

The rearing, growing and fattening performance, carcass and meat quality of pigs fed naked oats supplemented with enzymes

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ABSTRACT

Each of two diets containing 30% naked oats, unsupplemented (diet I) or supplemented with a multienzyme preparation (diet II), was fed to 3 litters of piglets from the age of 10 days until weaning on day 52 (prestarter), to weaners until day 83 of life (grower), and to fatteners until slaughter on day 177 of life (grower and finisher). Thirty or thirty-one piglets and weaners and 20 fatteners were included in group I and II, respectively. Feeding diets supplemented with β -glucanase, hemicellulase, and pectinase increased daily gain from 251 to 266 g during the suckling period, and from 340 to 357 g from days 10 to 83 of life, and improved feed utilization in both periods compared with the control diet. Supplementation of naked oats with enzymes tended to improve fattening performance, significantly decreased loin eye area, and modified the fatty acid profile and water holding capacity of the loin, while increasing the dry matter content in ham. Feeding an enzyme-supplemented diet did not significantly affect sensory scores, but they tended to be lower in both ham and loin.

KEY WORDS: piglets, fatteners, performance, carcass, meat, naked oats, enzymes

INTRODUCTION

Naked oat grain is fed to pigs due to its favourable chemical composition and high energetic value in comparison with other grains (Brand and van der Merwe, 1996; Kosieradzka and Fabijańska, 1999; Fabijańska et al., 2003). The use of oats in diets for very young pigs is limited, however, because of its high β -glucan content (3-6% of dry matter), which exceeds that in barley and husked oat (Bach Knudsen, 1993; Gibiński, 2000).

The aim of the study was to determine rearing, growing, fattening performance, and slaughter value in pigs fed an enzyme-supplemented diet containing naked oats.

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MATERIAL AND METHODS

The experiment involved feeding diets containing 30% of naked oats (Table 1) unsupplemented (group I) or supplemented with a multienzyme preparation (group II) to piglets from day 10 day of age until weaning on day 52 (prestarter), from weaning to day 83 of life (grower), and day 83 until slaughter on day 177 of life (grower and finisher). The multienzyme preparation contained β -glucanase, hemicellulase, and pectinase and was fed at 1 g/kg of the diet. Each group was issued from three litters of piglets of LW \times Puławska breed and comprised 30 and 31 piglets and weaners in groups I and II, respectively, and 20 fatteners (10 males and 10 females). The body weight of pigs on days 10, 52, 84 and 177 of life and feed intake were controlled. At the end of the fattening period, 10 animals from each group (5 males and 5 females) with a body weight similar to the group average were selected and slaughtered.

Table 1. Composition and nutritive value of mixtures

Item	Mixtures		
	prestarter	grower	finisher
<i>Composition of diets, %</i>			
wheat	37	-	-
barley	-	49	55
naked oats	30	30	30
soyabean meal	26	18	13
skim milk powder	3	-	-
feed additives ¹	4	3	2
<i>Nutritive value per 1 kg of mixtures</i>			
crude protein, g	219	175	159
crude fibre, g	22.7	30.5	30.8
lysine, g	13.7	10.4	8.9
methionine + cystine, g	7.9	6.4	6.0
threonine, g	8.2	6.4	5.7
tryptophan, g	2.6	2.1	1.9
metabolizable energy, MJ	13.1	12.6	12.7

¹ limestone, dicalcium phosphate, premix

Carcass leanness was estimated using an ULTRA-FOM 100 apparatus and pH₄₅ was measured after slaughter, while pH₂₄ and backfat thickness in 5 places were measured on cold carcasses after 24 h. The chemical composition of loin and ham was determined according to AOAC (1990) and their fatty acid composition was determined as ethyl esters using gas chromatography. The water holding capacity was evaluated by the Grau and Hamm method (1953), and meat taste quality was estimated according to Barylko-Pikielna (1975).

The results were analysed by one-factor analysis of variance and the significance of differences between means was determined by Student's t-test.

RESULTS AND DISCUSSION

Feeding diets containing 30% naked oats supplemented with a multienzyme preparation significantly increased the weight gains of piglets and improved feed utilization compared with the control diet in the periods from day 10 to 51 and from day 10 to 83 of age (Table 2). Weight gains after weaning (between days 52 and 83 of life) and during the fattening period (from days 84 to 177) also tended to be increased due to enzyme supplementation.

Table 2. Rearing, growing and fattening performance of pigs

Item	Groups		SEM
	control	experimental	
<i>Rearing and growing performance</i>			
body weight, kg			
d 10	3.10	2.85	0.14
d 52	13.63*	14.02*	0.05
d 84	28.27*	29.29*	0.12
daily gain, g			
d 10 - 51	251*	266*	1.43
d 52 - 83	457	477	5.86
d 10 - 83	340*	357*	1.96
<i>Feed conversion ratio, g/kg gain</i>			
d 10 - 51	438*	414*	2.68
d 52 - 83	2230	2101	35.52
d 10 - 83	1480*	1389*	17.76
<i>Fattening performance</i>			
body weight, kg			
d 84	28.75	28.70	0.45
d 177	97.30	98.70	0.56
daily gain, g	737	753	1.15
feed conversion ratio, kg/kg	3.19	3.02	-
<i>Carcass parameters</i>			
weight at slaughter, kg	98.4	99.5	0.69
cold dressing percentage	78.3	78.3	0.50
lean in carcass, %	55.1	54.2	1.15
loin eye area, cm ²	48.9*	45.4*	0.11
average backfat thickness, mm	26.7	25.6	1.17

* - $P \leq 0.05$

The enzymes had no effect on carcass parameters except a decrease of loin eye area (Table 2), but affected the dry matter content in ham and the fatty acid profile and water holding capacity in loin (Table 3). The loin of pigs fed the enzyme-supplemented diet had a lower proportion of SFA and PUFA than the meat of control animals.

The fattening performance of pigs fed on diets containing 30% oats was lower in our experiment than reported by Kosieradzka and Fabijańska (1999), while the dressing percentage and loin area were higher.

Table 3. Physicochemical and sensory characteristics of meat

Item	Loin		SEM	Ham		SEM
	control	experimental		control	experimental	
<i>Basic nutrients, %</i>						
dry matter	27.12	27.53	0.20	25.08*	26.04*	0.56
crude ash	1.14	1.12	0.002	1.17	1.16	0.006
crude protein	22.93	23.53	0.32	21.59	22.48	0.51
crude fat	2.61	2.71	0.34	2.24	2.38	0.22
<i>Fatty acids, % total</i>						
SFA	39.92*	38.55*	0.08	32.85	34.04	1.05
UFA	59.92*	61.29*	0.11	66.97	65.78	0.98
MUFA	54.74	56.48	0.48	56.47	55.49	1.26
PUFA	5.18*	4.81*	0.05	10.50	10.29	1.11
pH ₄₅	6.07	6.22	0.13	-	-	-
pH ₂₄	5.84	5.82	0.10	-	-	-
Water holding capacity, %	20.71**	22.13**	0.08	21.60	20.53	0.41
Sensory scores (mean of traits, points)	3.92	3.65	0.21	3.82	3.52	0.12

* - $P \leq 0.05$; ** - $P \leq 0.01$

CONCLUSIONS

A multienzyme preparation hydrolysing nonstarch polysaccharides may be recommended as a supplement improving the growth performance of young pigs fed on mixtures with naked oats.

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