

Performance of Crossbred (Landrace × Local Indian) Finisher Barrows Fed Maize or Wheat Bran Based Diets: Short Note

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ABSTRACT : Three groups of 7, 8 and 8 barrows (22 weeks age; 35 kg body weight), reared on grower diets were fed *ad libitum* on three isonitrogenous finisher diets containing 50, 71 and 92% wheat bran by replacing maize grain till the attainment of about 74 kg slaughter weight. Growth pattern, average daily gain, feed intake, feed/gain ratio and carcass traits were similar in all the groups. The digestibility of DM, OM, CF, NFE total carbohydrate and energy (DE) decreased ($p < 0.01$) with the increased level of wheat bran in the diet. However, CP digestibility was comparable among all the diet and the digestibility of EE was significantly ($p < 0.01$) higher in grainless diet (FD₃). It appears that maize grain may be completely replaced with wheat bran in the diet of crossbred pigs without any adverse effect on their performance with respect to feed intake, body weight gain and carcass characteristics. (*Asian-Aus. J. Anim. Sci.* 2000. Vol. 13, No. 10 : 1429-1432)

Key Words : Crossbred Finisher Pigs, Grainless Diets, Wheat Bran, Growth, Nutrient Utilization, Carcass Characteristics

INTRODUCTION

Pig grow well when fed on grain based diets. Maize grain has been a choice feed ingredient in conventional swine rations. However it is also extensively used as human food as well as for poultry. Thus, there is very little scope of feeding this costly grain to pigs for profitable return from pork which is relatively a cheap meat in India. Therefore, an attempt was made to replace maize grain with wheat bran. In the present experiment, the grain sparing effect of wheat bran was studied by incorporating bran at exceptionally high levels in finisher pigs with an assumption that Indian crossbred finisher pigs may have reasonable capacity to compensate their energy intake through higher consumption of a wheat bran based diet (Brouns et al., 1995).

MATERIAL AND METHODS

Three groups of 7, 8 and 8 barrows (22 weeks; 35 kg body weight), which were on grower diets, were fed three isonitrogenous finisher diets (FD₁, FD₂ and FD₃) in which maize was replaced by wheat bran at 0, 50, and 100%, respectively (table 1). Animals were group fed with their respective diets *ad libitum*. Clean drinking water was made available.

Average daily feed consumption in each group and changes in body weight of the animals were recorded

up to about 60 kg live weight. A metabolism experiment was conducted on 4 representative barrows in each groups at about 53 kg body weight to study the nutrient utilization and to measure the nutritive value of the diet. Prior to slaughter (at about 74 kg body weight) the animals were kept fasting for about 16 h, but water was made available to the animals. Conventional carcass measurements were recorded in 6 animals in the control group compared to 8 animals each in the later groups to study the effect of the diet on carcass traits.

Chemical analysis of feeds, residues and faeces was done as per AOAC (1995). Gross energy content of these samples and also of urine was done in a Gallenkamp ballistic bomb calorimeter to express DE as ME. Statistical analysis was carried out as per Snedecor and Cochran (1968).

RESULTS AND DISCUSSION

The chemical composition of different rations (table 1) shows that the diets were isonitrogenous. Other nutrients, GE and EE, were also almost similar in the 3 diets. The CF and ash were slightly higher and NFE and total carbohydrate were slightly lower in diets 2 and 3 as compared to the control diet (FD₁). The DE content was gradually reduced due to replacement of grain with wheat bran (Kyriazakis and Emmans, 1995).

The overall ADG (average daily gain), average daily feed intake and FCE (feed conversion efficiency) are presented in table 2. The growth patterns and average daily gains of the animals in all three groups were similar ($p < 0.01$). Animals reached their slaughter weight (about 74 kg) after about 84, 96 and 95 days (NS) of experimental feeding in group FD₁, FD₂ and FD₃, respectively. The feed/gain ratio was higher by

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Table 1. Dietary ingredient composition, chemical composition and nutritive value of different diets fed to the finisher barrows

Ingredients	Diets			SEM
	1	2	3	
Maize	35	18	-	
Wheat bran	50	71	92	
Deoiled groundnut cake	7	3	-	
Fish meal	6	6	6	
Min. mixt.	1.5	1.5	1.5	
Salt	0.5	0.5	0.5	
Chemical composition (%DM basis)				
OM	90.94	89.98	89.70	
CP	15.04	15.50	15.12	
EE	2.88	3.08	3.28	
CF	6.66	7.59	8.13	
NFE	66.36	63.81	63.17	
Total carbohydrate	73.02	71.40	71.30	
Ash	9.06	10.02	10.30	
GE (kcal/g)	4.43	4.38	4.34	
Digestibility coefficient (%)				
DM	71.98 ^a	66.90 ^b	65.81 ^b	1.79
OM	76.56 ^a	72.23 ^b	70.79 ^b	1.71
CP	64.51	64.35	63.70	2.94
EE	71.41 ^b	71.18 ^b	76.27 ^a	3.28
CF	29.97 ^a	26.77 ^a	24.45 ^b	2.25
NFE	83.95 ^a	79.56 ^b	78.12 ^b	1.82
Total carbohydrate	79.11 ^a	73.96 ^b	72.01 ^b	1.80
DE (as % of GE)	74.26 ^a	69.24 ^b	66.38 ^b	2.04
Nutritive value				
DCP (%)	9.70	9.97	9.63	0.45
TDN (%)	72.04 ^a	67.70 ^b	66.57 ^b	1.66
DE (kcal/kg diet)	3,287 ^a	3,029 ^b	2,883 ^c	88.26
ME (kcal/kg diet)	3,226 ^a	2,968 ^b	2,820 ^c	90.34

Means bearing different superscripts (a,b,c) in a row differ significantly ($p < 0.01$).

4.1 and 21.7% in group 2 and 3, respectively as compared to group 1. This may be due to replacement of maize grain by wheat bran and increased ADFI of the grainless diet (FD₃). A similar trend in respect of ADG and feed/gain ratio was observed by Ranjhan et al. (1972) in finisher Large White Yorkshire (50-70 kg) and by Agrawal et al. (1982) in Landrace pigs. However, contrary to our results Ranjhan et al. (1971) and Kyriajakis and Eman (1995) observed a significant decrease in growth rate in growing purebred pigs fed on a high level (>60%) of wheat bran in their diet. These variations in ADG and FCE in various studies may be due to differences in types and breeds of pigs used in the experiments.

The digestibility of almost all the nutrients (except CP and EE) was significantly reduced in the grainless diet as compared to the diet containing 35% maize. When maize grain was replaced at the 50% level, the digestibility of most of the nutrients (except CP, EE

and CF) was also significantly lower as compared to the control group. It is clear that the replacement of grain by wheat bran had a significant depressive effect on the digestibility of most of the major nutrients. However, the digestibility of CP and the DCP values were comparable among the diets. This is in confirmation of the results of Ranjhan et al. (1971) who also did not observe any adverse effect on the digestibility of CP in the animals fed grainless diets. A significant reduction in DM, OM, NFE, total carbohydrate and energy (GE) digestibilities in diets FD₂ and FD₃ resulted in significant depressions in their DE, ME and TDN values which were significantly ($p < 0.01$) lower in both FD₂ and FD₃ groups as compared to control group (FD₁). The CP value of all the diets and DE of FD₁ was comparable with NRC (1998), but the DE value of FD₂ and FD₃ was lower by 8.21% and 12.64% than this standard.

There was non-significant difference in slaughter

Table 2. Performance and carcass characteristics of barrows fed on different diets

Attributes	Diets			SEM
	1	2	3	
Performance				
Number of animals	7	8	8	15.47
Duration of feeding(days) ^{NS}	83.71	96.13	94.63	3.68
Initial body weight (kg)	36.43	35.24	37.15	2.81
Final body weight (kg)	73.0	74.89	74.75	5.36
Total body weight gain (kg)	36.57	39.65	37.60	61.96
Average daily gain (g) ^{NS}	460	429	399	
Total feed intake (kg)	197.11	222.43	246.47	
Average daily feed intake (kg)	2.35	2.32	2.59	
Efficiency of feed conversion				
Feed/kg gain	5.61	5.61	6.56	
DE (Mcal/kg gain)	17.72	17.00	18.90	
Carcass characteristics^{NS}				
Live weight at slaughter (kg)	73.50	74.89	74.75	2.96
Fasting wt. at slaughter(kg)	69.25	69.48	70.10	2.62
Back fat thickness (cm)	3.31	3.36	3.08	0.27
Loin eye area (sq cm)	27.21	28.07	30.17	2.35
Carcass length (cm)	68.27	68.93	70.59	1.46
Carcass weight (kg)	52.03	51.83	50.51	2.69
Dressing percentage (%)	70.86	70.12	67.58	2.50
Primal cuts (kg)^{NS}				
Jowl	1.33	1.46	1.28	0.21
Boston butt	5.38	6.04	5.74	0.42
Picnic shoulder	6.34	6.57	6.15	0.48
Loin	14.56	14.64	14.14	0.95
Belly	9.52	8.98	9.44	0.77
Ham	11.75	12.19	11.68	0.66
Ham percentage (%)	22.61	23.56	23.12	0.92
Edible Offals^{NS}				
Head (kg)	3.85	3.90	3.73	0.26
Trotters (feet, kg)	1.45	1.42	1.31	0.12
Heart (g)	202	191	201	15.04
Liver (kg)	1.11	1.14	1.10	0.08
Kidneys (g)	182	176	186	15.91
Inedible Offals (kg)^{NS}				
Blood	2.01	1.92	2.04	0.14
Pluck	2.20	2.17	2.12	0.14
Spleen (g)	130	154	146	19.26
G.I. tract (total)	6.64	6.54	6.91	0.51
G.I. tract (empty)	4.27	3.57	4.12	0.42

NS - Non significant.

weight of the animals as well as in the time necessary (days) to attain the slaughter weight. All the carcass traits were also similar between groups (table 2). Highest loin eye area (30.17 sq cm.) was observed in the 3rd group (FD₃), followed by the 2nd (FD₂) and 1st groups (FD₁). This indicated an increase of leanness parallel to the level of wheat bran in the diet. A similar trend in leanness was also reported by Ranjhan et al. (1972) in the diet of finishing pigs.

The overall results indicated that the replacement of maize grain with wheat bran in the diet of finisher pigs, though it significantly reduced the energy value of the diets, it had by and large no adverse effect on growth performance and carcass characteristics in crossbred pigs. It appears that older pigs can probably efficiently utilize high fibre diets (Varel et al., 1987; Canh et al., 1999). In the present experiment the animals were in finisher stage at about 35 to 75 kg

body weight; so they could utilize the high fibre diet quite efficiently. Further studies with larger numbers of animal are suggested.

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