

Performance of crossbred pigs fed on niger seed cake

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Pig is a highly prolific meat producing domestic animal but the feed cost is 75–80% of the total recurring cost alone and it has to be minimized by inclusion of locally available feed ingredients in its diet to make pig husbandry lucrative. Groundnut cake (GNC) is used as one of the common protein supplements in the pig diet. GNC is not grown in Jharkhand, which makes it more costly. Further, its availability throughout the year is questionable. On the other hand, the niger (*Guizotia abyssinica*) is widely grown in Jharkhand, and is being used for feeding of poultry and milch cow after oil extraction. It contains about 31% crude protein, 5.98% mineral matter and 14–18% crude fibre. It is richer in available lysine (400 mg/100 g) and methionine content than groundnut cake. ME value varies between 2700 and 2800 kcal/kg in poultry (Banerjee 1998) and therefore can completely replace GNC on protein equivalent basis. In spite of high fibre content, Roychoudhury and Mandal (1984) have recommended inclusion of niger seed cake in the ration of pig as a protein supplement. Replacement of GNC with NSC had beneficial effect on growth, digestibility and feed efficiency ratio, and makes the ration more economical.

The study was carried out on 21 growing crossbred (Tamworth and *desi*) piglets of about 2 to 2.5 months of age having nearly same body weight, and maintained at Pig Breeding Farm of the university. The piglets were randomly divided into 3 groups (T₁, T₂, and T₃) of 7 piglets each. Pigs of all the 3 groups were fed iso-caloric and iso-proteinous diets as per NRC (1988) recommendation. Piglets of group T₁ (control) were fed standard concentrate mixture consisting of maize, groundnut cake (GNC), wheat bran and fish meal in required proportions so as to satisfy NRC (1988) requirements (Table 1). In group T₂ and T₃, the GNC of ration

Table 1. The composition of the concentrate mixture for different groups of pigs

Ingredients	T ₁	T ₂	T ₃
Crushed maize	61.0	56.0	51.0
Groundnut cake	14.0	7.0	
Niger seed cake		12.0	24.0
Wheat bran	16.0	16.0	16.0
Fish meal	7.5	7.5	7.5
Min. and vitamin	1.0	1.0	1.0
Common salt	0.5	0.5	0.5
Total	100	100	100
CP% (calculated)	18.18	18.20	18.22
CF% (calculated)	4.17	5.48	6.78
DE (kcal/kg) (calculated)	3391.4	3312.3	3211.2

Mineral mixture composition/kg : Vit.A, 62500 IU; Vit., D₃, 62500 IU; Vit.E, 250 mg; nicotinamide, 1 g; copper, 312 mg; cobalt, 45 mg; magnesium, 6 g; Iron, 1.5 g; zinc, 2.13 g; iodine, 156 mg; selenium, 10 g; manganese, 1.2 g; calcium, 247.34 g; phosphorus, 114.689 g; sulphur, 12.20 g; sodium, 5.8 mg; potassium, 48.03 g.

T₁ was replaced with niger seed cake @ 50 and 100% on protein equivalent basis, respectively. Piglets were fed *ad lib.* in a group. The weighed quantity of concentrate mixture was offered to them every day at 9 AM in the morning and again at 4 PM in the evening. The left over feed was weighed next morning before offering fresh feed for next day. Clean freshwater was made available to piglets all the time.

The average initial body weight of crossbred growing pigs of groups T₁, T₂ and T₃ did not differ significantly among themselves. The average body weight recorded at the end of 1st, 2nd, 3rd, 4th, 5th, 6th and 7th fortnight of feeding experiment of various groups also did not differ significantly. The total average body weight gain in pigs of group T₁ was significantly (P<0.05) lower than group T₂ but did not differ to that of group T₃. Similarly body weight of pigs of group T₂ and T₃ did not differ significantly. Similar trend was observed in every fortnight and daily body weight gain among pigs of groups T₁, T₂ and T₃ did not differ significantly.

At the end of experiment the final body weight of crossbred pigs did not differ significantly (Table 2). Daily

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Table 2. Average fortnightly body weight (kg), daily and average cost weight gain (g), feed efficiency experimental of crossbred (T & D) piglets in different groups

	Experimental groups			CD value
	T ₁	T ₂	T ₃	
Fortnights				
Initial	15.92±0.82	15.92±0.79	15.92±0.42	NS
1 st	19.00±1.09	19.07±1.05	18.71±0.79	NS
2 nd	23.10±1.37	24.64±1.22	23.14±0.93	NS
3 rd	27.07±1.30	30.00±1.25	27.35±1.22	NS
4 th	32.28±1.47	34.64±1.21	32.32±1.47	NS
5 th	38.71±1.30	42.21±1.77	39.14±1.21	NS
6 th	45.71±1.19	50.57±2.17	47.71±1.57	NS
7 th	51.85±1.36	57.35±2.16	55.42±1.64	NS
Total wt. gain (kg)	35.92±1.36 ^a	41.42±1.59 ^b	39.50±1.48 ^{ab}	4.41
Fortnightly wt. gain (kg)	5.13	5.91	5.64	0.62
Daily wt. gain (g)	366.61	422.73	403.05	43.96
	±39.52 ^a	±48.29 ^b	±56.59 ^{ab}	
Average daily weight gain (g)				
1 st	219.38±30.61	224.48±33.71	198.97±31.99	NS
2 nd	292.79±29.60	397.95±23.93	316.32±25.16	NS
3 rd	283.66±34.56	382.65±27.79	301.01±30.04	NS
4 th	372.44±23.19	331.62±24.29	355.09±28.60	NS
5 th	459.17±27.47	540.81±54.79	486.73±30.48	NS
6 th	499.99±34.88	596.93±34.60	612.20±44.36	NS
7 th	438.77±43.88	484.69±56.12	551.01±57.19	NS
Average feed efficiency				
Total feed consumption/ pig (kg)	128.13	133.43	127.99	NS
Feed consumption/ pig/day (kg)	1.30±0.16	1.36±0.14	1.30±0.17	NS
Feed : BW	3.53±0.13	3.28±0.21	3.27±0.12	NS
Average cost/ kg weight gain (Rs)	47.93	42.74	40.81	NS

NS, Nonsignificant; figures bearing different superscript in a row differ significantly ($P < 0.05$); each value is an average of 7 observations.

weight gain in pigs of group T₂ was significantly higher than those of group T₁ but did not differ from T₃, similarly group T₃ did not differ with group T₁. This indicates that 50% replacement of groundnut cake protein with niger cake is more beneficial as compared to 100%. However, growth rate was not less to control group even at 100% replacement. Hence, niger seed cake could completely replace groundnut cake on protein equivalent basis. Better growth performance in groups T₂ and T₃ in comparison to group T₁ might be due to higher available methionine and lysine content, higher protein digestibility and higher metabolizable energy content in niger seed cake. The result of growth performance in cross-bred (T & D) pigs obtained under present study is in

consonance with the finding of Samanta and Biswas (1987) in poultry, Roychoudhari and Mandal (1984) in pig, Nega and Melaku (2009) in sheep and Mengistu *et al.* (2007) in oxen (*Bos indicus*). The weight gain of crossbred pigs in the present experiment, kept on conventional diet was almost similar to those recorded by Kumar (1998), Devi (2002) and Paul *et al.* (2003).

The average quantity of total feed consumed per kg gain in body weight (feed : Bw) were nonsignificant ($P > 0.05$) but numerically higher value was recorded in T₁ followed by T₂ and T₃ ration (Table 2). The trend of feed efficiency of T&D pigs under present study is similar to earlier studies by various workers. Kumar (1998) recorded feed conversion efficiency of growing T&D pigs as 3.65 to 3.77 on conventional feed with or without methionine and lysine. Paul *et al.* (2003) reported feed conversion efficiency of T&D pigs during growth period as 3.94, 4.28 and 3.45 on standard grower ration, Lucerne plus standard ration and standard ration plus agro-industrial by-products, respectively. The feed efficiency ratios recorded in the present studies (3.27 to 3.53) in T&D are considered to be highly satisfactory and it further indicates that the efficiency of utilization of niger seed cake is equal to conventional cakes.

The cost of feed per kg gain in body weight was highest in group T₁ (₹ 47.93) followed by group T₂ (₹ 42.74) and lowest in group T₃ (₹ 40.81). Thus, ration T₃ worked out to be cheapest, followed by ration T₂ than T₁ (Table 2). Similar trend was noted in cost of production by various workers when they fed rations containing different agro-industrial by-products to LWY or other exotic pigs (Roychoudhary and Mandal 1984, Ranjan *et al.* 1998, Kumar *et al.* 2000).

SUMMARY

Present work was conducted to study the performance of crossbred pigs fed on niger seed cake. Pigs (21) were divided into 3 groups (7 in each) fed with iso-caloric and iso-proteinous diets. Group 1 (T₁) was fed with a standard concentrate mixture (with GNC) whereas, 50% GNC of T₁ diet was replaced by NSC (*Guizotia abyssinica*) in T₂ and 100% in T₃ diet. After 98 days of experimental feeding, the final body weights were higher in T₂ followed by T₃ and T₁ but the difference among groups was nonsignificant. The feed efficiency ratios recorded in the present studies (3.27 to 3.53) in T&D pigs are considered to be highly satisfactory and indicated that the efficiency of utilization of niger seed cake is equal to conventional cakes. The cost of feed per kg gain in body weight was highest in group T₁ followed by group T₂ and lowest in group T₃. Thus, ration T₃ worked out to be cheapest, followed by ration used in T₂ than T₁ groups.

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