

EFFECT OF SUPPLEMENTATION OF ENZYME COMPLEX ON GROWTH PERFORMANCE OF CROSSBRED PIGS

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Abstract: Eighteen numbers of 75% Large white Yorkshire crossbred (Large white Yorkshire X Desi) pigs were selected at the age of three months and were randomly divided into three groups each group comprising of six pigs. Group I was fed with concentrate feed without any supplementation, group II was fed with concentrate containing NSP-Protein enzyme complex @ 200 gm/ton and group III was fed with concentrate containing NSP-Protein enzyme complex @ 300 gm/ton. The enzyme complex when added in diet @ 200 gm/ton and @ 300 gm/ton releases 75 kcal and 112.5 kcal of metabolizable energy per kilogram and 1% and 1.5% of amino acids respectively. The initial and final body weight of the pigs fed with concentrate containing 0, 200 and 300 gm of enzyme mixture per ton of feed were 17.75 ± 0.67 , 17.83 ± 0.79 and 17.75 ± 0.77 kg and 69.83 ± 1.72 , 75.83 ± 2.48 and 82.33 ± 5.07 kg respectively. The treatment had significant influence on the body weight between different groups. The mean body weight gain of T1, T2 and T3 groups of pigs were 52.08 ± 1.42 , 58.00 ± 2.22 and 64.58 ± 4.54 kg respectively. T2 group gained 11.36% and T3 group gained 24.06% more weight compared to T1 group of pigs. The average daily weight gain of T1, T2 and T3 groups of pigs were 347.22 ± 9.44 , 386.67 ± 14.80 and 430.56 ± 30.23 kg respectively. The average feed intake during the trial period for T1, T2 and T3 group pigs were 282.70 ± 24.67 , 286.42 ± 32.15 and 302.32 ± 37.55 kg respectively. The enzyme supplemented groups (T2 and T3) had consumed more feed than the control (T1) group. However no significant difference was observed in average feed intake between these three groups. It was observed that pigs fed with concentrate containing NSP-Protein enzyme complex @ 300 gm/ton had better growth rate than the other groups.

Keywords: NSP-Protein enzyme, Crossbred pig, weight gain, feed efficiency.

Introduction

Numerous works have been conducted recently on the benefits of enzyme supplementation in swine. However, research work in India is very scanty. Very few authors have reported the benefits of NSP enzyme supplementation in pigs. Hence, this study was designed to assess the effect of NSP-Protein enzyme complex supplementation in grower pigs.

Materials and Methods

Eighteen numbers of 75% Large white Yorkshire crossbred (Large white Yorkshire X Desi) pigs were selected at the age of three months and were randomly divided into three groups

each group comprising of six pigs. Group I was fed with concentrate feed without any supplementation, group II was fed with concentrate containing NSP-Protein enzyme complex @ 200 gm/ton and group III was fed with concentrate containing NSP-Protein enzyme complex @ 300 gm/ton. By a process of solid-state fermentation, a selected strain of *Aspergillus Niger* is used to act in the animal's digestive system. The enzyme complex when added in diet @ 200 gm/ton and @ 300 gm/ton releases 75 kcal and 112.5 kcal of metabolizable energy per kilogram and 1% and 1.5% of amino acids respectively. All the three groups of pigs were maintained under uniform management condition and were fed with known quantity of feed and the feed left over on the next day was weighed to calculate the daily feed intake. Water was provided throughout 24 hours. Body weight was taken once in a month. The experiment was conducted for a period of five months.

The data collected were subjected to statistical analyses (Snedecor and Cochran, 1994) for interpretation.

Results and Discussion

The initial and final body weight of the pigs fed with concentrate containing 0, 200 and 300 gm of enzyme mixture per ton of feed were 17.75 ± 0.67 , 17.83 ± 0.79 and 17.75 ± 0.77 kg and 69.83 ± 1.72 , 75.83 ± 2.48 and 82.33 ± 5.07 kg respectively (Table 2). The treatment had significant influence on the body weight between different groups. The mean body weight gain of T1, T2 and T3 groups of pigs were 52.08 ± 1.42 , 58.00 ± 2.22 and 64.58 ± 4.54 kg respectively. T2 group gained 11.36% and T3 group gained 24.06% more weight compared to T1 group of pigs. Estko and Lotsyus (1987) reported that feeding of enzymes to the young pigs had increased the mean weight gain by 5 to 9 per cent than control.

The average daily weight gain of T1, T2 and T3 groups of pigs were 347.22 ± 9.44 , 386.67 ± 14.80 and 430.56 ± 30.23 kg respectively (Table 2). The average daily weight gain of T2 and T3 group was more compared to T1 group of pigs. There was significant difference in average daily gain between different groups. Ramesh *et al.*, (2011) reported that the pigs supplemented with multi-enzymes had significantly higher average daily weight gain over the control. Xuan *et al.*, (2001) reported that the average daily gain was numerically higher in pigs fed diets supplemented with enzyme than the control group fed without enzymes.

The average feed intake during the trial period for T1, T2 and T3 group pigs were 282.70 ± 24.67 , 286.42 ± 32.15 and 302.32 ± 37.55 kg respectively. The enzyme supplemented groups (T2 and T3) had consumed more feed than the control (T1) group. However no significant difference was observed in average feed intake between these three groups during the trial

period. Similar findings were reported by Kim *et al.*, (1998). They observed that supplementing cellulase enzyme to pigs had no effect on feed intake. Whereas, Bharathidhasan *et al.*, (2010) and Lei *et al.*, (2005) observed that the feed intake was significantly ($P < 0.05$) higher in enzyme supplemented groups than control.

The feed efficiency of T1, T2 and T3 groups were 5.29 ± 1.06 , 4.81 ± 0.99 and 4.49 ± 0.89 respectively. Feed efficiency was 9.07% and 15.12% better in T2 and T3 groups compared to T1 group. Ramesh *et al.*, (2011) observed improved feed efficiency of 5.39 to 7.90% and Thacker *et al.*, (1991) observed 8% in enzyme supplemented groups of pigs compared to control.

The cost of production/kg weight gain was Rs.8.16/- (8.57%) and Rs.13.73/- (14.42%) less in T2 and T3 groups than the control group. Bharathidhasan *et al.*, (2010) and Ramesh *et al.*, (2011) observed that the decrease in the cost of production/kg weight gain in pigs supplemented with multi-enzymes was 3.22 to 6.01% and 4.62% to 9.03% compared to control.

Table 1. Ingredients and chemical composition of diet of different treatment groups

Sl. No.	Ingredients %	Control (T1)	Enzyme @200g/ton (T2)	Enzyme @300g/ton (T2)
1	Yellow Maize	45	45	45
2	Cumbu	17	17	17
3	Wheat Bran	8	8	8
4	Deoiled ricebran	11	11	11
5	Soyabean meal	10.5	10.5	10.5
6	Dry fish	6	6	6
7	Mineral mixture	2	2	2
8	Salt	0.5	0.5	0.5
9	Enzyme mixture	0	200g/ton	300g/ton
	Nutrients			
1	CP %	16	16	16
2	Metabolizable Energy (Kcal/kg)	2754	2754	2754
3	Crude Fibre	5.96	5.96	5.96
4	Calcium %	1.04	1.04	1.04
5	Phosphoru%s	0.39	0.39	0.39
6	Lysine %	0.64	0.64	0.64
7	Methionine %	0.25	0.25	0.25

Table 2. Post-weaning performance of 75% Large White Yorkshire crossbred pigs

Sl. No.	Parameters	Control (T1)	Enzyme@200g/ton feed (T2)	Enzyme@300g/ton feed (T3)
1	Initial body weight (kg)	17.75 ± 0.67	17.83 ± 0.79	17.75 ± 0.77
2	Final body weight (kg)	69.83 ^a ± 1.72	75.83 ^b ± 2.48	82.33 ^c ± 5.07
3	Mean weight gain (Kg)	52.08 ^a ± 1.42	58.00 ^b ± 2.22	64.58 ^c ± 4.54
4	Average daily gain (gm/day)	347.22 ^a ± 9.44	386.67 ^b ± 14.80	430.56 ^c ± 30.23
5	Average Feed Intake (kg)	282.70 ± 24.67	286.42 ± 32.15	302.32 ± 37.55
6	Feed Efficiency	5.29 ± 1.06	4.81 ± 0.99	4.49 ± 0.89
7	Feed cost (Rs./kg)	18.00	18.10	18.15
8	Cost of production/kg weight gain (Rs.)	95.22	87.06	81.49

Row means bearing different superscripts differ significantly ($p < 0.05$).

Summary

This study was conducted to detect the effect of enzyme supplementation on the post-weaning performance of crossbred pigs. It was found that the body weight gain, average daily weight gain and feed intake was more in enzyme supplemented group than the control groups. There was significant difference found in body weight gain and average daily weight gain between the three groups. There was steep reduction of Rs.8.16/- and Rs.13.73/- per kg weight gain in pigs fed enzyme complex of 200 g/ton and 300 g/ ton compared to control group of pigs.

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