

Effect of Supplementation of QPM Maize Fodder on Production Performance in Large White Yorkshire Grower Pigs

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Abstract

Eighteen Large White Yorkshire grower pigs were divided into three groups using randomized block design and they were supplemented with 0, 5 and 10% QPM maize fodder to the basal diet by replacing (wt/wt on DM) the maize grains and designated as T₁, T₂ and T₃ respectively. The protein content of the experimental diet was 18.63 ± 0.25, 18.51 ± 0.18 and 18.37 ± 0.11 while protein content of QPM maize fodder was 7.95 ± 0.04. Dry matter intake was found similar across the treatment groups. There was no significant difference on nutrient digestibility across the treatment groups. Similarly, there was no significant difference on average daily gain (g/day), feed intake per kg gain (FCR) and feed cost per kg gain. However, FCR and feed cost per kg gain was found better at 5% and 10% supplementation of maize fodder in the diet. Feed cost per kg gain was reduced by Rs.7.17 and Rs.11.59 at 5% and 10% supplementation of QPM maize fodder. From this study it is concluded that supplementation of QPM maize fodder to grower Large White Yorkshire pigs has economic benefit without affecting the growth and nutrient utilization and can be supplemented up to 5% in the diet of LWY pigs without affecting the performances.

Keywords: QPM Maize Fodder; Production Performance; Large White Yorkshire; Pigs

Introduction

In pig production, feed alone represent 70 - 75% of total cost of production [1]. In intensive pig production, pig directly compete with human being for feeding, since conventional fattening is based on the feeding of cereals like maize, wheat, oats, barley etc. along with other protein, mineral and vitamin supplement. Farmers are unable to support costly feeding program because of high cost of cereals and oil cakes. As a result, animal nutritionist used to search for new feed resources especially unconventional feeds and other locally available feedstuff in order to produce economic feeding programme for pigs as well as for other livestock [2-6]. Although, pig is a monogastric animal, they can be fed green fodder like berseem, lucerne, maize fodder etc. where they get digested [7] because of their high development of large intestine i.e. cecum. QPM maize is a rich source of lysine and tryptophan than normal maize [8-10]. Therefore, in the present study, different level of QPM (Shaktimaan 5) maize fodder was used to investigate the effect on production performances of Large White Yorkshire pigs.

Materials and Methods

The experiment was conducted after approval from the institute animal ethics committee. Eighteen Large White Yorkshire (LWY) grower pigs (about 4 months old, body wt. ranged from 40.67 ± 4.84 to 41.04 ± 3.36 kg) of either sex were divided into three groups of six each in a randomized block design. Three different diets were used for feeding of the animals namely - T_1 : standard grower ration without Quality Protein Maize (QPM-Shaktimaan-5) fodder, control diet, T_2 : standard grower ration supplemented with 5% QPM fodder, T_3 : standard grower ration supplemented with 10% QPM fodder mixed with required salt and mineral mixtures similar to standard diet (Table 1). QPM (Shaktimaan-5) fodder was harvested at flowering stage when cobs reached milk stage. It was cut into small pieces before mixing with concentrate feed. The nutrient requirement of pigs was made as per BIS [11]. The pigs were fed on the experimental grower rations twice daily in the morning and evening. The experiment was conducted for a period of three months. Digestibility trial was conducted at the end of the experiment. The lysine and methionine are balanced in all the rations as per requirement. The calculated [12] energy (ME, Kcal/kg) of experimental diet was 3345, 3327.9 and 3321.8 respectively in T_1 , T_2 and T_3 group. Proximate composition was done as per AOAC [13].

Ingredients	T_1	T_2	T_3
	Parts	Parts	Parts
Maize grain	60.0	55.0	50.0
Wheat bran	12.0	12.0	12.0
Maize fodder	0.0	5	10.0
Soyabean meal	15.0	15.0	15.0
G.N. Cake	11.5	11.5	11.5
Mineral mixture	1.0	1.0	1.0
Salt	0.5	0.5	0.5
Total, Kg	100.0	100.0	100.0
Lysine	100g	100g	100g
Phytase	20g	20g	20g

Table 1: Ingredient composition (w/w) of experimental diet.

T_1 = Grower ration containing 0 % maize fodder, T_2 = Grower ration containing 5% maize fodder,

T_3 = Grower ration containing 10 % maize fodder by replacing maize grain.

Statistical analysis

Feed intake, nutrient digestibility, feed conversion ratio (feed gain ratio), feed cost per kg gain, average daily weight gain was subjected to a one-way ANOVA with experimental diet (T_1 , T_2 and T_3) as fixed effect as per Snedecor and Cochran [14]. Differences were considered significant when $P < 0.05$.

Results and Discussion

The protein content (% DM) of the ration was 18.63 ± 0.25 , 18.31 ± 0.02 and 18.37 ± 0.11 in T_1 , T_2 and T_3 respectively and that of QPM maize was 7.95 ± 0.04 . Nitrogen free extract content (% DM) of the ration was 67.10 ± 0.40 , 66.44 ± 0.59 and 65.56 ± 0.30 to in T_1 , T_2 and T_3 respectively and that of QPM maize was 46.26 ± 0.14 (Table 2). Similar nutritional composition of QPM maize fodder was reported by Vaswani., *et al.* [10] and Rodríguez., *et al* [15].

Ration	OM %	CP %	CF%	EE %	Ash %	NFE %
Maize fodder	90.65 ± 0.08	7.95 ± 0.04	32.84 ± 0.49	3.59 ± 0.31	9.35 ± 0.08	46.26 ± 0.14
T ₁	95.55 ± 0.33	18.63 ± 0.25	6.33 ± 0.33	3.48 ± 0.15	4.45 ± 0.33	67.10 ± 0.40
T ₂	94.99 ± 0.08	18.31 ± 0.02	6.63 ± 0.38	3.61 ± 0.28	5.01 ± 0.08	66.44 ± 0.59
T ₃	94.85 ± 0.23	18.37 ± 0.11	7.39 ± 0.11	3.54 ± 0.06	5.15 ± 0.23	65.56 ± 0.30

Table 2: Proximate composition of experimental diets.

T₁ = Grower ration containing 0 % maize fodder, T₂ = Grower ration containing 5 % maize fodder, T₃ = Grower ration containing 10 % maize fodder by replacing maize grain; OM = Organic matter, CP = Crude protein, CF = Crude fiber, EE = Ether extract, NFE = Nitrogen free extract.

The digestibility coefficient of DM ranged from 76.67 ± 3.99 to 85.44 ± 0.13 in T₃ to T₁ respectively other was within this range of variation. Similarly, CP digestibility was ranged from 85.09 ± 8.17 to 85.62 ± 3.73 in T₁ to T₃ respectively. The digestibility of OM, EE, CF and NFE also followed the same patterns (Table 3). Dry matter and NFE digestibility was reduced (P < 0.05) at 10% supplementation of QPM fodder in comparison to control and 5% supplementation of QPM maize fodder. Except protein and ether extract which showed not much variation in digestibility, all other nutrient digestibility decreased at higher level of QPM maize fodder which might be due to high crude fiber content of maize fodder that ‘resulted in increased rate of passage as well as entrapping of nutrients in the fiber that hamper their digestion in the gut as reported by Stanogias and Pearce [16] and Fevrier, *et al* [17].

Group	DM	OM	CP	EE	CF	NFE
T ₁	85.44 ^b ± 0.13	88.55 ± 1.04	85.09 ± 8.17	68.51 ± 2.93	75.53 ± 0.17	94.02 ^b ± 1.71
T ₂	82.21 ^b ± 0.75	86.10 ± 0.86	85.22 ± 4.47	72.56 ± 2.06	72.91 ± 3.26	89.93 ^b ± 1.05
T ₃	76.67 ^a ± 3.99	82.60 ± 7.28	85.62 ± 3.73	65.90 ± 2.91	66.25 ± 6.57	80.75 ^a ± 6.22
P Value	0.16	0.654	0.665	0.338	0.397	0.178

Table 3: Effect of supplementation of QPM maize fodder on digestibility coefficient of nutrient in Large White Yorkshire grower pigs.

T₁ = Grower ration containing 0% maize fodder, T₂ = Grower ration containing 5% maize fodder, T₃ = Grower ration containing 10% maize fodder by replacing maize grain; ^{a,b,c}: Superscript in a column differ significantly, p < 0.05.

The dry matter intake (g/d) ranged from 1319.40 ± 36.44 in T₁ to 1313.55 ± 22.62 in T₂ group. The average gain in weight (g/d) was ranged from 304.77 ± 27.57 in T₃ to 306.25 ± 29.53 in T₁ group. The FCR was ranged from 4.01 ± 0.39 in T₃ to 4.42 ± 0.50 in T₁ group (Table 4). Dry matter intake and growth also decreased insignificantly in QPM fed groups in comparison to control. However, FCR was improved in QPM maize fodder fed group. Decreased in feed intake on feeding of hydroponic maize fodder in weaned pigs was also reported by Adebisi, *et al* [18]. They had also found improvement in FCR in those pigs fed with 50:50 concentrate: hydroponic maize fodder and 100% concentrate feed. Similar to the present findings, Adebisi, *et al*. [18] also found higher feed intake. The feed cost per kg gain (Rs/kg gain) was reduced (P < 0.05) by Rs. in 5 and 10% supplementation of QPM maize fodder.

Conclusion

From this study, it is concluded that supplementation of QPM maize fodder to grower Large White Yorkshire pigs has economic benefit without affecting the growth and nutrient utilization and can be supplemented up to 5% in the diet of LWY pigs without affecting the performances.

Parameters	T ₁	T ₂	T ₃	P Value
DM intake, g/d	1319.40 ± 36.44	1313.55 ± 22.62	1316.70 ± 14.29	0.980
Initial weight, kg	40.93 ± 4.65	41.04 ± 3.36	40.67 ± 4.84	0.996
Final weight, kg	67.88 ± 2.34	67.94 ± 2.25	67.49 ± 4.43	0.990
ADG, g/d	306.25 ± 29.53	305.68 ± 22.42	304.77 ± 27.57	0.998
FCR	4.42 ± 0.50	4.15 ± 0.32	4.01 ± 0.39	0.661
Feed cost per kg gain, Rs	125.90 ± 14.13	118.19 ± 9.07	114.31 ± 11.13	0.661

Table 4: Effect of supplementation of QPM maize fodder on nutrient utilization in Large White Yorkshire grower pigs. T₁ = Grower ration containing 0% maize fodder, T₂ = Grower ration containing 5% maize fodder, T₃ = Grower ration containing 10% maize fodder by replacing maize grain; ^{a, b, c}: Superscript in a row differ significantly, *p* < 0.05.

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