtained when Probiodor was used. The effect of Probiodor was also reflected in weight gains of piglets and their body weight at the end of the experiment,

although they consumed an un-supplemented diet. Pregnant and lactating sows pass many of their nutrients to the fetus, which has a residual effect on rearing performance of piglets. This phenomenon might be caused by detoxifiers and polar trace micronutrients contained in Pribiodor. A positive residual effect of the feed supplements given to sows on growth of piglets was also reported by Slupczyńska and Wertelecki (2004).

A more beneficial effect of Probiodor was observed in earlier studies by Hanczakowska et al. (2000), in which the efficiency of fattening pigs given a Probiodor diet, containing rapeseed meal, peas and lupin, was improved. Wetscherek et al. (1990) also observed better weight gains when supplemented feeds with zeolite and kaolinite.

In conclusion, the Probiodor addition to sow diets increased the number of piglets per litter and improved their weight gains.

Table 3. Sow reproductive indices**Tablica 3. Reproductivni indeksi krmača**

Item - Sastav	Feed mixture restricted feeding Ograničeno hranjenje krmnom smjesom			Feed mixture + maize silage <i>ad libitum</i> Krmna smjesa + kukuruzna silaža			Feed mixture + grass silage <i>ad libitum</i> Krmna smjesa + travna silaža		
	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM
BW (kg) - Težina tijela (kg)									
- mating - pripust	166	170	5,20	161	146	7,29	168	164	6,55
- 100 day of pregnancy - 100 dana bređosti	202	215	4,92	209	202	7,77	207	215	7,15
- farrowing - prasenje	200	215	4,75	199	198	8,23	197	203	6,80
- weaning - odbiće	166	181	4,73	164	157	7,59	172	169	7,12
BWG (kg) - Prirast težine tijela (kg)									
- mating - farrowing - parenje - prašenje	34	45	3,08	38	52	3,70	29	39	3,35
- mating - weaning - parenje - odbiće	0	11	3,24	3	11	4,24	4	5	3,39
Body weight loss in lactation (kg) Gubitak tjelesne težine u laktaciji (kg)									
- lactation (kg) - laktacija (kg)	34	34	2,05	35	41	2,61	25	34	3,35
Backfat thickness (cm) Debljina leđne slanine (cm)									
- mating - parenje	16,18	16,79	0,48	14,98	15,44	0,56	16,57	16,13	0,96
- farrowing - prasenje	18,11	18,64	0,37	17,12	17,50	0,49	19,91	18,48	0,83
- weaning - odbiće	15,11 a	16,40 b	0,31	14,55	15,70	0,47	17,11	13,95	0,94
Plasma glucose levels (mg/dl) Razine glukoze u krvnoj plazmi (mg/dl)									
- mating - parenje	69,7	68,1	3,79	78,6	82,2	3,55	84,0	76,8	3,99
- farrowing - prasenje	75,0	70,9	3,26	74,6	83,4	3,04	93,0	84,4	6,13
- weaning - odbiće	61,7	77,4	3,92	71,8 a	88,7 b	4,14	83,5	88,4	3,55

Mean values the row with different letters differ significantly at $P \leq 0,05$ (a,b)

Srednje vrijednosti u redu s drugačijim slovima značajno se razlikuju $P \leq 0,05$ (a,b)

Table 4. Efficiency of weaning in pigs fed standard feed mixtures per groups of sows**Tablica 4. Djelotvornost odbića prasadi hranjenih standardnim krmnim smjesama koji su potjecali od pojedinih skupina krmača**

Item - Sastav	Feed mixture restricted feeding Ograničeno hranjenje krmnom smjesom			Feed mixture + maize silage <i>ad libitum</i> Krmna smjesa + kukuruzna silaža <i>ad libitum</i>			Feed mixture + grass silage <i>ad libitum</i> Krmna smjesa + travna silaža <i>ad libitum</i>		
	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM	Without Probiodor Bez Probiodora	Addition Probiodor S Probiodor.	SEM
No. of born piglets Broj rođenih prašćića	9,75	10,10	0,38	9,00	9,73	0,45	9,45	10,57	0,34
No. of weaner piglets (42 nd day) Broj odbitih prašćića (42. dan)	8,92	9,30	0,30	8,45	9,36	0,40	8,54	9,86	0,18
No. of piglets at 84 th day Broj prašćića 84. dan	8,33	8,80	0,32	8,09	9,09	0,37	8,45	9,57	0,17
Mortality of piglets (%) - Smrtnost prašćića (%)									
1 - 42 day - 1. - 42. dan	8,5	7,9	-	6,1	3,8	-	9,6	6,7	-
42 - 84 day - 42. - 84. dan	6,6	5,4	-	4,3	2,9	-	1,0	2,9	-
1 - 84 day - 1. - 84. dan	14,6	12,9	-	10,1	6,6	-	10,6	9,5	-
Body weight (kg) - Tjelesna težina (kg)									
1 day - 1. dan	1,49	1,57	0,04	1,57	1,46	0,04	1,52	1,52	0,05
42 day - 42. dan	9,47	9,03	0,28	9,32	9,13	0,32	9,28	9,86	0,30
84 day - 84. dan	23,55	25,64	0,61	23,43	24,36	0,58	23,51 A	29,05 B	0,87
Body weight gain (g) - Porast tjelesne težine (g)									
1 - 42 day - 1. - 42. dan	195	182	0,007	189	187	0,007	189	203	0,007
42 - 84 day - 42. - 84. dan	335 a	395 b	0,013	336	363	0,011	339 A	457 B	0,017
1 - 84 day - 1. - 84. dan	266	290	0,007	263	276	0,007	265 A	332 B	0,010

Mean values in the same row with different letters significantly at $P \leq 0,05$ (a,b) or $P \leq 0,01$ (A,B)

Srednje vrijednosti u istom redu drugačijih slova znatno se razlikuju kod $P \leq 0,05$ (a,b) ili $P \leq 0,01$ (A,B)

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SAŽETAK

Istraživana je mogućnost poboljšanja proizvodnih indeksa krmača dodavanjem krmnim smjesama Probidora koji sadrži dijamit i mikroelemente bipolarnosti u pokusu provedenom na 58 ekološki hranjenih krmača (PL x PLW - poljski landras x poljska velika bijela).

Krmače u kontrolnoj skupini (21 životinja) hranjene su samo standardnom krmnom smjesom. Krmače u skupini II osim pokusne krmne smjese dobivale su *ad lib.* i silažu čitavih biljaka kukuruza, te skupina III - silažu trave. Probidor je dobivalo 9 krmača u kontrolnoj skupini II i 7 krmača u skupini III. Svi su prašćići odbijeni u dobi od 42 dana, a pokus je trajao do dobi od 84 dana. Rezultat pokusa pokazuje da su krmače koje su dobivale Probidor postigle veću tjelesnu težinu između pripusta i prasnja (9 do 13 kg), a od pripusta do odbića 1.2 do 10.9 kg

Međutim, veći gubitak tjelesne težine zabilježen je za vrijeme laktacije kod pokusnih krmača u usporedbi s kontrolnom skupinom. Dodavanjem Probidora povećao se broj rođenih prašćića u leglu za 0.35 u kontrolnoj skupini, 0.73 u skupini II i 1.12 u skupini III.

Primijećena je nešto niža smrtnost kod prašćića krmača koje su dobivale Probidor. Njihova tjelesna težina bila je veća, osobito između 42. i 63. dana starosti za 29 g u skupini II i 113 g u skupini III.

Ključne riječi: krmače, odojci, Probidor, tjelesna masa