

DIETARY SUPPLEMENTATION OF BREWERY WASTE ON PERFORMANCE OF LARGE WHITE YORKSHIRE PIGS

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Abstract: A study was conducted to assess the influence of different levels of inclusion of dried brewer grains on the growth performance in Large White Yorkshire pigs under intensive system of management at Post Graduate Research Institute in Animal Sciences, Kattupakkam for a period of 140 days (61-201 days of age). Twenty four weaned Large White Yorkshire piglets were selected for the purpose of the study and were randomly divided into three groups comprising of eight piglets each and allotted as Group I (0 per cent dried brewer grains), Group II (15 per cent dried brewer grains) and Group III (30 per cent dried brewer grains). There was no significant difference in body weight between the treatment groups. At the end of the experiment (140 days), the final weight (kg) was 78.18 ± 5.05 (Group I), 79.56 ± 2.43 (Group II) and 77.43 ± 1.85 (Group III). The overall average daily weight gain (g) was 469.70 ± 40.02 , 479.60 ± 40.62 and 464.50 ± 43.98 for Group I, II and III respectively. Similarly there was no significant difference in the average daily feed intake between the treatment groups. The overall feed conversion ratio was 3.81 ± 0.48 , 3.29 ± 0.34 and 3.37 ± 0.32 and it did not differ significantly. It was concluded that the inclusion of dried brewer grains at 15 and 30 per cent level proved to be effective in reducing the feed cost with better growth.

Keywords: Growth, FCR, Economics, dried brewer grains, LWY pigs.

Introduction

Pig farming is one of the emerging livestock industries which will give quick economic return to the farmers. Among the various livestock species, piggery is most potential source of meat production and more efficient feed converters after the broiler. The pig can utilize wide variety of feed stuffs viz. grains, forages, damaged feeds and garbage and convert them into valuable nutritious meat. In pig farming, the feed cost accounts for about 80% of the total cost expenditure. To overcome the total cost, unconventional feeds can be added in the diet. By replacing, the unconventional feeds with maize or groundnut oil cake or sunflower oil cake can reduce the feed cost and this has the impact on growth performance. Hence this study was designed to assess the effect of dried brewery grains which is abundantly available in Chennai on the performance of LWY pigs.

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Methodology

Twenty four weaned Large White Yorkshire piglets were selected for the purpose of the study and were randomly divided into three groups comprising of eight piglets each and allotted as Group I (0 per cent dried brewer grains) as control, Group II (15 per cent dried brewer grains) and Group III (30 per cent dried brewer grains). In each group, equal numbers of male and female piglets were taken and all the males were castrated. The trial was conducted for a period of 140 days (61-201 days of age). Standard managerial practices were followed with regards to health care of piglets. Feed samples were analysed for their nutrient composition to calculate effective inclusion of dried brewery grains. Data on average daily feed intake, fortnightly body weight, average daily weight gain and feed conversion ratio. Cost of production on feed basis were calculated at the end of the experiment. The collected data were statistically analyzed by One Way ANOVA by using SPSS 20. The significance was tested using Duncan's multiple range test (Duncan, 1955).

Results and Discussion

Fortnightly body weight

The fortnightly bodyweight (kg) of Large White Yorkshire pigs fed with 0, 15 and 30 per cent inclusion level of dried brewer grains (Table 1) did not show any significant difference between the treatments groups. This is in accordance with the findings of Young *et al.* (1967) who observed that there was no significant difference between the average growth rates of pigs received upto 50 per cent inclusion of dried brewer's grain. In contrast, Kornegay (1973) who reported that higher levels of brewer dried grains in the diet depressed the growth rate of pigs. However, there was slight increasing trend in body weight at 15 per cent inclusion of dried brewer grains. This concurs with the observations of Rijal *et al.* (2009) who observed that decreasing trend of live weight from fourth fortnight to sixth fortnight study period with increasing levels of dried brewer grains.

Average Daily Weight Gain

The average daily weight gain (g) of Large White Yorkshire pigs fed with 0, 15 and 30 per cent inclusion level of dried brewer grains (Table 2) in swine grower and finisher diet showed no significant difference between the treatment groups. This might be due higher protein content in the dried brewer grains (28.62 %) contributed for the better growth rate while replacing with maize. This is in agreement with the findings of Young *et al.* (1967) who observed no significant difference in average daily weight gain of pigs with varying level of inclusion of dried brewer's grains in pigs. In contrary to the above findings, Yaakuge

et al. (1994) who reported that dried brewer grains added up to 36 per cent level for finishing period of pigs showed decreasing in weight gain with increase in inclusion in the diet.

Average Daily Feed Intake

The average daily feed intake (kg) of Large White Yorkshire pigs fed with 0, 15 and 30 per cent inclusion level of dried brewer grains (Table 3) found that there was no significant difference between the treatments groups. This might be due to the fact that palatability of the diet was not changed by inclusion of dried brewer grain in the grower-finisher ration. Similar findings also reported by Zhu *et al.* (2010) reported that the inclusion of distiller dried grains with soluble up to 30 per cent had no significant effect on average daily feed intake of 10-23 kg grower pigs compared to control diet fed pigs. On the contrary, Amaefule *et al.* (2006) observed that daily feed intake did not significantly differ between the pigs fed with control and brewer dried grains diet and concluded that 30 per cent brewer dried grain diet significantly reduced daily feed intake with significantly increased Feed conversion ratio of pigs.

Feed Conversion Ratio

Feed conversion ratio (kg) of Large White Yorkshire pigs fed with 0, 15 and 30 per cent inclusion level of dried brewer grains (Table 4) found that there was no significant difference in feed conversion ratio in pigs between the treatment groups. This may be due to quality of dried brewer grains is adequate to support better feed intake and there by improved feed conversion efficiency in spite of its higher crude fiber content in dried brewer grains (16.53 %) . However, the overall feed conversion ratio seems to be better in dried brewer grains fed groups. This finding concurred with observation of Amaefule *et al.* (2006) stated that there was significant increase in feed conversion ratio of pigs when fed with 35 per cent brewer dried grain diet. In contrary, many researchers reported that there was poor conversion efficiency with increasing level of inclusion of dried brewer grains in the diet of pigs. (Aro and Tewe., 2006; Whitney *et al.*, 2006; Spencer *et al.*, 2007 and Chu *et al.*, 2011).

Economics

The cost of production of pigs on feed basis (Table 5) were worked out by incorporating bodyweight gain, feed cost and feed conversion ratio. It was found that the cost of production per kg gain for the three groups were ₹106.68, 83.56 and 84.68 respectively. The net gain per kg production in the treatment group (group II and group III) was ₹ 23.12 and 22.00 respectively. From the results, it can be concluded that inclusion of brewery waste at 15 and 30 per cent level proved to be effective in reducing feed cost by ₹ 23.12 and 22.00.

Similar findings was reported by many authors at different levels of inclusions in the grower-finisher ration of pigs (Zhu *et al.*,2005; Amaefule *et al.*,2006; Chu *et al.*,2011).

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Table 1. Fortnightly bodyweight (kg) of Large White Yorkshire pigs

FORTNIGHT INTERVAL	Dried brewer grains			<i>p</i> value
	0 % Group I	15 % Group II	30 % Group III	
Weight at 61 th day	12.35 ± 1.09	12.36 ± 0.74	12.33 ± 0.48	0.99
Weight at 75 th day	16.73 ± 1.56	16.62 ± 1.02	16.11 ± 0.66	0.91
Weight at 89 th day	21.12 ± 2.09	21.25 ± 1.38	20.37 ± 0.87	0.91
Weight at 103 th day	26.50 ± 2.28	26.56 ± 1.54	25.37 ± 0.84	0.85
Weight at 117 th day	32.25 ± 2.57	32.06 ± 1.74	30.43 ± 1.02	0.76
Weight at 131 th day	38.25 ± 2.95	38.55 ± 2.95	37.06 ± 1.36	0.88
Weight at 145 th day	47.12 ± 3.25	47.75 ± 2.08	46.06 ± 1.32	0.78
Weight at 159 th day	53.18 ± 3.28	54.62 ± 2.10	52.25 ± 1.50	0.77
Weight at 173 th day	62.18 ± 3.60	63.68 ± 2.12	61.06 ± 1.53	0.91
Weight at 187 th day	70.81 ± 4.52	71.12 ± 2.29	69.37 ± 1.85	0.90
Body weight at 201th day	78.18 ± 5.05	79.56 ± 2.43	77.43 ± 1.85	0.90

Mean of 8 observations; Values not significant

Table 2. Average daily weight gain (g)

FORTNIGHT INTERVAL	Dried brewer grains			<i>p</i> value
	0 % Group I	15 % Group II	30 % Group III	
1	313.00 ± 0.41	304.00 ± 0.02	269.00 ± 0.01	0.57
2	313.00 ± 0.04	330.00 ± 0.02	304.00 ± 0.01	0.83
3	383.00 ± 0.02	379.00 ± 0.02	357.00 ± 0.02	0.74
4	410.00 ± 0.02	392.00 ± 0.02	361.00 ± 0.03	0.49
5	428.00 ± 0.05	463.00 ± 0.03	473.00 ± 0.03	0.75
6	633.00 ± 0.06	657.00 ± 0.31	642.00 ± 0.02	0.93
7	433.00 ± 0.04	491.00 ± 0.03	442.00 ± 0.02	0.51
8	642.00 ± 0.05	647.00 ± 0.03	629.00 ± 0.03	0.95
9	616.00 ± 0.08	531.00 ± 0.03	593.00 ± 0.04	0.58
10	526.00 ± 0.11	602.00 ± 0.03	575.00 ± 0.02	0.73
Overall	469.70 ± 40.02	479.60 ± 40.62	464.50 ± 43.98	0.96

Table 3. Average daily feed intake (kg)

FORTNIGHT INTERVAL	Dried brewer grains		
	0 % Group I	15 % Group II	30 % Group III
1	0.46 ± 0.01	0.46 ± 0.01	0.46 ± 0.01
2	0.71 ± 0.01	0.70 ± 0.02	0.70 ± 0.02
3	0.95 ± 0.01	0.95 ± 0.01	0.95 ± 0.01
4	1.20 ± 0.15	1.20 ± 0.13	1.20 ± 0.13
5	1.46 ± 0.14	1.45 ± 0.14	1.45 ± 0.16
6	1.70 ± 0.14	1.70 ± 0.15	1.69 ± 0.14
7	1.93 ± 0.13	1.95 ± 0.13	1.94 ± 0.14
8	2.17 ± 0.15	2.21 ± 0.14	2.19 ± 0.14
9	2.47 ± 0.31	2.47 ± 0.29	2.46 ± 0.30
10	2.91 ± 0.21	2.91 ± 0.23	2.89 ± 0.23
Overall	1.60 ± 0.24	1.60 ± 0.25	1.59 ± 0.24

Table 4. Feed conversion ratio

FORTNIGHT INTERVAL	Dried brewer grains			<i>p</i> value
	0 % Group I	15 % Group II	30 % Group III	
1 ^{NS}	1.69 ± 0.23	1.62 ± 0.14	1.75 ± 0.09	0.85
2 ^{NS}	2.60 ± 0.36	2.25 ± 0.19	2.37 ± 0.13	0.60
3 ^{NS}	2.58 ± 0.20	2.61 ± 0.20	2.80 ± 0.22	0.73
4 ^{NS}	3.06 ± 0.28	3.17 ± 0.25	3.50 ± 0.29	0.52
5 ^{NS}	4.51 ± 1.32	3.29 ± 0.28	3.19 ± 0.23	0.43
6 ^{NS}	3.05 ± 0.55	2.63 ± 0.13	2.67 ± 0.11	0.62
7 ^{NS}	5.82 ± 1.75	4.13 ± 0.31	4.52 ± 0.29	0.49
8 ^{NS}	3.70 ± 0.56	3.49 ± 0.19	3.55 ± 0.19	0.92
9 ^{NS}	4.66 ± 0.74	4.81 ± 0.33	4.27 ± 0.29	0.73
10 [*]	6.52 ± 0.69 ^b	4.93 ± 0.26 ^a	5.11 ± 0.26 ^a	0.04
Overall	3.81 ± 0.48	3.29 ± 0.34	3.37 ± 0.32	0.59

Mean of 8 observations; NS-not significant

*Mean values bearing different superscript in a row differ significantly ($p < 0.05$)

Table 5. Cost of production of pigs

PARAMETERS	Dried brewer grains		
	0 % Group I	15 % Group II	30 % Group III
Number of pigs	8	8	8
Total initial body weight (kg)	98.80	98.90	98.70
Total final body weight (kg)	625.50	636.50	619.50
Total weight gain (kg)	526.70	537.60	520.80
Total feed intake (kg)	1923.01	1928.06	1917.91
Total feed cost (₹)	53844.31	48972.75	48203.62
Cost of feed per kg (₹)	28.00	25.40	25.13
Feed conversion ratio	3.87	3.29	3.37
Cost of production on feed basis (FCR x cost of feed/kg (₹))	106.68	83.56	84.68
Net gain per kg production (₹)	-	23.12	22.00

Table 6: Ingredient composition (% DMB) of grower rations fed to LWY pigs

Ingredients (%)	Dried brewer grains		
	0 % (Group I)	15 % (Group II)	30 % (Group III)
Maize	56.70	48.20	39.75
Dried brewer grains	0.00	8.55	17.00
Deoiled rice bran	0.70	12.52	14.15
Sunflower oil cake	12.00	0.00	0.00
Soyabean meal	21.50	21.80	18.40
Vegetable oil	6.50	6.26	8.00
Mineral mixture	2.00	2.00	2.00
DL-methionine	0.10	0.10	0.10
L-Lysine	0.00	0.07	0.10
Salt	0.50	0.50	0.50
Total	100	100	100

Table 7: Ingredient composition (% DMB) of finisher rations fed to LWY pigs

Ingredients (%)	Dried brewer grains		
	0 % (Group I)	15 % (Group II)	30 % (Group III)
Maize	54.30	46.20	38.00
Dried brewer grains	0.00	8.20	16.30
Deoiled rice bran	3.57	19.50	22.00
Sunflower oil cake	20.00	0.00	0.00
Soyabean meal	11.50	15.70	12.00
Vegetable oil	8.00	7.70	9.00
Mineral mixture	2.00	2.00	2.00
DL-methionine	0.10	0.10	0.10
L-Lysine	0.03	0.10	0.10
Salt	0.50	0.50	0.50
Total	100	100	100

Both rations formulated based on nutritive values of individual ingredients