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A note on naked oats as a substitute for wheat and barley for young pigs

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ABSTRACT

In a 28-day experiment on 18 gilts and 18 barrows of Polish Landrace x Duroc (18-42 kg body weight) the nutritional value of naked oats cv. Akt was determined. Three diets (BW, BO, and O) containing 0, 35 and 73.8% of oats, which formed 0, 50 and 100% of the dietary cereals, were used. The BW control diet contained barley and wheat; the BO diet, only wheat; in the O diet, both wheat and barley were replaced by oats. The BW, BO and O diets were supplemented with 2.5, 1.6, and 0% of soyabean oil, respectively. The daily feed intake (DFI), average daily gains (ADG), and feed conversion ratio (FC) tended to be greater in the BO group fed the diet containing 35% oats than in groups BW and O, respectively (907 vs 822 and 803 g and 1.85 vs 2.00 and 2.01 kg/kg; P>0.05). The results suggest that naked oats in an amount of 35% (50% of the diet cereals) can provide a good source of nutrients for young pigs.

Key words: naked oats, growth performance, pigs

INTRODUCTION

The naked oats grown in Poland contain 14.4-15.7% crude protein of high biological value, 1.8-2.3% crude fibre and 7.6-8.0% ether extract in dry matter (Kosieradzka and Fabijańska, 1995; Maciejewicz-Ryś and Sokół, 1999). Earlier research showed that naked oat could be a successful alternative to maize in diets for pigs (Friend et al., 1988; Brand and van der Merwe, 1996).

Akt is the first Polish cultivar of naked oats (registered in 1997), and the area of its cultivation is constantly expanding. The aim of our experiment was to assess the nutritional value of this cultivar of naked oats as a replacement for wheat and barley in the feeding of young pigs.

MATERIAL AND METHODS

The experiment was performed on 36 young pigs, 18 gilts and 18 barrows about 18.0 kg body weight, aged 8 weeks, crosses of Polish Landrace gilts and Duroc boars. The pigs, 12 in each group, were kept in pairs (one gilt and one barrow) in flat-deck cages fitted with self-feeders and automatic water nipples.

The pigs were fed on diets with naked oat cv. Akt, supplying 0, 50 and 100% of the cereal in diets BW, BO and O, respectively (Table 1). The soyabean control diet BW was composed of wheat and barley; oat (35%) replaced wheat in diet BO; in diet O wheat and barley were substituted with oat (73.81%). The cereal was ground to medium particles on a roller mill. The diets were balanced according to the Nutrient Requirements of Pigs (1993) and contained 1.09% lysine and 0.32% methionine. The experiment lasted for 28 days, daily feed intake, average daily gains, and feed conversion ratio were determined.

One-way analysis of variance and the Duncan multiple range test were used to analyze the results of the experiment.

TABLE 1

Diets formulation and chemical composition, %

Ingredients	Diets		
	BW	BO	O
Barley	36.3	33.71	0.0
Wheat	30.0	0.0	0.0
Naked oat	0.0	35.0	73.81
Soyabean meal	27.0	25.5	22.0
Soyabean oil	2.5	1.6	0.0
Limestone	1.0	1.0	1.0
Dicalcium phosphate	1.6	1.6	1.6
Salt	0.3	0.3	0.3
Lutamix PP-grower[1]	0.5	0.5	0.5
Lysine HCl (78%)	0.23	0.23	0.23
Methionine (99%)	0.07	0.06	0.06
Agricid[2]	0.5	0.5	0.5
Analysed composition			
crude protein	18.36	18.96	18.22
ether extract	4.07	5.05	5.71
crude fibre	4.27	4.04	3.10
gross energy, MJ/kg	16.52	17.01	17.56

[1] supplying per kg of diet: vit. A 13500 IU, vit. D_3 2000 IU, vit E 40 mg, vit K 40 mg, vit B_{12} 2.5 mg, thiamine 4.0 mg, riboflavin 4.0 mg, pyridoxine 4.0 mg, calcium panthotenate 25.0 mg, niacin 25 mg, folic acid 1 mg, choline 350 mg, Mg 50 mg, Mn 60 mg, J 05 mg, Zn 150 mg, Fe 100 mg, Cu 160 mg, Co 0.3 mg, Se 0.2 Se

[2] preparation with lactic acid

RESULTS

Naked oat contained 11.4% protein, 2.8% crude fibre, and 7.2% ether extract. There were no significant differences in the daily feed intake between the diets, although the pigs tended to eat less of the diet with the maximum amount of oat (1649, 1676 and 1609 g of the BW, BO and O diets, respectively) (Table 2). The average daily gains of pigs were high. The use of 35% naked oat as a substitute for wheat in the diet caused a non-significant increase in the growth rate of pigs (from 822 to 907 g daily). Oat used in an amount of 73.8% as the only cereal in diet O was as effective in terms of daily gains as a combination of barley and wheat supplemented with plant oil in the BW control diet. The pigs that received the barley-oat (BO) diet were slightly better at feed efficiency compared with the pigs fed on the barley and wheat or oat diets (1.85 vs 2.00 and 2.01 kg/kg; $P>0.05$).

TABLE 2

Average performance of pigs (18-42 kg) fed during 28 days on diets containing O (BW), 35 (BO) and about 74 (O)% of naked oat

Item	Group			
	BW	BO	O	SE[1]
No. of animals	12	12	12	
Initial weight, kg	17.7	18.0	17.9	0.62
Final weight, kg	40.7	43.4	40.4	1.09
Daily feed intake, g	1649	1676	1609	54.70
Average daily gain, g	822	907	803	20.80
Feed conversion ratio, kg/kg	2.00	1.85	20.01	0.04

[1] standard error

DISCUSSION

The results show that naked oat in an amount of 35% (50% of the dietary cereal) was willingly consumed and provided a good source of nutrients for young pigs, with its nutritional value being superior when applied in a combination with barley to that of a barley and wheat diet. Growth performance of pigs did not improve when the contribution of oat was increased to 73.8% of the diet. However, the daily feed intake slightly decreased. In the experiments on younger pigs, the intake of diets containing 71.5 or 73.8% of naked oat decreased significantly (Brand and van der Merwe, 1996; Falkowski et al., 2000). It was found that in diets for pigs growing from 8.7 to 21 kg of body weight, the amount of naked oat should not exceed 47.9% (Brand and van der Merwe, 1996).

In our experiment, the use of naked oat saved high-protein feed, such as soya-bean meal, and fat in the nutrition of young pigs.

CONCLUSIONS

Naked oat is a valuable cereal dietary component for young pigs and can replace up to 74% of wheat and/or barley and save feed protein and fat.

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STRESZCZENIE

Owies nagi jako zamiennik pszenicy i jęczmienia w dawkach dla młodych świń

W 28-dniowym doświadczeniu na 18 loszkach i 18 wieprzkach rasy pbz x Duroc (18-42 kg) badano wartość pokarmową nagiego owsa odmiany Akt. Stosowano trzy mieszanki (BW, BO i O) zawierające odpowiednio 0, 35 i ok. 74% owsa, który stanowił 0, 50 i 100% zboża diety. Kontrolna mieszanka BW zawierała jęczmień i pszenicę, w mieszance BO owsem zastąpiono pszenicę, a w mieszance O owsem zastąpiono pszenicę i jęczmień. Mieszanki BW, BO i O uzupełniono olejem sojowym w ilości odpowiednio 2,5; 1,6 i 0%. Określono pobranie paszy (DFI), dzienne przyrosty (ADG) i wykorzystanie paszy (FC). Stwierdzono tendencję zwiększenia ADG i FC w grupie BO żywionej mieszanką z udziałem 35% owsa, w porównaniu z grupą BW i O (907 vs 822 i 803 g i 1,85 vs 2.00 i 2,01 kg/kg; P>0,05).

Wyniki wskazują, że nagi owies w ilości 35% (50% zboża w mieszance) może być bardzo dobrym źródłem składników pokarmowych dla młodych świń.